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Public Concern and Measurements of Noise in the City

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Editor's Note: *I wish to thank NoiseNewsInternational.net for permission to reprint this article by Walter Montano for the opportunity to share this article with a Canadian audience. Mr. Montano points out that it was Greenville Kleiser (born in Toronto) who was the person, who started in 1927, to advocate for having a "week of silence." Used with permission from the January 2022 issue of NoiseNewsInternational.net.*

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1. INTRODUCTION

This article on historical facts in acoustics, centered on the subject of noise and health, is the final in the series that began with the article of the first anti-noise groups in 1895 and the first international anti-noise convention of 1908 (Montano, 2021-a), and goes up to 1950 when the first urban zoning ordinances were published which established noise limits with numerical values in decibels. These articles have been prepared to contribute to both the 50th anniversary of International Institute of Noise Control Engineering and to the International Year of Sound (IYS2020+), and are intended to rescue from history events and circumstances in relation to noise and sound. They are based on published content from newspapers, magazines, journals, and pamphlets. This is a good way to see and study human behavior in the face of technological and scientific advances in acoustics and gain an impression of what society considered were the effects of noise on the daily lives of people in cities and in their workplaces.

As discussed below, an important milestone year for acoustics was1937when in June-July the Première Conférence Internationale de l'Acoustique took place at Paris. This meeting was organized by the International Federation of National Standards Associations, also known as 'International Standards Associations-ISA' (now known as ISO). In this article is transcribed a summary because it is important to rescue what was discussed in the technical committees. It took some time following this meeting before noise limits in decibels were first included in a noise ordinance; this was in Chicago in 1950 and even octave-band frequency limits were included.

In this article, some of the historical events leading up to the creation of this noise ordinance will be discussed as well as some activities that could be considered in the coming years.

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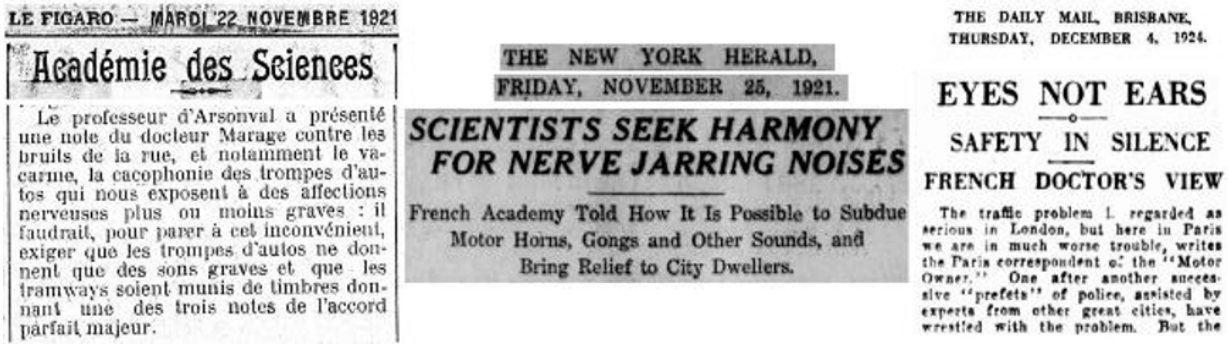
2. ACTIONS REGARDING CONCERN ABOUT HEALTH EFFECTS OF NOISE

There are some publications of the 19th century which prescribed having a ‘silence week’ for mental rest and religious pamphlets which recommended of having a ‘week of silence’ to communicate with God, but it was not until the 20th century that the problem of noise on people’s health was taken into account by medicine and engineering, The previous articles published in NNI (Montano, 2021-a; 2021-b; 2021-c) discuss the process by which different individual actions developed into movements that proposed ongoing actions. This chapter presents the actions that, in the author’s opinion, stand out from the rest and especially the proposal for an “anti-noise day” each year, in order to reflect on the health problems derived from ongoing noise exposure.

2.1 The Académie des Sciences and its fight against noise problems in 1921

At a meeting of the French Academy of Sciences November 1921, a lecture was presented by Dr. Georges René Marage (1859-1930) in which he warned of the brain and mental problems derived from street noise, and that the ear consequently shows a loss of sensitivity. Dr. Marage was an otologist and a prolific inventor; he presented in 1901 the first synthetic talking machine (Marage, 1901).

Many newspapers around the world (see Figure 1) replicated his lecture, and The Boston Sunday Globe of December 18, 1921, published a large article explained the Dr. Marage’s statements: “*He declared that the noises of apartment houses are the most harmful to both spiritual and physical dispositions*”. As a countermeasure to the effects of the noise. Dr. Marage said that “*a small, low-toned electric motor, placed inside a box within one's room should be set going the moment the disturbing noises commence. The low vibrations thus sent out, do not injure the tympanum of the ear, and do prevent the other noises from accomplishing their destruction.*”



LE FIGARO — MARDI 22 NOVEMBRE 1921

Académie des Sciences

Le professeur d'Arsonval a présenté une note du docteur Marage contre les bruits de la rue, et notamment le vacarme, la cacophonie des trompes d'autos qui nous exposent à des affections nerveuses plus ou moins graves : il faudrait, pour parer à cet inconvénient, exiger que les trompes d'autos ne donnent que des sons graves et que les tramways soient munis de timbres donnant une des trois notes de l'accord parfait majeur.

THE NEW YORK HERALD,
FRIDAY, NOVEMBER 25, 1921.

SCIENTISTS SEEK HARMONY FOR NERVE JARRING NOISES

French Academy Told How It Is Possible to Subdue Motor Horns, Gongs and Other Sounds, and Bring Relief to City Dwellers.

THE DAILY MAIL, BRISBANE, THURSDAY, DECEMBER 4, 1924.

EYES NOT EARS

SAFETY IN SILENCE

FRENCH DOCTOR'S VIEW

The traffic problem is regarded as serious in London, but here in Paris we are in much worse trouble, writes the Paris correspondent of the "Motor Owner." One after another successive "prefets" of police, assisted by experts from other great cities, have wrestled with the problem. But the

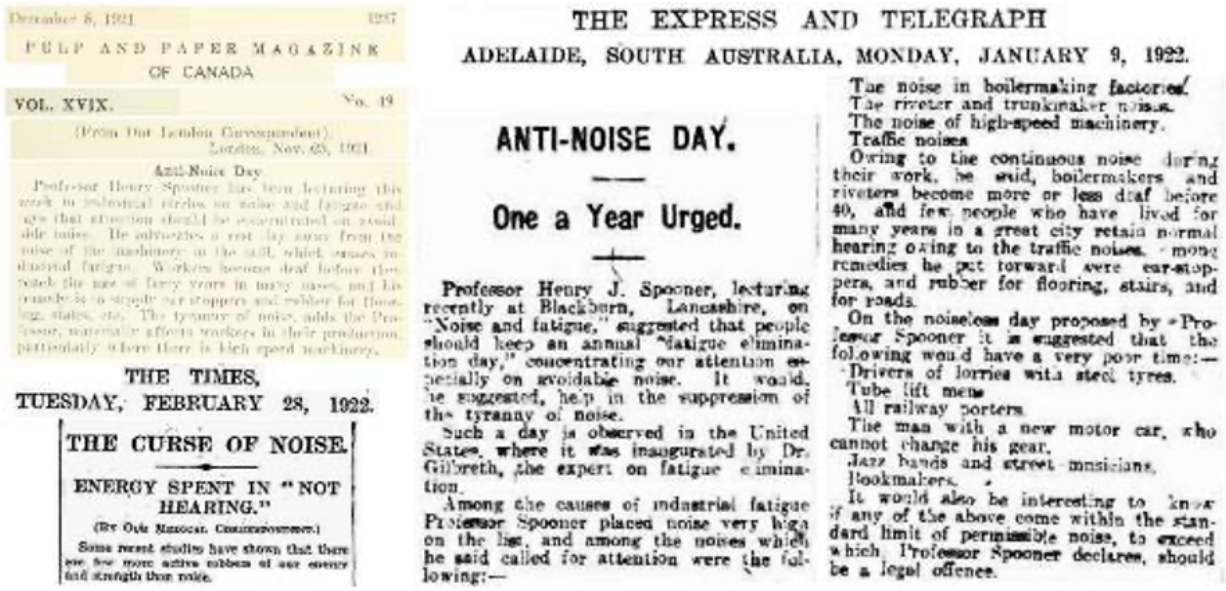
Fig. 1: Some mentions on media about the French Academy of Sciences statements on noise.

For the first time not only were the health problems from home/urban noises identified, but also an acoustic design for a solution. Finally, Dr. Marage suggested that “*it was the duty of the Government, out of regard to future generations, to introduce restrictive measures before the nerves of parents are finally ruined*.” This is an important political argument, considering the year

in which it was written, because if governments are the ones who decide that there should be more vehicles and more household appliances, it is also their responsibility that these decisions do not make people sick and deaf.

2.2 Henry Spooner and his proposal of 1921

The first suggestion of a “Day of Silence” or “Anti-noise Day” or similar activity, was in November 1921 by Henry John Spooner (1856-1940), a prominent industrial engineer from England who was dedicated to promoting awareness of the problems of noise in industries. Spooner took the idea from the “Day of Elimination of Fatigue” that was celebrated every December 5 since 1916 in several US Colleges (Spooner, 1922). His idea of a day for reflection on noise problems being held annually on a specific date caused great impact in the media for industrial issues (see Figure 2). It is possible to find many references to having an “Anti-noise Day” at workplaces based on his suggestion. Spooner was a Member of the International Committee on Industrial Fatigue and in all his speeches he asked for such a day to be declared.



