

turers from the burden of meeting conflicting standards, so long as there are effective Federal regulations, while preserving the power of State and local governments to deal with all sources of noise in the hands of their users. Thus, limitations on uses may be imposed but no State or local emission standards have products covered by Federal standards.

I also bring to the attention of the Senate the provisions in title V of S. 3342, which establishes a regulatory framework for noise from interstate trucks and buses and the operations of railroads. Here, as well as in the area of product noise emission standards, the transportation industry is faced with the prospect of conflicting noise control regulations in every jurisdiction along their routes. It is completely inappropriate for interstate carriers or interstate transportation to be burdened in this way. The committee met the need for active legislation on moving noise sources by requiring controls on noise from all interstate trucks and buses and railroads, including existing equipment which would not otherwise be subject to product noise emission standards under title IV and the patterns of operations of such carriers. After the effective date of an adequate Federal regulation program, the authority of State and local governments to regulate noise from interstate trucks and buses or trains is completely preempted, except where the Administrator determines it would be necessitated by special local conditions or in no conflict with the Federal requirements.

During the consideration of this bill, I received extensive correspondence on the subject of the warranty required by section 408(d). This warranty, similar to one now in effect for other vehicles under the Clean Air Act, requires manufacturers to warrant that defects in maintenance and workmanship will not cause a new product subject to noise emission standards, under normal uses and maintenance, to fail to conform to those standards under its useful life. The committee, recognizing that useful life will vary substantially for any given product depending upon the uses to which it is put and many other factors, modified the warranty provisions to require the Administrator to take into account the range of uses to which a product might be put as he establishes its useful life. It is the intention of the committee to make the manufacturers liable only for those increases in noise emission which were within his control in the manufacturing process. The user must bear the burden of operating and maintaining the product in a normal way if he wishes to be protected by the warranty on noise emissions.

Mr. President, there have been sporadic efforts by State and local governments to control the noise problem, and recent activity at those levels of government have given a further spur to Federal legislation. In 1970, the Committee on Public Works authored title IV of the Clean Air Act, establishing an Office of Noise Abatement and Control in the Environmental Protection Agency and launching the study which has culmi-

nated in this legislation. This bill will be a valuable tool in reducing the noise in our cities and our countryside and I urge its passage by the Senate.

Mr. PEARSON. Mr. President, one of the congressional leaders in efforts to control noise pollution is the distinguished senior Senator from Oregon (Mr. HATFIELD). Since coming to the Senate in 1967, he has been in the forefront of efforts to educate the public about this hazard, and to see that meaningful efforts to control unwanted noise are pursued by the Congress.

Senator HATFIELD hoped to be here on the Senate floor today to participate in this debate, but is in Oregon and unable to be here.

Because of his prominence in this effort, I would like to ask unanimous consent that a copy of Senator HATFIELD's major address to the Noise Abatement Council of America on October 8, 1969; his floor remarks in introducing the Noise Abatement Act of 1970 on November 24, 1970; his opening statement at hearings he chaired on the Noise Control Act of 1971—legislation he sponsored—on June 28, 1971, and his remarks and those of Senator HART in introducing strengthening amendments to that bill on June 21, 1971 all might appear at this point in the RECORD.

There being no objection, the remarks were ordered to be printed in the RECORD, as follows:

[From the CONGRESSIONAL RECORD, Oct. 9, 1969]

NOISE, THE GATHERING CRISIS

(Speech by Senator MARK O. HATFIELD, before the Noise Abatement Council of America, October 8, 1969)

There is a bumper sticker now circulating which says: "Eliminate Pollution Before Pollution Eliminates You." Immediately we will think of studies which threaten a lack of water by 1980 and conjure up the words of California scientists stating that within 50 years their state will be uninhabitable for any form of life. Or we hold our breath for a moment remembering that 142 million tons of smoke and noxious fumes are dumped into the atmosphere each year. Momentarily we feel brief panic and then for one reason or another, we forget the threatening words of the bumper sticker and go about our daily duties in a comfortable shield of self-deception and false security. Unfortunately such an attitude has now brought us to a situation in which the rapidly deteriorating quality of our environment is the most hazardous challenge to not only our health and well-being but to our very lives and those of our children and grandchildren.