PULP AND PAPER MAGAZINE OF CANADA

VOL. XVIX. No. 19

Anti-Noise Day

Professor Henry Spooner has been lecturing this week to industrial circles on noise and fatigue and says that attention should be concentrated on avoidable noise. He advocates a rest day away from the noise of the machinery in the mill, which causes industrial fatigue. Workers become deaf before they reach the age of forty years in many cases, and he remarks in regard to stopple ear stoppers and rubber for flooring, stairs, etc. The tyranny of noise, adds the Professor, universally affects workers in their production, particularly where there is high speed machinery.

THE TIMES, TUESDAY, FEBRUARY 28, 1922.

THE CURSE OF NOISE.

ENERGY SPENT IN "NOT HEARING."

(By Our Manchester Correspondent.)

Some recent studies have shown that there are few more active subjects of our energy and strength than noise.

THE EXPRESS AND TELEGRAPH

ADELAIDE, SOUTH AUSTRALIA, MONDAY, JANUARY 9, 1922.

ANTI-NOISE DAY.

One a Year Urged.

Professor Henry J. Spooner, lecturing recently at Blackburn, Lancashire, on "Noise and fatigue," suggested that people should keep an annual "fatigue elimination day," concentrating our attention especially on avoidable noise. It would, he suggested, help in the suppression of the tyranny of noise.

Such a day is observed in the United States, where it was inaugurated by Dr. Gilbreth, the expert on fatigue elimination.

Among the causes of industrial fatigue Professor Spooner placed noise very high on the list, and among the noises which he said called for attention were the following:—

The noise in boilermaking factories.
The riveter and trunkmaker noises.
The noise of high-speed machinery.
Traffic noises.

Owing to the continuous noise during their work, he said, boilermakers and riveters become more or less deaf before 40, and few people who have lived for many years in a great city retain normal hearing owing to the traffic noises. Among remedies he put forward were ear-stoppers, and rubber for flooring, stairs, and for roads.

On the noiseless day proposed by Professor Spooner it is suggested that the following would have a very poor time:—

Drivers of lorries with steel tyres.
Tube lift men.
All railway porters.
The man with a new motor car, who cannot change his gear.
Jazz bands and street musicians.
Bookmakers.

It would also be interesting to know if any of the above come within the standard limit of permissible noise, to exceed which Professor Spooner declares, should be a legal offence.

Fig. 2: Press reactions to Spooner's proposal of having an “Anti-noise day”

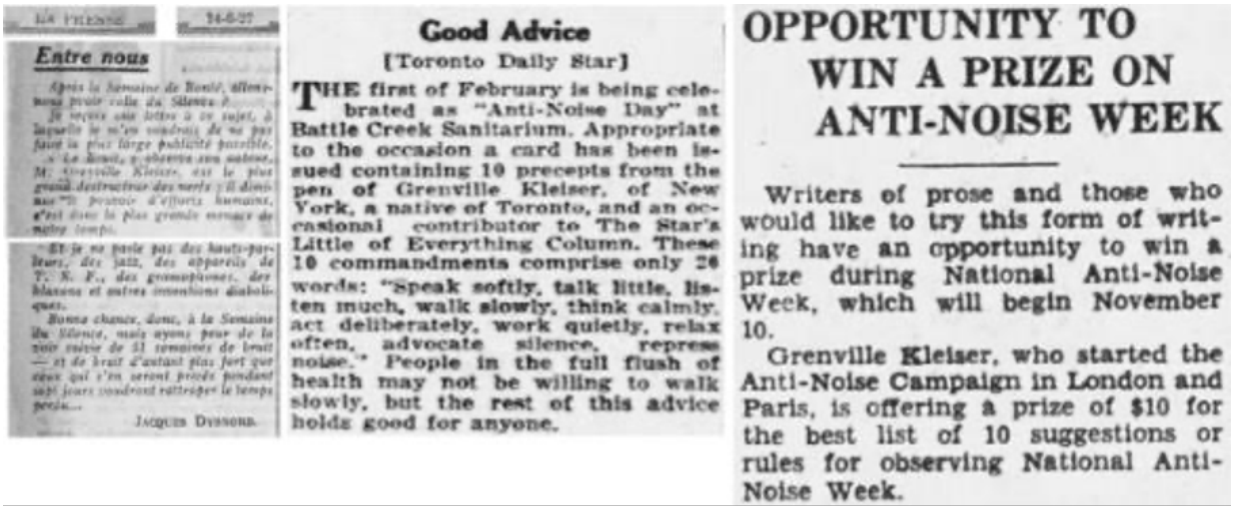
His influential lecture “*Health problems involved in noise and fatigue. Rhythms, cadences, periodicities regulate human activities, but noise lessens the aptitude for work*” delivered at the Public Hall, Blackburn, Lancashire, England, on November 21, 1921, is available on Internet (Spooner, 1922). Some background on Spooner was presented, by the author, in NNI magazine of October 2021 (Montano, 2021-c).

The author has found a very curious coincidence, which on November 21, 1921, René Marage in France, and Henry Spooner in England, both presented lectures on the health problems of noise, although approached from different points of view. So far, the author has found no references that they had personal contact.

2.3 Grenville Kleiser and his proposition for anti-noise week on 1927

Grenville Kleiser (1868-1935) a Canadian Methodist preacher suggested an “Anti-Noise Week” which he presented in a manifesto entitled “The power of silence.” Kleiser sent letters in June 1927

to the mayors and media editors (see Figure 3) of the world's largest cities asking for practical cooperation in generating a movement of "*An Anti-Noise Week held once a year will mean to the community an economic gain in thought, feeling, energy, health, etc.,*" ending his suggestion with "*The elimination of unnecessary noise does not imply absolute silence or inertia, but greater poise and power to do more efficient work. A crusade against noise is one of the greatest needs of our time*" (Editor, 1927). Today the original Kleiser pamphlet could not be found, but references are given in the "Methodist Protestant Herald" (Editor, 1927).



Entre nous

Good Advice

[Toronto Daily Star]

THE first of February is being celebrated as "Anti-Noise Day" at Battle Creek Sanitarium. Appropriate to the occasion a card has been issued containing 10 precepts from the pen of Grenville Kleiser, of New York, a native of Toronto, and an occasional contributor to The Star's Little of Everything Column. These 10 commandments comprise only 20 words: "Speak softly, talk little, listen much, walk slowly, think calmly, act deliberately, work quietly, relax often, advocate silence, repress noise." People in the full flush of health may not be willing to walk slowly, but the rest of this advice holds good for anyone.

OPPORTUNITY TO WIN A PRIZE ON ANTI-NOISE WEEK

Writers of prose and those who would like to try this form of writing have an opportunity to win a prize during National Anti-Noise Week, which will begin November 10.

Grenville Kleiser, who started the Anti-Noise Campaign in London and Paris, is offering a prize of $10 for the best list of 10 suggestions or rules for observing National Anti-Noise Week.

Fig. 3: Some media reaction on Kleiser proposal (France, 1927) (Toronto, 1928) (Bangor Daily News-Maine, 1935)

2.4 Early efforts to have an "Anti-noise week"

Given the vast information that exists in US, Australasian, and European newspapers of those years, here we only list the countries and the corresponding year in which they implemented the annual "Day of Silence". These were based on the suggestions by Kleiser for an anti-noise week. In 1927 the London and Paris media 'voiced' the implementation of Kleiser's idea but only for one day, and there is no mention of the actual implementation of this proposal.

In Australia, in 1928, the "Melbourne Noise Abatement League" (MANL), within the "Health Week" organized by the municipality every year, for the first time presented the problems of noise in school children. In the 1930s, other cities in Australia held an activity with the theme of the "Week of silence" (Montano, 2020). For the case of the rest of Australasian cities, dozens of references are found in the search engines of newspapers of those, but full access to those articles is not yet available.

There is a report published in the magazine of the "North Central Association of Colleges and Schools" (North, 1929), in which mention is made of a proposal for an "Anti-noise Week" as an extracurricular educational activity for educational institutions in nineteen US States. This is interesting because in that year the only reference found about the anti-noise week is that of Kleiser, so it could be speculated that they were aware of the movement initiated by him.

During the 1930s many French cities organized their own "Week of Silence" (under Kleiser's idea), and these were also replicated in Asian and African cities where France had its colonial enclaves. In Germany and Italy in the 1930s some cities adopted a "Day of Silence" or "Week of Silence," for which the foreign press of the time claimed was due more to political reasons than to

concern over public health.

2.5 “Anti-noise” campaigns around the world

After New York City’s 1930 campaign against urban noise ?a complete explanation of this campaign is presented in Thompson (2002) ?, similar actions were replicated in major cities around the world as anthropogenic noise became more prevalent. In part this is because listening to music became the only source of free entertainment available to people, due to the 1930’s worldwide economic crisis. The second source of annoying noise was identified as the abusive use of car horns. If we consider that in the 1920s and 1930s newspapers were the main source of information for people, journalists were interested in keeping the attention of readers, so reproducing strange news transmitted by press agencies was routine. So, it was possible to read about anti-noise campaigns in distant cities in those years. Since it is always assured that “anti-noise actions were carried out all over the world,” the author transcribes some ‘curious news’ that he could find in newspapers, as examples of the reactions of the media to this issue:

- January 25, 1928, the Bakersfield Californian (California, US): “*Santiago Proclaims War Against Noise*” ? “*Chile. War has been declared on noise here. An ordinance passed by the city authorities provides fines and jail sentences for those who conduct their activities without due regard for peace and quiet*.”
- November 3, 1929, the Jopling Globe (Missouri, US): “*No practice toots on Havana cornets*” ? “*The anti-noise crusade, inaugurated several weeks ago, has proved troublesome to purchasers of musical instruments of the wind variety... The ordinance is applied also to tin horns and penny whistles for children.*”
- November 27, 1929, the Portsmouth herald (New Hampshire, US): “*Copenhagen. Burgomaster Kaper has followed the example of executives of other large cities and started an anti-noise crusade. He has asked the city council to ban phonographs, radio loud-speakers and yelling street vendors*.”
- July 31, 1930, the Altoona Mirror (Philadelphia, US): “*Moving to quiet Istanbul noises*” ? “*The campaign against noise has Just been launched with the Istanbul that the municipality's street peddlers suggestion use mellow musical instruments, instead of their one thousand and one deafening cries*.”
- November 23, 1930, The Sunday Star (Washington DC): “*Ban street noises. Advertising loud-speakers are forbidden in Brussels. Burgomasters of the localities situated on the outskirts of the Belgian capital decided to recommend the general application of a Brussels police regulation against street noises*.”
- February 19, 1931, The Evening Star (Washington DC): “*Traffic noises scored Mexico City*” ? “*The League for the Defense of Pedestrians today requested to head of the District Traffic Department, to establish a ‘dictatorship’ against noise, as a public health measure. The league asserted that traffic noise is responsible for deafness and cerebral disorders. Impedes concentration of thought and retards mental development of children*.”
- October 18, 1932, Indianapolis Times (Indiana, US): "*Noise Budapest Citizens Form League to Obtain Lots of Quiet. Prominent citizens have decided to rid the city of noise caused by loudspeakers and street traffic ... and the first step in their campaign has been to secure the co-*

operation of all inhabitants."