Environmental pollution may not pose the immediate destruction that nuclear war does, but I might remind you that the effects are the same and just as lasting. And I might remind you that destruction at the hands of our environment is as immediate as your and my lifetime. And finally, I might remind you that lack of inhabitable land, lack of food, lack of good water to drink and good air to breathe are the very conditions under which men become desperate and resort to any and all means to preserve their survival. It is with these thoughts in mind that I state my firm conviction that pollution—all forms of pollution: air, water, and noise pollution, overpopulation, land and soil pollution—is the most challenging and the most crucial problem facing the man of the 20th century. And it is with these thoughts in mind that I

firmly believe that if we do not meet this problem with all the creativity and ingenuity of our age, then within a very short time nothing else will matter, for there will be nothing else to worry about.

Your concern with environmental pollution has brought you here today in order to form an effective citizen's group to combat this onslaught on our planet before it is indeed too late. Your special concern is with the assault of noise pollution on our society and in your recognition of noise as a pollutant you have established yourselves as somewhat pioneers in combating the effects of noise on our society. It was therefore an honor to be invited to speak at this organizational meeting of the Noise Abatement Council of America. Had such groups been instrumental in educating the public to appreciate the inevitable results of uncontrolled air and water pollution and in effecting remedial action to combat these problems even ten years ago then we would not be faced with the present national crisis in these areas. Today let us pledge ourselves to the task of preventing noise becoming another uncontrolled threat to our existence.

The effects of noise, although long a problem, have only begun to receive the well-founded concerns of government, health, industrial and community organizations. We are already far behind the rest of the world in appreciating the scope of the problem. For our backwardness in the field of noise abatement the United States is now the noisiest country on this planet, and frankly, I hate to think that we are now carrying this lack of respect for civilized standards to other planetary bodies. Basically, noise pollution is reaching crisis proportions in the United States and I think that it is time that all of us wake up to this fact.

We should be concerned with noise as a problem because for over a century noise exposure of sufficient intensity and duration has been recognized to produce sensorineural hearing loss. But in spite of this knowledge, an over-exposure to excessive noise is the major cause of hearing loss in the United States today. In fact it is estimated that 10-20 million people in the United States have some degree of hearing impairment.

Everyone realizes that if he is exposed to a very loud noise such as an explosion he may very likely wind up deaf—at least temporarily. What is not so apparent is that the effect of noise is cumulative; it produces as Dr. Leo Beranek, whose work in acoustics is international in scope, an "acoustic fatigue". Repeated moderate noise builds up to produce the same effect as would a single loud noise. And even more important, is the fact that repeated noise is the only type, short of a shattering explosion, that produces permanent hearing loss. The importance of this is readily seen when one is considering the harmful effects of exposure to daily occupational noise.

Another matter of some concern is that the noise level of the United States is increasing at an astonishing rate. Over the past 25 years the average increase in noise level has been at one decibel per year. When one considers that damage to the ears can occur at sustained exposure to the ranges around 85 decibels and over, and given our present noise levels, it will not be too many years before noise levels in the United States became lethal. To quote Dr. Vern O. Knudsen, physicist and former Chancellor of the University of California, "If the noise we make keeps increasing at the present rate, it will be as deadly in thirty years in some of our downtown cities as were the ancient Chinese tortures for executing condemned prisoners."

We know of course that the most pronounced physical effect of noise is damage to the ear. Exposure to intense noise over

varying durations causes partial and in some cases permanent hearing loss due to actual cell damage in the organ of the Corti located within the cochlea of the inner ear.

But noise has much farther reaching effects than just hearing damage. As Paul E. Sabine stated even back as far as the March 1944 issue of the American Journal of Public Health: "There is a wealth of reliable data from medical sources in support of the statement that sustained exposure to noise is a contributing factor in impaired hearing, chronic fatigue that lowers bodily resistance, neurasthenia, increased blood pressure, and decreased working and mental efficiency and that noise should rightfully be classified as an occupational hazard along with gases, fumes, dust, toxic liquids, and bacteria." To put this into, if nothing else, economic perspective, the total cost to industry in compensation payments, lost production, and decreased efficiency due to noise is estimated at well over \$4 billion per year. In relation to business a World Health Organization report states that before 1939 office noise was costing United States business \$2 million per day through inefficient work. Today that figure is \$4 million. The psychological and physiological effects of noise are difficult to assess but the correlation between noise and such things as sleep disturbances, hypertension due to the constant response of hormonal and neurological mechanisms to noise stress, interference with basic communication, the loss in efficient performance and even damage to property must be counted as a very real and a very enormous threat to our well-being not to mention the economic repercussions.

The effects of noise cannot be fully appreciated until we have more thorough studies in the field. One effect which needs to be especially explored by sociologists and criminologists is referred to in a recent Fortune magazine article. As related by Fortune: In the Bronx borough of New York City one evening last spring, four boys were at play, shouting and racing in and out of an apartment building. Suddenly from a second-floor window came the crack of a pistol. One of the boys spawled dead on the pavement. The victim happened to be Roy Innis, Jr., thirteen, son of a prominent Negro leader, but there was no political implication in the tragedy. The killer, also a Negro, confessed to police that he was a nightworker who had lost control of himself because the noise from the boys prevented him from sleeping. This incident is extreme but worthy of our careful attention due to the implications it has on the worsening human problems which we are now experiencing in our cities.

Until recently the most authoritative voices about noise have come from within the industrial occupations due to the mere fact that noise has been a problem much longer in this area than in any other. Industrial management has become increasingly concerned with the adverse effects of noise on those persons who work under constant exposure to intense levels of noise—and I might add with due reason.

According to Dr. Glorig, director of the Caller Hearing and Speech Center in Dallas, Texas: "Industrial noise is now the most important single cause of hearing loss." Despite numerous research, training and regulatory programs now underway in some industries and in various Federal agencies, and despite the great strides accomplished in responsible noise abatement efforts in the occupational fields, there is still need for a vast amount of education in the field of occupational noise. For instance, B. F. Goodrich estimates that the total market for acoustical goods and products will reach \$875 million by 1970, which if one takes into account all that this comprises is a very paltry sum.

Another example of the need for increased emphasis placed on occupational noise is the

fact that permanent hearing loss caused by excessive exposure to noise is now a recognized occupational hazard and is compensable in only 35 states. I am always reminded of the basic lack of awareness in this field by an unfortunately true story which occurred when one of my aids was touring a textile factory in the South. When he commented on the high level of noise to which the workers were subjected, the manager hastened to assure him that immediate efforts were being made to correct the unpleasant conditions. "Next week the factory is playing country-western music over the loud-speaker at a level which will block out the noise of the factory."

The noise of our industries is put into further perspective when one considers them in light of "safe" noise levels. There are differences of opinion about permissible occupational noise levels. The American Academy of Ophthalmology and Otolaryngology states that our present knowledge of the relation of noise exposure and hearing loss is much too limited to propose safe amounts of exposure. However, the Academy recommends noise-exposure control and tests of hearing if there is habitual exposure to continuous noise at 85 decibels at a frequency of 300-1200 cycles per second. Noise is measured in a dimensionless unit called the decibel which is used to describe the levels of acoustical pressure, power and intensity.

The decibel expresses a logarithmic ratio between two sounds. In other words, the difference between a noise with a decibel rating of 60 and that with a rating of 70 is a relative increase of 10 times the lower level. The frequency of noise expressed in cycles per second is useful for rating noise hazards since some frequencies are more likely to cause hearing damage than others, with high pitched sounds more annoying than low pitched sounds. The British Medical Society recommends hearing conservation measures when noise exceeds 85 decibels in the 250-4000 cycles per second range.

The United States Air Force recommends ear defenders when personnel are exposed to 85 decibels in the 300-4800 frequency range. The American Standards Association has suggested permissible daily quotas of exposure to noise which they suggest should protect the worker from hearing loss. Over an eight hour working day they suggest a limit of 85 decibels at any frequency range above 700 cycles per second. In the Walsh-Healey Public Contracts Act the Federal government has adopted 90 decibels at any frequency range as a permissible safe occupational noise level.

Only recently has there been concern about the entire realm of urban and community noise although millions of Americans are affected each day by the repercussions of this type of noise. As Dougherty and Welsh commented in "Community Noise and Hearing Loss":

"The saving quality heretofore has been that community noise has been a short-term exposure as compared to an 8 hour day period in industry. As the power use of both home and street increase, steps must be taken to limit the noise output. Otherwise, total timed exposure will exceed industrial standards that actually rely on regular audiograms to prevent severe hearing loss."

Indeed the din in the cities at times far exceeds the noise levels considered "safe" for an occupational situation. A noise level of 100 decibels was once recorded on the Avenue of the Americas in New York City where the Transit Authority was building the extension of the 6th Avenue subway. Construction is perhaps the most irritating source of noise to the urbanite and the problem is intensified when once we realize that there are virtually no legal controls on the amount of noise that can emanate from a construction site. In the absence of any

forms of control the consequences are logical—existing knowledge for noise control is not even applied.