- October 4, 1934, The Singapore Free Press and Mercantile Advertiser "*Penang street noises*" ? "*Penang police are waging a campaign of their own towards the silencing of street noises. Specially selected men are stationed at strategic points and take the numbers of offending cars. The owners receive a traffic notice*."
- January 20, 1935, the Chattanooga Daily Times (Tennessee, US): "*Noise measurements seen for Stockholm*" ? "*Policemen equipped with machines for measuring traffic din are visualized by a Stockholm professor, who says he will propose a low to limit the amount of permissible noise*."
- July 10, 1935 the Delphi Journal (Indiana, US): "*Finland silenced motor horns, streetcar bells, traffic whistles, hand organs, and the cries or hucksters, newsboys, and sidewalks orators*."
- July 12, 1935, the Nieuwe Schiedamsche Courant (Schiedam, Netherlands): "*Zurich is also going to fight noise. The first experiences. As in other major cities in Europe, the battle against noise has been fought in Zurich. The first week of July was dominated by the anti-noise campaign*."
- September 9, 1935, The Lethbridge Herald (Alberta, Canada): "*Bombay too noisy*" ? "*H. E. Ormerod. President of the Western India Automobile Association has sponsored an 'anti-noise' campaign in Bombay, motorists being asked to restrict the use of horns*."
- February 1, 1936, the Kingston Gleaner (Jamaica): one letter to the editor asked of having "*an aggressive 'anti-noise' campaign, directed against auto horns...*"
- June 14, 1936, The Charleston Gazette (West Virginia, US): "*Riga Rests in Silence Week*: *Much refreshed after peaceful slumbers during the city's 'Noiseless Traffic week,' officials of Riga make the plan permanent. During the seven days auto horns, streetcar bells and other sound signals were forbidden completely night or day*."
- November 23, 1936, the New York Times: "*Lima Forbids Peddlers to Use Noise-Makers* ? *Peru. Lima's anti-noise campaign has resulted in an ordinance forbidding street peddlers to use horns, whistles or bells to draw attention*."

2.6 The "Anti-noise week" in the Netherlands

There is a lot of information available about the activities that took place among 1934 and 1937 that has been rescued in recent years by the Dutch Acoustical Society. There is also a large data base at Max Planck Institute for the History of Science website, with some explanatory notes in English (Institute, 2018). The author in this article only discusses some media items on the anti-noise actions (see Figure 4), because the archives mentioned above only store the valuable documents but not the newspapers that mention them.


DAGBLAD DE LOCOMOTIEF 28 November 1934

Onder groote belangstelling is 8 November te Delft het eerste „Anti-Lawaai Congres" gehouden. — Op het sprekersbuffet de chef der Amsterdamsche Verkeerspolitie, commissaris C. Bakker, die een rede hield, getiteld: „De bestrijding van het straatlawaai, bezien van politioneel standpunt"; onder het auditorium (tweede van rechts) de bekende geluidsspecialist prof. A. D. Fokker.

DE ABONNEMENTSPRIJS van de NIEUWE SCHIEDAMSCHE COURANT

DINSDAG 29 OCTOBER 1935

DE ANTI-LAWAAI-CAMPAGNE.

De „stilte-zône" wordt uitgebreid.

De Hoofd-Commissaris van Politie verzoekt opname van met navolgende: De sedert Maandag 21 October j.l. ingezette anti-lawaaicampagne heeft, dank zij een bewonderenswaardige medewerking van het publiek, in de z.g. „stille-zône" (Vierambachtsstraat, 2e Middellandstraat en Middellandplein) successen afgeworpen. Deze successen zijn van dien aard.

Woensdag 22 April 1936

Het tweede Anti-lawaai Congres te Delft. Ir. C. Boot tijdens het uitspreken van zijn rede.

Fig. 4: Some mentions about the “anti-noise week” in the Netherlands

2.7 The US “Noise Abatement Week”

In the mid 1940’s, a group of professionals from the Acoustical Society of America (ASA) created the “National Noise Abatement Council,” with the purpose of making the population aware of the problems of noise on health (among other issues). Several activities then promoted a “Noise Abatement Week,” suggested to be held once a year (Little & McGee, 1942). The first edition had a modest beginning on 21-28 October, 1940, but achieved prominence with the large number of mentions in the press.

One interesting feature in the US media occurred in Hartford City (capital of Connecticut) and published in the Hartford Courant newspaper of September 27, 1940 (see Figure 5). As the mayor was absent due to health problems, Lillian L. Malley (1910-1999) took office, becoming the first woman mayor of that city and she had the honorable task of signing the proclamation (see Figure 5) in which the city adhered to the “Noise Abatement Week” from October 21?26, 1940, thus becoming the first US city to officially join the initiative.



Fig. 5: Miss Malley signing the proclamation of the Hartford City Noise Abatement Week, 1940.

The “Noise Abatement Week” was adopted in many US cities, spreading the publicity with a very famous poster at national level (see Figure 6), designed by the National Noise Abatement Council, which was displayed in more than 200 US cities from June 1 to 7, 1941.

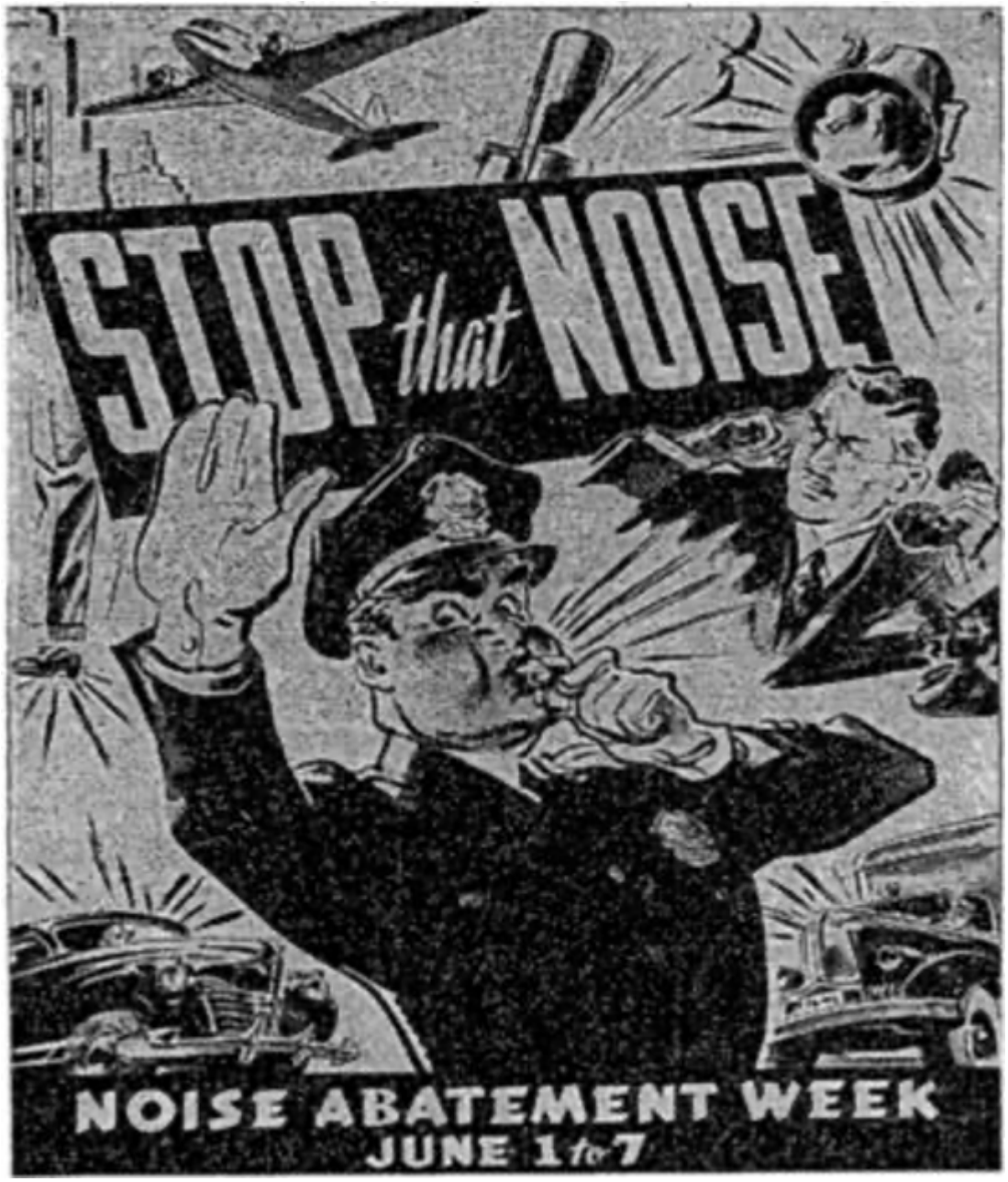


Fig. 6: Poster designed by the National Noise Abatement Council (1941)

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3. MEASURING THE NOISE IN CITY STREETS

It was not until the manufacture of audiometers which measure in ‘sound units’ based on decibel levels, that there begins to be information about measurements of urban sound, and these measurements began in 1925.