Noise control costs money, and it is not reasonable to ask sympathetic construction firms to invest in noise control only to let unsympathetic firms underbid them on jobs by avoiding the noise control costs. Air compressors, pneumatic drills, power saws, concrete mixers and other machines involved in the construction or demolition of buildings are permitted in some urban areas between 7 am and 6 pm, six days a week and at night with special permit. Combined with the poor soundproofing in modern apartments, the sounds of congested traffic which can reach upwards of 90 decibels, and the multitudinous other sounds of "civilized living", the city dweller is caught in the midst of a "cacophonous catastrophe".

Europe and such countries as Russia and Japan have for some time had strictly enforced noise abatement laws, including zoning and construction measures and national councils like the Swiss Anti-Noise Commission which deals with the basic medical, acoustic and technical questions of road, rail and water traffic: aircraft noise, noise in industry, building construction, homes, etc.: and legal questions.

The United States by contrast has few laws regarding noise abatement and even those that it has are barely enforced. For example, New York City is one of the cities that has strict noise laws against horn-blowing and even has a legal noise limit for the city of 88 decibels at 150 feet. If you have ever been to New York, I am sure that these laws will come as surprising news.

The final assault on the nation's well-being due to noise and the one which brings you here today is that of aircraft noise. Of all the fields of noise abatement that of air transportation has received the most attention by industry and government due to the obvious severity of the problem. The possible adverse effects of aircraft noise have been recognized for several years. In 1952 the Dolittle Report pointed out that "positive efforts should be continued by both government and industry to reduce or control aircraft noise nuisance to people on the ground and that substantial reduction of such noise is practicable."

Such firms as Pratt and Whitney, General Electric and Boeing have been involved for some years in the research and development of a "quiet" engine. According to sources within the field we are five years away from a prototype which when operational will only reduce the perceived noise level at take-off and landing by 10 percent. The problem in this area is not so much a matter of money as lack of available technology. The sound of a jet taking off is approximately 130 decibels which is also the estimated maximum noise bearable to human ears. A reduction of 10% will barely scratch the surface of the noise problem in this area unless there is a major technological breakthrough.

Therefore in combating aircraft noise we also need to pursue abatement efforts in the aspects of aircraft operations and apply methods of compatible land use around the airports. In the realm of flight patterns, airport design and placement, guaranteed buffer zones, adequate soundproofing of buildings in and around airports, extension of runways, legal controls, and so on, joint action will have to be taken by the Federal government, the airlines, and the community. With over 98% of our airports owned by some level of state government, it will be primarily up to the local government and the airport operators of the same to effect noise abatement controls. In addition airport operators should share the responsibility of enforcing the new Federal Aviation Agency noise standards to be announced this month

and closely coordinating local efforts with such programs as the Aircraft Noise Abatement Program established under the F.A.A. in 1961.

For examples of innovative noise control efforts I recommended such programs as that taken in the Los Angeles area in which community efforts and pilot programs have been established to abate noise at the Los Angeles International Airport. The Port of New York Authority has also carried out extensions costing several million dollars to the three runways at New York's Kennedy International Airport solely out of noise abatement considerations. Dulles International Airport in Washington is a good example of how zoning laws and design can be effectively employed to control noise levels emanating from aircraft.

But despite these examples, the fact remains that there is much left to do before you can successfully cope with aircraft noise. Your recognition of this fact has brought you here today. There are many questions which must be answered before actual work can even begin. The most important of these is funding of noise abatement efforts. Who is responsible? Should we ever obtain an operational "quiet" engine, the estimated cost of retrofitting our four engine commercial jets has been upwards of \$300 million. This is perhaps the most touchy issue which will face you in your efforts to combat jet noise for the costs are formidable and the responsibility ill-defined.

Another problem of considerable concern is that of the sonic boom. Until recently the shock waves from the sonic boom was confined to occasional military flights scheduled to fly over unpopulated areas of the United States. However, since President Nixon's request for \$96 million for the current fiscal year ending June 30, 1970 in order to finance the start of construction of two SST prototype aircraft it now appears that within the next 10 years we will be subjected to the sound of commercial sonic booms. I am opposed to the development of this aircraft. Aside from the obvious criticism of low cost-benefit considerations, I find it difficult to justify the vast noise disturbance of this aircraft in light of the small domestic value derived. The plane has no defense value, will cost the government a total of \$1.29 billion, out of a total development cost of \$1.51 billion, and its flights have been estimated to disturb 20 million groundlings every time the SST flies from coast to coast.

The repercussions of the noise problem have just begun to be understood and much has been done to alleviate the noise onslaught on our environment. For instance, New York City has a law requiring walls soundproof enough to reduce any airborne noise passing through by 45 decibels. Some construction companies have proved that buildings can be constructed quietly, by muffling blasting by special steel mesh blankets, welding instead of using the horrendous racket of riveting or bolting. New machines have been offered on the market which have a vast reduction in decibel rating over their old predecessors such as a new compressor which reduces the decibel level from 110 to 85 decibels and a new paving breaker that has had its sound reduced by 2/3.

New York, California, New Jersey, Minnesota, and other states have voted or have pending various legislation on noise abatement particularly in the realm of vehicular noise. Numerous local ordinances deal with specific noise problems of their area offering such things as prevention of transistor playing in public areas, zoning laws, etc. Some states have legislation which prohibits vehicles on its public highways that exceed certain established noise levels for that particular vehicle.

All of these are good beginnings but they cannot be assessed as anything more than

just beginnings. What is needed are guaranteed standards for the man on the street, on his job, or in his home. In this category I would like to mention the Walsh-Healey Public Contracts Act which was signed into effect by Secretary of Labor Shultz on May 17, 1969. This Act provides for a limit of on-the-job noise levels at 90 decibels at any frequency. This regulation only applies to firms that have a \$10,000 or better contract with the Federal government during the course of one year. The Walsh-Healey Act is a step in the right direction but again it is only a beginning. It only affects certain segments of workers and sets as a standard a noise level which is of debatable safety for an occupational level.

The real question at hand in the consideration of the noise level of our society is whether we are going to preserve the basic amenities of civilized life in the onslaught of technological advance.

As one noted figure in the noise abatement field, William H. Ferry, once said: "We have been neither interested nor successful in controlling noise because we have been neither interested nor successful in coping with technology."

Some 60 years ago Robert Koch, a bacteriologist and Nobel Laureate predicted: "The day will come when man will have to fight merciless noise as the worst enemy to his health."

That day is not so far away. The problem must be faced now before it is beyond our control. So I offer a few suggestions from my meager knowledge of the problem of what may prevent a continuation of the insult of noise on the future sensibilities of our nation. The problem of our "cacophonous republic" requires education, public awareness, increased research and greater application of economical acoustical materials, and a great deal of cooperation and coalition of effort between industry, business, government, health officials and community groups in order to find and carry out solutions to local, regional and national noise problems.

We need uniform noise control standards for all industrial and office workers . . . a Walsh-Healey Public Contracts Act of more encompassing and more rigorous standards.

We need to educate consumer demand that will call for quieter jobs and products in order to make it desirable for industry to compete to produce both at less cost.

We need the City Code level to handle such noise sources as garbage collection, construction, loud speakers, and motor vehicles. We need a regional approach to the research and development or programs directed toward the alleviation of the noises that plague particular areas of the United States. Lastly we need the full cooperation of the Federal government in assisting, coordinating and financing these efforts to provide a quieter environment.

As Dr. William H. Steward of the Public Health Service once stated: "Those things within man's power to control which impact upon an individual in a negative way, which infringe upon his integrity, and interrupt his pursuit of fulfillment, are hazards to the public health."

Noise can and must be controlled as a danger to the public health and economy, but above all else we must commit ourselves to the control of the noise in our society on the basis of civilized standards.

[From the CONGRESSIONAL RECORD,
Nov. 24, 1970]

S. 4538—INTRODUCTION OF THE NOISE
ABATEMENT ACT OF 1970

Mr. HATFIELD. Mr. President, as the country has become increasingly aware of the growing threat to our environment, attention has been primarily focused on air and water pollution. But there is another form

of pollution which has been shown to be very harmful yet has received little public attention: noise.

Recently the Environmental Protection Agency was formed in which the various problems of our environment could be focused and possible solutions recommended. However, there was no provision made to deal with noise abatement with this agency. Today, consequently, I am introducing legislation which would create an Office of Noise Abatement within the Environmental Protection Agency. This office would help coordinate research on Federal, State, and local levels, provide grants for such research, help provide information regarding noise abatement to interested parties, and make recommendations regarding the promulgation of standards.