3.1 A ‘thermometer scale-type’ to gauge the noise level

Representing the scale of sound pressure levels as ‘if it were a thermometer’ is a very useful pedagogical tool since it can be visualized through an ordered numerical scale. There are countless mentions of when this analogy was adopted; and by hunting through the media the author believes the first time that the sound level was published like a thermometer, with the intention of showing a ‘Sensation Units’ scale, was presented as a part of a Research Paper (see Figure 7-a) published by the US Bureau of Standard in 1928 (Chrisler & Snyder, 1928). So in this way, that representation

of the sound levels like a thermometer has been among us for more than ninety years.

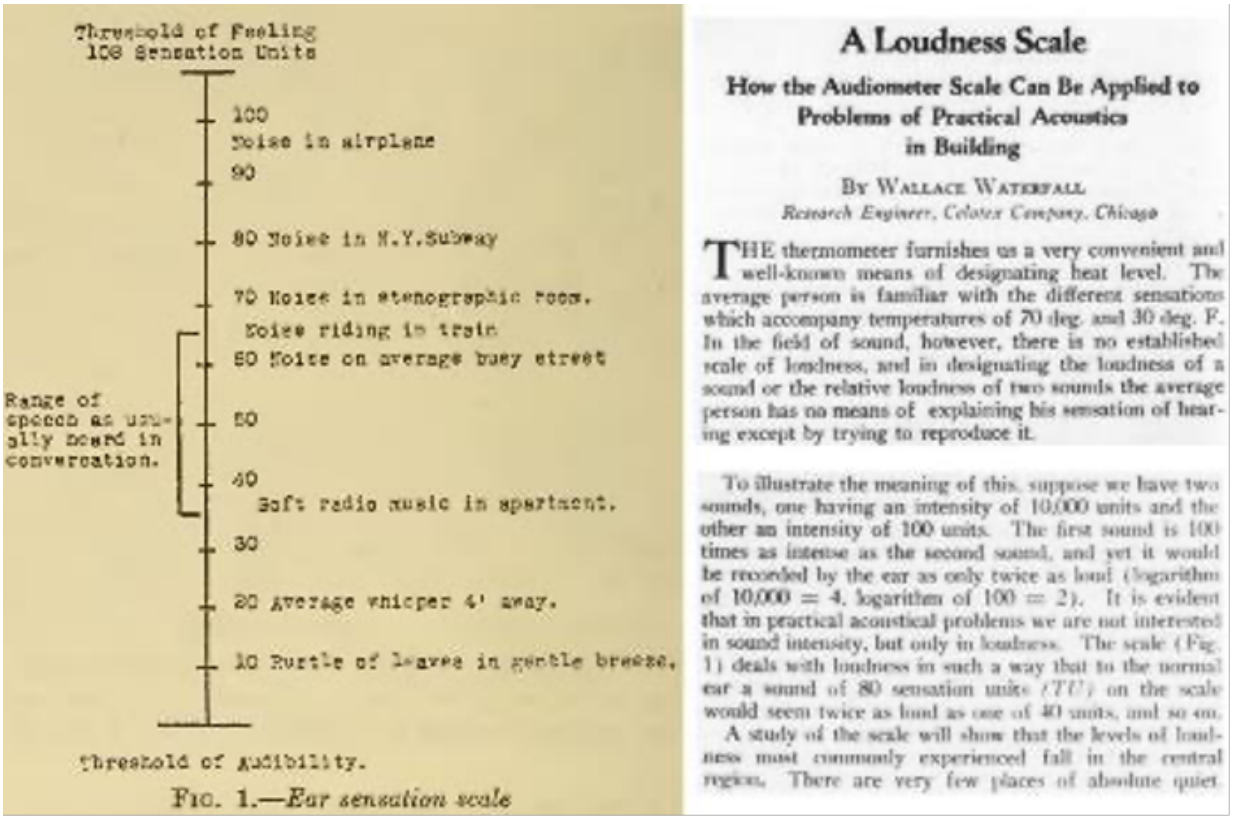


Fig. 7: The unit sensation scale and some significant points (a-1928) (b-1929)

According to this paper "*Wallace Waterfall, in a private communication, has suggested a way of illustrating the values of sensation units in familiar terms. We may call it an ear sensation scale*" (Chrisler & Snyder, 1928). Waterfall explained this numerical scale in an article published in the Engineering News Record journal (see Figure 7-b), closing his article by stating that "*The writer claims no originality in the development of this scale. It has been made possible by the very fine work of Dr. Harvey Fletcher and his colleagues at the Bell Telephone Laboratories and by the experiments of Dr. Vern O. Knudsen at the University of California at Los Angeles*" (Waterfall, 1929).

3.2 Automobile-noise measurements in 1925 by H. C. Snook

In the 1925 summer convention of the Society of Automotive Engineers, Homer Clyde Snook (1878-1942) of the Bell Laboratories presented before the Noise Research Session of the Society of Automotive Engineers (on 16 June in White Sulphur Springs, Virginia), a whole set of instruments to measure the noise levels from cars (see Figure 8), and a complete article titled "Automobile-Noise Measurement" describing his work (Snook, 1925). This is considered to be the first time that acoustic instruments were technically used to record, analyze and measure the noise emitted by devices, in this case from cars.

From the Snook article it is clear that engineers in1925 were thinking outside just the mechanical details, in their quest for the solution of their problems, because they considered psychological and physiological factors relative to the driving of cars. They propose that the problem of noise is not merely a problem in physics, but also a problem in the physiology of hearing and probably also a psychological problem. It is important to note that two thirds of the Snook article is devoted to explaining how sounds are perceived by the auditory system, and how in terms of loudness sound

waves can be measured, thus leading readers to understand that acoustic measurements have to be related to how the auditory system ‘hears’ the sound waves.



Fig. 8: Picture of equipment used by Snook for his presentation at the SAE Convention (1925)

We found a commentary on its presentation in Bell’s journal, which summarizes it:

> *Using an audiometer, extra amplifier, and cone loudspeaker, Mr. Snook gave his large audience a rough test of their own hearing. He first caused the tone from the audiometer to vary continuously from a volume easily audible to one completely inaudible to the normal ear. As each of his listeners reached the limit of his own hearing, he raised his hand to indicate that fact; and the way in which hands shot up in the audience, first one and then another, was a striking demonstration of the variations between individuals of acuity of hearing. He also used simultaneously two cone -type loudspeakers to demonstrate the masking effect of a tone or noise and how it could obscure another tone which it was desired to hear. After giving his audience such fundamental ideas as to hearing and the measurement of musical tones and noises, Mr. Snook applied these principles to the problems of reducing noise in an automobile.* (Bell, 1925)

From what one can read in the article written by Snook (1925) that set of acoustic instruments was developed to be used indoors, since in some paragraphs it deals with the effect of room reverberation on the measurements.

3.3 Measurement of street noises in several US cities 1926-1927

In December 1925 Edward Elway Free (1883-1939) published the article “Does Noise Injure Health!” in Forum magazine about the health problems caused by noise in cities. This focuses on the need to measure the noise level in order to quantify in some way the damage and danger to the auditory system, and how to solve the noise problems by means of acoustics engineering, pre-announcing the noise measurement campaign that would begin on streets in New York and Brooklyn. During January 1926 he made dozens of measurements under the campaign named “How noisy is New York?”, the results of which were published on January 15, 1926 (see Figure 9), but little mention was written of the measurements he made in Brooklyn. Free published a

complete article commenting on what he found in The Forum magazine (Free, 1926). As part of the same research, he conducted noise measurements in New York Subways in April.



SEEK NOISE? IT'S NOISIEST AT 6TH AVE. AND 34TH ST.

Answering the question "How Noisy Is New York?" Dr. E. E. Free, scientific editor of the publication Forum, has found that the noisiest spot in the city is at 34th st. and 6th ave., and the quietest is Grove st., in Greenwich Village.

We humans are virtually noiseless. The greatest cause of clamor is the truck. These facts represent the findings of a survey published in the February number of Forum.

Contrary to common belief the ill effect of noise on New Yorkers is "not serious," or the damage is "so small as to be negligible," says Dr. Free.

Dr. E. E. Free

AudiometerShowsBrooklyn Has Quieter Sections Than Manhattan;AlsoNoisySpots

Dr. Free's Instrument Shows Trucks and Flat Wheels on "L" Lines Worst Offenders—Flatbush Has Lowest Noise Level, Boro Hall Highest.

Brooklyn at its noisiest is as noisy as Manhattan, but it also has quiet places where the concentrated hum that makes up a city's sound is below anything in the hurrying community across the bridge. And on the whole the average sound level of Brooklyn is somewhat lower than that in which Manhattanites have to live.

Thus Dr. E. E. Free discovered yesterday after a pilgrimage up and down the main highways and some of the less important byways of the boro, stopping constantly with his audiometer in search of an answer to the question: How noisy is Brooklyn?

Prospect Park More Quiet Than Central.

At the entrance to Prospect Park, adjoining the great arch, a constant flow of automobiles and trucks forced up the reading to 35, considerably above what a residential neighborhood should have.

In the heart of Prospect Park, away from the automobile roadways, a test was taken with a resulting reading of 10, or 5 lower than the quietest part of Central Park and as low as any point tested in Manhattan.

First Experiments of Kind.

Dr. Free's are the first scientific experiments made to record the noises of a city. Their purpose was to discover what effect, if any, these varied noises have on the health of city dwellers. So far as can be determined, Dr. Free said, they probably affect health only slightly. The effect on the orderly thinking of city dwellers may, however, be very great.

That, however, will have to await still further experiments, some of them based on those already made. The noise-map of the city has not yet been completed, even the noise-map of Manhattan and Brooklyn, where the audiometer has already asked and answered its questions.

Fig. 9: Daily News of 15 Jan. The Brooklyn Daily Eagle of 21 Jan. (1926)

The Graybar Electric Company was hired to measure the noise levels in some US cities in 1926, with a similar audiometer used for New York measurements; K. P. Royce in February was responsible for the campaign in Washington DC, and in April in Buffalo another survey was done by A. L. Greene (see Figure 10).



Fig. 10: Free with its audiometer (Illustrated Daily News Feb. 7). The Evening Journal (1926)

The Chicago's Health Commissioner Herman K. Bundeson was concerned about health effects of street noise exposure, so the Celotechnic Institute of America started in July 1926 a noise measurement campaign which was conducted by T. B. Munroe, the scientific head of that institution. But the media was worried about the relevance of the findings with one journalist from the South Bend Tribune (Indiana) on July 28th wrote: "*Chicago is to have a noise survey with the object of eliminating unnecessary jarring sounds. When the college boys home on vacation disappear with their fearful and wonderful collegiate automobiles the survey may be superfluous*." Both Graybar's and Celotechnic's measurements are not yet available via the Internet; there are only scattered references in some books and newspapers.

3.4 Melbourne noise campaign in 1928

On April 30, 1928, under the title of "*Science to investigate electric tram din*," The Herald Melbourne, Australia, announced the beginning of a noise measurement campaign requested by the 3LO radio station. Thomas Howell Laby (1880-1946) a well-known physicist was the head of the investigation and the responsible for devising the instrument to measure the noise levels. In 1928 audiometers were not commercial available equipment, so Laby and his collaborators (Richard Ormond Cherry and R. Fallon) built from scratch the whole chain of devices to record and analyse sound waves.

On May 9th, The Argus evening issue (of Melbourne) described the instrumentation used for the noise measurements: "*The apparatus consists of a microphone for pickuping up noises and a valve*

amplifier similar to a wireless amplifier, by which the microphone currents are 'boosted up' to sufficient strength to work a delicate stylus tracing a graph on a sheet of squared paper, which is drawn beneath the stylus by clockwork." One chart obtained by this chain is shown in Figure 11.

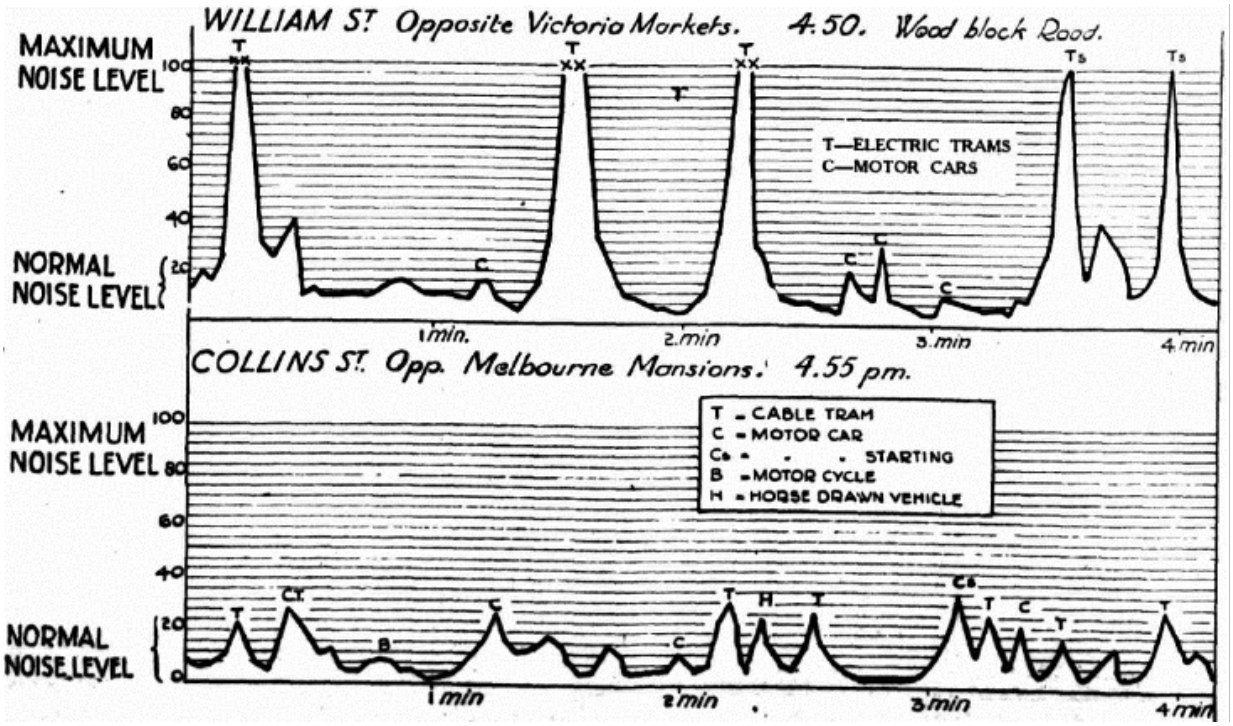


Fig. 11: Noise level chart published in The Herald of Melbourne on May 22, 1928.

Laby, Cherry and Fallon work was a pioneering study as:

(a) They did not use the audiometer for their noise measurements.

(b) They recorded the sound time-history on paper (not by means of mechanical mirrors/photos).

(c) They broadcast the sound picked up by the microphone simultaneously.

(d) They published the complete work in a newspaper.

An article by the author describing this measurement campaign in Melbourne is being prepared for publication in the journal Acoustics Australia.

3.5 'Noise' is scientifically defined by ASA in 1931

In1929 the Acoustical Society of America created several committees, and one of them was appointed to develop descriptions of acoustical terms to standardize the common words used in acoustics. Dr. Floyd Alburn Firestone (1898–1986), of the University of Michigan, was the chairman of the Committee, and among 160 definitions, the word "noise" was described for the first time in1931 as "*Noise is any undesired sound*." Journalists and critics did not miss the opportunity to take a critical look at the ASA's definition, and one of the most acidic articles was published (see Figure 12) in The Evening Star newspaper (of Washington DC) on May 20, 1931.



THE EVENING STAR, WASHINGTON, D. C.,

WEDNESDAY MAY 20, 1931.

"Noise is any undesired sound," says the Acoustical Society of America, defining the word scientifically for the first time.

Webster may not be quite so scientific, but it has some pretty good definitions:

1. Loud, confused, or senseless shouting or outcry; clamor; din or uproar of persons.

2. General, or common, talk or discussion; rumor; report.

3 Sound or a sound of any sort, whether loud or harsh, or low, pleasant or melodious; also, noises collectively; as, the city and its noise.

The concise Oxford says: Noise—loud outcry, clamor, shouting, din of voices and movements; any sound, especially loud or harsh one.

* * * *

The definition of the Acoustical Society shifts the meaning by putting the definition, in reality, in the hands of the listener.

The greatest symphony orchestra in the world might become a noise, under this definition, to a man who was trying to sleep in a building next door.

A student studying for the bar might easily enough construe the words of a great orator as a noise, pure and simple.

If undesired by him, it would be a noise, according to this definition.

The psychology of the Acoustical Society definition is acute, "Noise is any undesired sound."

The mind of the listener has as much to do with it, then, as his ears, if not more so. Those who do not happen to be sensitive to the particular noise put on looks of loftiness and declare, "You should use will power."

Will power has little, if anything, to do with it. The mind of the listener, having gathered in the sound, or noise, insists on keeping it.

What the critic does not realize is that the mind will build this noise up, for itself, if the noise insists on abating.

* * * *

Man, under civilization, tends to bring in his own personality, until the Acoustical Society boldly and honestly gives the world the definition, "Noise is any undesired sound."

Noise, in other words, is a sound you don't like, don't want to hear. It is an intruder in your symphony of life.

Every man his own lexicographer! Such is the precedent set by the Acoustical Society of America. It is a step forward up the ladder called the rights of man.

Fig. 12: Text extracted from “This and That” column by Charles E. Tracewell (1931)

“Charles E. Tracewell” was the alter ego of the journalist Templeton Jones, a character he created whose observations on the multitude of everyday things others accepted as routine comprised his popular column “This and That” in The Evening Star newspaper, and he attempts to use philosophical arguments from Schopenhauer and Spencer to criticize the definition; yet, after 90 years, “*Noise is any undesired sound*” is still used worldwide.

3.6 The ‘noise inspector’ and the first London noise map of 1933

In 1933 the London Anti-Noise League launched a major media campaign against noise, and they brought into activity a “noise inspector”, a former Army sergeant named John Ilett (Sydney, 1933). On 8 November the League announced that a noise map will be prepared to identify the locations of the higher noise. The Times of London on Friday November 17, 1933, published for the first time a noise map (Times, 1933) as is shown in Figure 13. The map was issued by the Anti-Noise League and is based upon the investigations done by the noise inspector. It concerned only motor traffic, noisy omnibus engines and gears, etc. The worst combination of these noises was identified at the junction of Park Lane and Hamilton Place in Piccadilly. This 1933 and a further 1935 campaign are well documented on Internet.