Mr. President, I am confident that the legislation I am introducing today will receive close scrutiny by the various Federal agencies which are already directing their attention to the problems of noise as well as the Environmental Protection Agency. And I am assured that we will be able to make an Office of Noise Abatement a reality through our mutual effort.

There is a bumper sticker now circulating which says:

"Eliminate Pollution Before Pollution Eliminates You."

Immediately we will think of studies which threaten a lack of water by 1980 and conjure up the words of California scientists stating that within 50 years their State will be uninhabitable for any form of life. Or we hold our breath for a moment remembering that 142 million tons of smoke and noxious fumes are dumped into the atmosphere each year. Momentarily we feel brief panic and then for one reason or another, we forget the threatening words of the bumper sticker and go about our daily duties in a comfortable shield of self-deception and false security. Unfortunately such an attitude has now brought us to a situation in which the rapidly deteriorating quality of our environment is the most hazardous challenge to not only our health and well-being but to our very lives and those of our children and grandchildren.

Environmental pollution may not pose the immediate destruction that nuclear war does, but I might remind you that the effects are the same and just as lasting. And I might remind you that destruction at the hands of our environment is as immediate as your and my lifetime. And finally, I might remind you that lack of inhabitable land, lack of food, lack of good water to drink and good air to breathe are the very conditions under which men become desperate and resort to any and all means to preserve their survival. It is with these thoughts in mind that I state my firm conviction that pollution—all forms of pollution: air, water, and noise pollution, overpopulation, land and soil pollution—is the most challenging and the most crucial problem facing the man of the 20th century. And it is with these thoughts in mind that I firmly believe that if we do not meet this problem with all the creativity and ingenuity of our age, then within a very short time nothing else will matter, for there will be nothing else to worry about.

Your concern with environmental pollution has brought you here today in order to form an effective citizen's group to combat this onslaught on our planet before it is indeed too late. Your special concern is with the assault of noise pollution on our society and in your recognition of noise as a pollutant you have established yourselves as somewhat pioneers in combating the effects of noise on our society. It was, therefore, an honor to be invited to speak at this organizational meeting of the Noise Abatement Council of America. Had such groups been instrumental in educating the public to

appreciate the inevitable results of uncontrolled air and water pollution and in affecting remedial action to combat these problems even 10 years ago then we would not be faced with the present national crisis in these areas. Today let us pledge ourselves to the task of preventing noise becoming another uncontrolled threat to our existence.

The effects of noise, although long a problem, have only begun to receive the well-founded concerns of government, health, industrial, and community organizations. We are already far behind the rest of the world in appreciating the scope of the problem. For our backwardness in the field of noise abatement the United States is now the noisiest country on this planet, and frankly, I hate to think that we are now carrying this lack of respect for civilized standards to other planetary bodies. Basically, noise pollution is reaching crisis proportions in the United States and I think that it is time that all of us wake up to this fact.

We should be concerned with noise as a problem because for over a century noise exposure of sufficient intensity and duration has been recognized to produce sensorineural hearing loss. But in spite of this knowledge, an overexposure to excessive noise is the major cause of hearing loss in the United States today. In fact it is estimated that 10 to 20 million people in the United States have some degree of hearing impairment.

Everyone realizes that if he is exposed to a very loud noise such as an explosion he may very likely wind up deaf—at least temporarily. What is not so apparent is that the effect of noise is cumulative; it produces as Dr. Leo Beranek, whose work is acoustics is international in scope, an "acoustic fatigue." Repeated moderate noise builds up to produce the same effect as would a single loud noise. And even more important is the fact that repeated noise is the only type, short of a shattering explosion, that produces permanent hearing loss. The importance of this is readily seen when one is considering the harmful effects of exposure to daily occupational noise.

Another matter of some concern is that the noise level of the United States is increasing at an astonishing rate. Over the past 25 years the average increase in noise level has been at one decibel per year. When one considers that damage to the ears can occur at sustained exposure to the ranges around 85 decibels and over, and given our present noise levels, it will not be too many years before noise levels in the United States become lethal. To quote Dr. Vern O. Knudsen, physicist and former chancellor of the University of California:

"If the noise we make keeps increasing at the present rate, it will be as deadly in thirty years in some of our downtown cities as were the ancient Chinese tortures for executing condemned prisoners."