Fig. 13: The noise map of London published by The Times (1933)

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4. THE “PREMIERE CONFERENCE INTERNATIONALE DE L'ACOUSTIQUE” IN 1937

This conference was the first international meeting, under the auspices of the International Electrotechnical Commission (IEC), held in Paris from 30 June to 3 July 1937, with participation by 70 delegates representing 19 countries and international organizations. These included the International Federation of National Standards Associations (ISA, the former ISO); the International Union of Broadcasting; the International Telephone Consultative Committee. Three documents summarizing the work of the commission are available, and the one published in Le Génie Civil is the most complete ?other is (G.C., 1937) and another (Akustische, 1937) ? of which the English translation of its paragraphs is transcribed here:

> *The scientific or technical applications of acoustics have developed considerably in recent years. The technical studies required by the development of long-distance telephone communications and the creation of telephone headsets and loudspeakers have led telegraph and electrical engineers to submit entirely new problems to acousticians. The development of traffic in the cities led the municipalities to undertake the fight against noise. Some*

> *acoustic measurements required the development of new measurement methods and the definition of special acoustic units. Inside the houses themselves, the fight against noise has required the creation of special insulating materials. Finally, architecture, taking advantage of the numerous works carried out over the last fifteen years, particularly in the United States, has benefited from new calculation methods or experimental results which have allowed the creation of rooms with an excellent acoustic performance.* (Dumont, 1937)

These acoustic works have been carried out in the principal civilized countries, but it is in the United States and in England that the most decisive progress has been made. In France, we are still a few years behind, but we must pay tribute to the efforts of a small group of scientists and engineers whose value outweighs their number. The confrontation of all these works had led the specialists of acoustics to deplore a lack of unity in the definition of the terms of the vocabulary used and in the methods of measurement and control. (Dumont, 1937)

Mr. Ch. Duval, President of the French Electrotechnical Committee, was the General Chairman, he was assisted by Messrs. Brylinski, President of the AFNOR; H. Ruf, Secretary General of the ISA, and Le Maistre, Secretary General of the IEC. The IEC General Secretariat divided the congressmen into five committees:

> **Committee N° 1**. Chairman: Jacques Brillouin (France) - responsible for developing the vocabulary.
>
> **Committee N° 2**. Chairman: Harvey Fletcher (US) - to carry out studies and unify measurement methods, in particular for the use of the sound level meter.
>
> **Committee N° 3**. Chairman: Martin Grützmacher (Germany) - to study electro-acoustic: recording, transmission and reproduction of sounds; a sub-commission was created there for musical acoustics.
>
> **Committee N° 4**. Chairman: Dr. George William Clarkson Kaye (England) – to deal with architectural acoustics.
>
> **Committee N° 5**. Chairman: Dr. Gigli (Italy) – to study noise and vibration reduction.

While Fletcher, Kaye and Grützmacher are well-known acousticians, little is known about Jacques Brillouin, although he was a great acoustician whose activity is unfortunately mistaken for that of his brother Leon, who is better known than Jacques. For the author it is important to rescue to the history his work: Jacques Brillouin (1892-1971) was the head of the acoustic services of the laboratories of building and public works of Paris. He wrote several books on acoustics and he signed as ‘Ingénieur acoustician.’ Jacques designed many theaters (including the Paris Trocadéro) and auditoria, he was lecturer for several institutions and he is a co-founder in 1932 of the journal Revue d’Acoustique and in 1948 of Groupement des Acousticiens de Langue Française, an organization that developed into the Société Francaise d'Acoustique-SFA (SFA, n.d.). Unfortunately the author has yet to find information on Dr. Gigli, but presumes he was an otologist.

The following is a summary of the work of each of these committees, written by Augustin Dumont, Ingénieur des Arts et Manufactures (Dumont, 1937).

Committee N° 1: Vocabulary. *The Committee examined the draft French vocabulary relating to*

physical acoustics. The chapters of this subdivision: general terms, vibrating mechanical system, acoustic oscillations in a fluid, were reviewed during the first session. In the second session, the terms relating to electro-acoustic devices and transmission systems were examined by Committee N° 1, which was joined by most of the members of Committee N° 3 (electroacoustics), who were particularly interested in the terms of this subdivision. Some terms were corrected or newly defined; a few definitions were reserved for further study (Dumont, 1937).

Committee N° 2: Unification of measurement methods. *The Committee considered questions relating to the fundamental units and methods of measurement of acoustics, especially those relating to the measurement of sound, since significant differences had arisen in various scientific works with respect to the reference sound, the reference zero and the definition of the units of sound intensity. The Committee was of the opinion that "sound intensity, in the case of travelling waves, should be defined as the energy flux per second per unit area (square centimeter) normal to the direction of propagation." However, since this definition applies only to the case of traveling waves, it was considered inappropriate for more general use. The question of the general definition of "loudness" was referred to a subcommittee*

The committee defined the reference sound to be used as the basis for the unit and scale of measurement of noise as follows:

> ***(1)*** *The sound shall be produced by a plane sine wave, progressive and having a frequency of 1.*
>
> ***(2)*** *The reference zero shall correspond, in round figures, either to an intensity of 10-16 watts or to a sound pressure of 2?10^{-4} low ryes (dynes per centimeter).*
>
> ***(3)*** *In either case, the scale of intensity or pressure shall be graduated in decibels from the reference zero.*

The Committee was of the opinion that the unit for the measurement of noise should be called "phone," the measurement to be made as follows. The reference sound and the sound to be measured should be listened to alternately with both ears. The reference sound shall be adjusted until it is judged by a normal observer to be of the same strength as the sound to be measured. The reference sound and the sound to be measured shall, whenever possible, be listened to for approximately equal durations. In any case, the duration of listening to the reference sound should not be less than one second. When, under these conditions, the intensity level (or pressure level) of the reference sound (pressure being that which exists in the free wave before the operator's head is in the sound field) is n decibels above the reference zero, the sound to be measured is said to have a subjective acoustic intensity of n phones. The Committee then formed a subcommittee to study the specification of an apparatus for the objective measurement of sound; the chairmanship of this subcommittee was given to Dr. Davis (Great Britain). Prior to the Conference, three devices had been tested: a German, an American and a French one. They gave approximately equal results, but for some sounds their indications were considerably inferior to the results of subjective measurements. It seemed premature to the Sub-Committee to draw a conclusion from all these measurements. But the Committee, having thus brought to light the present state of the problem, has made a contribution to the realization of a universally applicable apparatus for the objective measurement of noise (Dumont, 1937).

Note: Fletcher (1938) is a brief article about the work of this committee from the Bell Laboratory

Record.

Committee N° 3: Electroacoustics. *This Committee has put the following questions on its agenda:*

(1) *Comparative scheme concerning sound recordings and reproductions.*

(2) *Calibration of microphones (unification of measurement methods).*

(3) *Loudspeakers: unification of measurement methods, qualification scheme. Standardization of the number of vibrations of the [musical note] 'A'.*

The French delegation had been asked by Mr. Rabaud, member of the Institute, director of the Conservatoire National de Musique et de Déclamation, to standardize the 'A' throughout the world. The various delegations were unanimous in recognizing the necessity of this standardization. However, none of them having been expressly mandated to do so, the delegates were invited to send to the German Secretariat, within one month, the proposals of their national committees. A meeting will be held later in Vienna to try to unify the number of vibrations of the normal 'la' (Dumont, 1937).

Committee N° 4: Architectural acoustics. *The Committee discussed the methods adopted in the various countries for:* ***(1)*** *The measurement of sound absorption based on reverberation by materials.* ***(2)*** *The transmission of airborne sound through partitions and walls.* ***(3)*** *The transmission of percussive sound through floors. The Committee considered that it was desirable to standardize absorption methods based on reverberation. It was recalled that a comparison of international results for certain materials was made some years ago by the American Standard Association. Because of the increase in the number of laboratories performing such tests in all countries, it was recognized that new international comparisons should be made again, using two materials, one highly absorbent, the other not very absorbent* (Dumont, 1937).

Committee N° 5: Noise and vibration reduction. *The Committee decided to collect from the National Committees documentation on the following questions:*

(1) *Noise and vibration control, regarding measurement methods and the physiological, medical, educational and administrative aspects of the question.*

(2) *Standardization of audiometers for medical use* (Dumont, 1937).

Coordinating Committee: *The purpose of this committee was to ensure liaison among the others. It has decided to separate from Committee N° 3 (electroacoustics) the question of the unification of normal 'A', which concerns mainly conductors and manufacturers of musical instruments* (Dumont, 1937).

---

5. FIRST ZONING ORDINANCES QUANTIFYING NOISE LIMITS

In this section, the author summarizes the firsts ordinances which set noise limits in decibels. Following the standardization of sound level measurements in 1937, it was not until 1940 (see Figure 14) that methods for calibrating sound level meters were developed. It is from 1944 onwards that street noise measurements used a standardized instrument, when the first Standard for

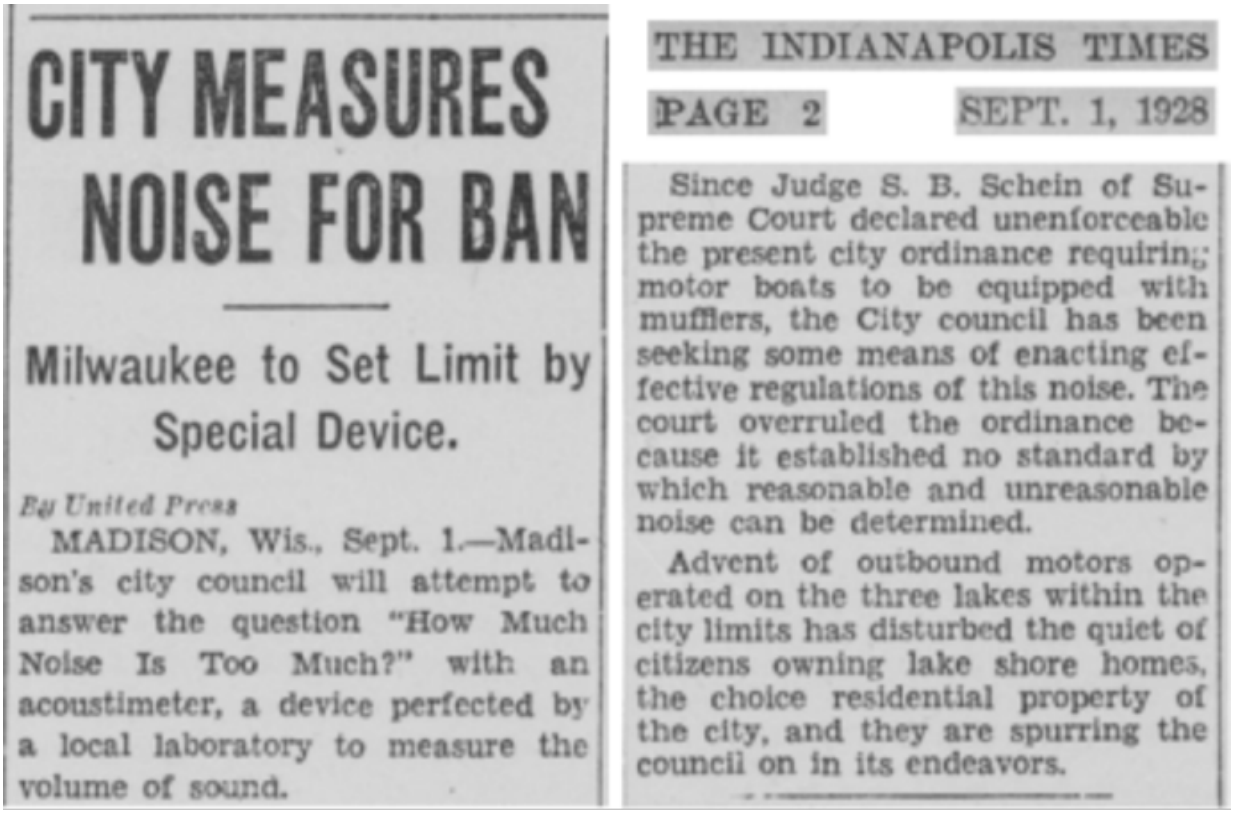
sound level meters Z24.3-1944 was published (ASA, 1944).



Fig. 14: Advertisement on calibrated sound level meters (Electronics, 1940)

5.1 Madison, Wisconsin, and its 1928 ordinance to intent to set noise limit

In 1928 in Madison, Wisconsin, the city's council wanted to attempt to answer the question “How much noise is too much?” An acoustimeter was proposed to measure the volume of sound and the level to be regulated within the ordinance (see Figure 15). However the court overruled the ordinance because it established no standard by which unreasonable noise could be determined. This is one of the first mentions in the media about an ordinance setting noise limits, and this same city had to wait for more than 25 years before it could introduce one.



CITY MEASURES NOISE FOR BAN

Milwaukee to Set Limit by Special Device.

By United Press

MADISON, Wis., Sept. 1.—Madison's city council will attempt to answer the question "How Much Noise Is Too Much?" with an acoustimeter, a device perfected by a local laboratory to measure the volume of sound.

THE INDIANAPOLIS TIMES

PAGE 2 SEPT. 1, 1928

Since Judge S. B. Schein of Supreme Court declared unenforceable the present city ordinance requiring motor boats to be equipped with mufflers, the City council has been seeking some means of enacting effective regulations of this noise. The court overruled the ordinance because it established no standard by which reasonable and unreasonable noise can be determined.

Advent of outbound motors operated on the three lakes within the city limits has disturbed the quiet of citizens owning lake shore homes, the choice residential property of the city, and they are spurring the council on in its endeavors.

Fig. 15: Article comments the Madison City intention to set noise limits (1928)

5.2 The 1950 noise ordinance of Chicago

Howard C. Hardy (1911-1962) was a leading acoustician from Chicago (working at Armor Research Foundation of Illinois Institute of Technology); during twelve months between 1948 and 1949, he conducted a noise survey at several sites in Greater Chicago. He analyzed the resulting values in order to propose noise limits in terms of decibels. This emblematic research is not available from the Internet yet, but there are dozens of media articles commenting the results. The author has not been able to find a copy of the original ordinance, but this newspaper article in Figure 16 mentions the existence of noise levels in decibel values for the city of Chicago, and it is clear that the limits were given by frequency in octave-bands. So it is clear that it was in 1950 that the city of Chicago had an ordinance to legislate noise limits in decibel values and these had to be measured using standardized instruments.



City Noises Can Be Reduced Now

Instrument Held Enforce Ordinance

Chicago, (AP)—Cities now can have laws with teeth and good ears to cut down city noise nuisances.

For science has developed the instruments to measure noises accurately, and to enforce anti-noise regulations scientifically, says Dr. Howard C. Hardy, physicist and acoustics expert of the Armour Research Foundation of Illinois Institute of Technology.

FRIDAY, NOVEMBER 3, 1950. SEVEN

THE LOGANSPORT PRESS, LOGANSPORT, INDIANA

It isn't just the loudness of noises that makes them bad, he explained. The frequency or pitch of sounds sometimes is a worse offender to human ears and nerves. Newer instruments can make both kinds of measurements.

Dr. Hardy and associates for two years have been studying Chicago city noises, in cooperation with the Greater Chicago Noise Reduction Council, the National Noise Abatement Council, and the city of Chicago. The findings apply to cities elsewhere.

The studies indicate that the tolerable or pleasant level of background is about 65 to 70 decibels. This is the limit in the frequency band of 400 to 800 cycles per second, about the middle octave for the human ear. Frequencies above that level are much more likely to be annoying, even at the same intensity or less of actual sounds.

Outside cities, the limit should be about 55 decibels in this frequency, Dr. Hardy said.

For more pleasant living, cities should try to cut down on decibels, particularly in the higher frequencies. High-pitched auto horns, for example, are worse offenders than horns of lower pitch.

Fig. 16: The Chicago City noise ordinance published on the media (1950)

5.3 The US zoning ordinances with noise limits

On September of 1955 the American Society of Planning Officials published a Report N° 78, a complete work about the Industrial Zoning Standards: "*In this report we discuss in general terms the progress thus far in the use of standards for the control of uses placed in industrial districts. The comments will be based on a detailed analysis of 11 zoning ordinances either adopted or proposed in cities throughout the United States that introduces this concept*" (ASPO, 1955). Given that this subject has not been completely studied, the author is struck by the fact that at the beginning, some ordinances used values in sones for their zone noise limit (see Figure 17).

STANDARDS FOR NOISE LIMITS

Ordinance	Maximum Noise
Albuquerque	
C-3 Unlimited Commercial	50 sones
M1 Industrial	No maximum
M2 Industrial	No maximum
Anne Arundel County	
Light Industrial	70 decibels
Heavy Industrial	70 decibels at zone boundaries
Center Line	
M1 Industrial	75 db. day; 70 db. night
M2 Industrial	80 db. day; 75 db. night
M3 Industrial	85 db. day; 80 db. night
Chicago (See Table 4)	
Clarkstown (See Table 4)	
Parsippany-Troy Hills Township	
A Industrial	20 sones
B Industrial	40 sones
Penn Township	
Restricted Industrial	20 sones
Rye	
Office-Laboratory	50-70 db. (See Table 5)
Southfield Township	
Technical Education-Research	50-75 db.
Warren Township	
M1 Industrial	60 decibels
M2 Industrial	65 decibels
M3 Industrial	70 decibels
M4 Industrial	75 decibels

Fig. 17: Table summarizing noise limits for various US cities around 1955.

An important fact to highlight is that all ordinances give their limit values in linear decibels, because from what is read in all references they never mention "dBA," but "db" or decibels, and an interesting statement is given in this report:

> *A noise limit specified only by a single decibel figure with no mention of octave bands, of instrument standards, or of a frequency-weighting network is meaningless under strict interpretation. It is possible that a liberal court might read into the figures a proper adjustment. But in view of the quiet precise nature of the term "decibel" this is doubtful.*

The sone is also a clearly (although not easily) defined term and actually needs no further elaboration in the ordinance. However, because the sone is not directly measurable by simple instruments, it is not the most practical unit to describe noise. (ASPO, 1955)

In the same report is presented the noise ordinances in terms of octave-band noise levels (see Figure 18), for the Chicago City. Hardy was responsible for Chicago, and Bolt, Beranek and Newman Co for Clarkston City (ASPO, 1955).

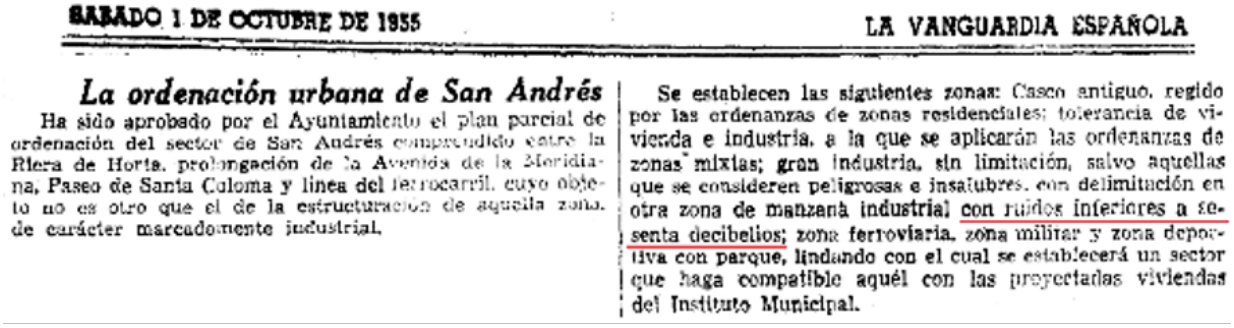
Octave Band in Cycles per Second	Maximum Sound Pressure Level in Decibels 0.0002 dynes per square centimeter			
	Chicago		Clarkstown	
	Residence District Boundaries	Business District Boundaries	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
0-75	72	79		
20-75			74	69
75-150	67	74	59	54
150-300	59	66	52	47
300-600	52	59	46	41
600-1,200	46	53	42	37
1,200-2,400	40	47	39	34
2,400-4,800	34	41	36	31
Above 4,800	32	39		
4,800-10,000			33	28

Fig. 18: Chicago and Clarkstown zoning ordinances noise limits (ASPO, 1955).