We know, of course, that the most pronounced physical effect of noise is damage to the ear. Exposure to intense noise over varying durations causes partial and in some cases permanent hearing loss due to actual cell damage in the organ of the Corti located within the cochlea of the inner ear.

But noise has much farther reaching effects than just hearing damage. As Paul E. Sabine stated even back as far as the March 1944 issue of the American Journal of Public Health:

"There is a wealth of reliable data from medical sources in support of the Statement that sustained exposure to noise is a contributing factor in impaired hearing, chronic fatigue that lowers bodily resistance, neurasthenia, increased blood pressure, and decreased working and mental efficiency and that noise should rightfully be classified as an occupational hazard along with gases, fumes, dust, toxic liquids, and bacteria."

To put this into, if nothing else, economic perspective, the total cost to industry in

compensation payments, lost production and decreased efficiency due to noise is estimated at well over \$4 billion per year. In relation to business a World Health Organization report states that before 1939 office noise was costing U.S. business \$2 million per day through inefficient work. Today that figure is \$4 million. The psychological and physiological effects of noise are difficult to assess but the correlation between noise and such things as sleep disturbances, hypertension due to the constant response of hormonal and neurological mechanisms to noise stress, interference with basic communication, the loss in efficient performance and even damage to property must be counted as a very real and a very enormous threat to our wellbeing, not to mention the economic repercussions.

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According to Dr. Glorig, director of the Callier Hearing & Speech Center in Dallas, Tex.:

"Industrial noise is now the most important single cause of hearing loss."

Despite numerous research, training, and regulatory programs now underway in some industries and in various Federal agencies, and despite the great strides accomplished in responsible noise abatement efforts in the occupational fields, there is still need for a vast amount of education in the field of occupational noise. For instance, B. F. Goodrich estimated that the total market for acoustical goods and products would reach \$875 million by 1970, which if one takes into account all that this comprises is a very paltry sum.

Another example of the need for increased emphasis placed on occupational noise is the fact that permanent hearing loss caused by excessive exposure to noise is now a recognized occupational hazard and is compensable in only 35 States. I am always reminded of the basic lack of awareness in this field by an unfortunately true story which occurred when one of my aides was touring a textile factory in the South. When he commented on the high level of noise to which the workers were subjected, the manager hastened to assure him that immediate efforts were being made to correct the unpleasant conditions.

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tional noise levels. The American Academy of Ophthalmology and Otolaryngology states that our present knowledge of the relation of noise exposure and hearing loss is much too limited to propose safe amounts of exposure. However, the academy recommends noise-exposure control and tests of hearing if there is habitual exposure to continuous noise at 85 decibels at a frequency of 300-1,200 cycles per second. Noise is measured in a dimensionless unit called the decibel which is used to describe the levels of acoustical pressure, power, and intensity.

The decibel expresses a logarithmic ratio between two sounds. In other words, the difference between a noise with a decibel rating of 60 and that with a rating of 70 is a relative increase of 10 times the lower level. The frequency of noise expressed in cycles per second is useful for rating noise hazards since some frequencies are more likely to cause hearing damage than others, with high pitched sounds more annoying than low pitched sounds. The British Medical Society recommends hearing conservation measures when noise exceeds 85 decibels in the 250-4,000-cycles-per-second range.

The U.S. Air Force recommends ear defenders when personnel are exposed to 85 decibels in the 300-4,800 frequency range. The American Standards Association has suggested permissible daily quotas of exposure to noise which they suggest should protect the worker from hearing loss. Over an 8-hour working day they suggest a limit of 85 decibels at any frequency range above 700 cycles per second. In the Walsh-Healey Public Contracts Act the Federal Government has adopted 90 decibels at any frequency range as a permissible safe occupational noise level.

Only recently has there been concern about the entire realm of urban and community noise although millions of Americans are affected each day by the repercussions of this type of noise. As Dougherty and Welsh commented in "Community Noise and Hearing Loss":

"The savings quality heretofore has been that community noise has been a short-term exposure as compared to an 8-hour day period in industry. As the power use of both home and street increase, steps must be taken to limit the noise output. Otherwise, total timed exposure will exceed industrial standards that actually rely on regular audiograms to prevent severe hearing loss."

Indeed the din in the cities at times far exceeds the noise levels considered safe for an occupational situation. A noise level of 100 decibels was once recorded on the Avenue of the Americas in New York City where the transit authority was building the extension of the Sixth Avenue subway. Construction is perhaps the most irritating source of noise to the urbanite and the problem is intensified when once we realize that there are virtually no legal controls on the amount of noise that can emanate from a construction site. In the absence of any forms of control the consequences are logical—existing knowledge for noise control is not even applied.