The author communicated via e-mail with the archives offices of the cities mentioned above, and received responses from all of them, except Chicago. The unanimous response was that there is no copy of those old ordinances among their archived documents.

5.4 1955 Zoning ordinance of Barcelona

The author made a surprising finding during his research in that there was an urban zoning ordinance for the city of Barcelona in 1955 (see Figure 19), which gave the noise limit of 60 decibels for mixed residential areas with industries.



SABADO 1 DE OCTUBRE DE 1955 — LA VANGUARDIA ESPAÑOLA

La ordenación urbana de San Andrés

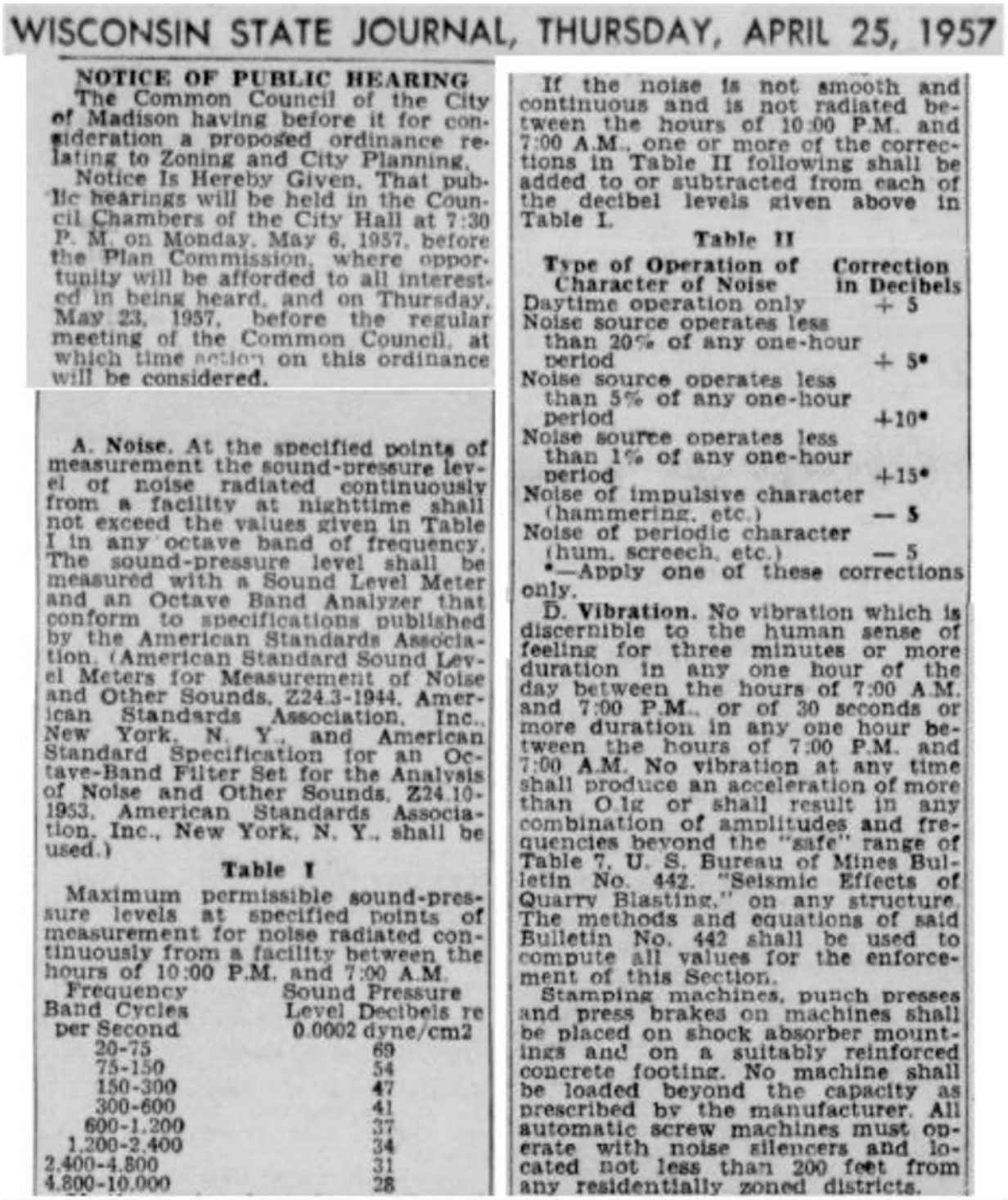
Ha sido aprobado por el Ayuntamiento el plan parcial de ordenación del sector de San Andrés comprendido entre la Riera de Horta, prolongación de la Avenida de la Meridiana, Paseo de Santa Coloma y línea del ferrocarril, cuyo objeto no es otro que el de la estructuración de aquella zona, de carácter marcadamente industrial.

Se establecen las siguientes zonas: Casco antiguo, regido por las ordenanzas de zonas residenciales; tolerancia de vivienda e industria, a la que se aplicarán las ordenanzas de zonas mixtas; gran industria, sin limitación, salvo aquellas que se consideren peligrosas e insalubres, con delimitación en otra zona de manzana industrial con ruidos inferiores a sesenta decibelios; zona ferroviaria, zona militar y zona deportiva con parque, lindando con el cual se establecerá un sector que haga compatible aquél con las proyectadas viviendas del Instituto Municipal.

Fig. 19: Noise limit for mixing urban zones in San Andres, a Barcelona City district (1955).

5.5 1957 Zoning ordinance of Madison on noise and vibration

The only complete transcript of a published ordinance in print that the author has found is from 1957 from the city of Madison (see Figure 20), the same city that attempted to legislate noise levels in 1928. This city is 237 km (147 mi) from Chicago, so perhaps they were strongly influenced by the ordinance of that city. As can be read in the text, to apply the ordinance, a sound level meter analyzer had to be used, with the latest standardization requirements, i.e., instruments designed after 1953 had to be used.



WISCONSIN STATE JOURNAL, THURSDAY, APRIL 25, 1957

NOTICE OF PUBLIC HEARING

The Common Council of the City of Madison having before it for consideration a proposed ordinance relating to Zoning and City Planning,

Notice Is Hereby Given, That public hearings will be held in the Council Chambers of the City Hall at 7:30 P. M. on Monday, May 6, 1957, before the Plan Commission, where opportunity will be afforded to all interested in being heard, and on Thursday, May 23, 1957, before the regular meeting of the Common Council, at which time action on this ordinance will be considered.

A. Noise. At the specified points of measurement the sound-pressure level of noise radiated continuously from a facility at nighttime shall not exceed the values given in Table I in any octave band of frequency. The sound-pressure level shall be measured with a Sound Level Meter and an Octave Band Analyzer that conform to specifications published by the American Standards Association. (American Standard Sound Level Meters for Measurement of Noise and Other Sounds, Z24.3-1944, American Standards Association, Inc., New York, N. Y., and American Standard Specification for an Octave-Band Filter Set for the Analysis of Noise and Other Sounds, Z24.10-1953, American Standards Association, Inc., New York, N. Y., shall be used.)

Table I

Maximum permissible sound-pressure levels at specified points of measurement for noise radiated continuously from a facility between the hours of 10:00 P.M. and 7:00 A.M.

Frequency Band Cycles per Second	Sound Pressure Level Decibels re 0.0002 dyne/cm2
20-75	69
75-150	54
150-300	47
300-600	41
600-1,200	37
1,200-2,400	34
2,400-4,800	31
4,800-10,000	28

If the noise is not smooth and continuous and is not radiated between the hours of 10:00 P.M. and 7:00 A.M., one or more of the corrections in Table II following shall be added to or subtracted from each of the decibel levels given above in Table I.

Table II

Type of Operation of Character of Noise	Correction in Decibels
Daytime operation only	+ 5
Noise source operates less than 20% of any one-hour period	+ 5*
Noise source operates less than 5% of any one-hour period	+10*
Noise source operates less than 1% of any one-hour period	+15*
Noise of impulsive character (hammering, etc.)	— 5
Noise of periodic character (hum, screech, etc.)	— 5

*—Apply one of these corrections only.

D. Vibration. No vibration which is discernible to the human sense of feeling for three minutes or more duration in any one hour of the day between the hours of 7:00 A.M. and 7:00 P.M., or of 30 seconds or more duration in any one hour between the hours of 7:00 P.M. and 7:00 A.M. No vibration at any time shall produce an acceleration of more than 0.1g or shall result in any combination of amplitudes and frequencies beyond the "safe" range of Table 7, U. S. Bureau of Mines Bulletin No. 442, "Seismic Effects of Quarry Blasting," on any structure. The methods and equations of said Bulletin No. 442 shall be used to compute all values for the enforcement of this Section.

Stamping machines, punch presses and press brakes on machines shall be placed on shock absorber mountings and on a suitably reinforced concrete footing. No machine shall be loaded beyond the capacity as prescribed by the manufacturer. All automatic screw machines must operate with noise silencers and located not less than 200 feet from any residentially zoned districts.

Fig. 20: Noise ordinance for Madison City (Wisconsin) in 1957.

6. CONCLUSION

As a result of World War II, all international actions against noise that began in the 1930s were interrupted and the acoustic community had to wait decades to coordinate global activities. It is important to promote Henry Spooner and Greenville Kleiser as the pioneers in proposing a day to reflect on the health problems of noise.

The author wrote this article based on media published in English and using the automatic translators for some sources in Belgian, Dutch, German, and French. There is a vast amount of data that can be accessed so the author encourages other acousticians to investigate the first anti-noise actions using in their own language.

Until new information is found it appears that Chicago was the first city to have a noise ordinance in 1950.

The author suggests that the acoustics community consider commemorating the centenary of the first noise measurements using instruments developed for that purpose and undertaken by H.C. Snook, and that the International Congress on Acoustics ICA2025 include an appropriate commemoration of this achievement.

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