Noise control costs money, and it is not reasonable to ask sympathetic construction firms to invest in noise control only to let unsympathetic firms underbid them of jobs by avoiding the noise control costs. Air compressors, pneumatic drills, power saws, concrete mixers and other machines involved in the construction or demolition of buildings are permitted in some urban areas between 7 a.m. and 6 p.m., 6 days a week and at night with special permit. Combined with the poor soundproofing in modern apartments, the sounds of congested traffic which can reach upwards of 90 decibels, and the multitudinous other sounds of civilized living, the city dweller is caught in the midst of a cacophonous catastrophe.

Europe and such countries as Russia and Japan have for some time had strictly en-

forced noise abatement laws, including zoning and construction measures and national councils like the Swiss Anti-Noise Commission which deals with the basic medical, acoustic, and technical questions of road, rail, and water traffic; aircraft noise, noise in industry, building construction, homes, et cetera; and legal questions.

The United States by contrast has few laws regarding noise abatement and even those that it has are barely enforced. For example, New York City is one of the cities that has strict noise laws against horn blowing and even has a legal noise limit for the city of 88 decibels at 150 feet. If you have ever been to New York, I am sure that these laws will come as surprising news.

The final assault on the Nation's well-being due to noise and the one which brings you here today is that of aircraft noise. Of all the fields of noise abatement that of air transportation has received the most attention by industry and Government due to the obvious severity of the problem. The possible adverse effects of aircraft noise have been recognized for several years. In 1952 the Doolittle report pointed out that:

"Positive efforts should be continued by both government and industry to reduce or control aircraft noise nuisance to people on the ground and that substantial reduction of such noise is practicable."

Such firms as Pratt & Whitney, General Electric, and Boeing have been involved for some years in the research and development of a quiet engine. According to sources within the field, we are 5 years away from a prototype which when operational will only reduce the perceived noise level at takeoff and landing by 10 percent. The problem in this area is not so much a matter of money as lack of available technology. The sound of a jet talking off is approximately 130 decibels which is also the estimated maximum noise bearable to human ears. A reduction of 10 percent will barely scratch the surface of the noise problem in this area unless there is a major technological breakthrough.

Therefore, in combating aircraft noise we also need to pursue abatement efforts in the aspects of aircraft operations and apply methods of compatible land use around the airports. In the realm of flight patterns, airport design and placement, guaranteed buffer zones, adequate soundproofing of buildings in and around airports, extension of runways, legal controls, and so on, joint action will have to be taken by the Federal Government, the airlines, and the community. With over 98 percent of our airports owned by some level of State government, it will be primarily up to the local governments and the airport operators of the same to effect noise abatement controls. In addition airport operators should share the responsibility of enforcing the new Federal Aviation Agency noise standards to be announced this month and closely coordinating local efforts with such programs as the aircraft noise alleviation program established under the FAA in 1961.

For examples of innovative noise control efforts I recommend such programs as that taken in the Los Angeles area in which community efforts and pilot programs have been established to abate noise at the Los Angeles International Airport. The Port of New York Authority has also carried out extensions costing several million dollars to the three runways at New York's Kennedy International Airport solely out of noise abatement considerations. Dulles International Airport in Washington is a good example of how zoning laws and design can be effectively employed to control noise levels emanating from aircraft.

But despite these examples, the fact remains that there is much left to do before we can successfully cope with aircraft noise. Your recognition of this fact has brought you here today. There are many questions which must be answered before actual work can

even begin. The most important of these is funding of noise abatement efforts. Who is responsible? Should we ever obtain an operational "quiet" engine, the estimated cost of retrofitting our four engine commercial jets has been upwards of \$300 million. This is perhaps the most touchy issue which will face you in your efforts to combat jet noise for the costs are formidable and the responsibility ill defined.

Another problem of considerable concern is that of the sonic boom. Until recently the shock waves from the sonic boom was confined to occasional military flights scheduled to fly over unpopulated areas of the United States. However, since President Nixon's request for \$96 million for the current fiscal year ending June 30, 1970, in order to finance the start of construction of two SST prototype aircraft it now appears that within the next 10 years we will be subjected to the sound of commercial sonic booms. I am opposed to the development of this aircraft. Aside from the obvious criticism of low cost-benefit considerations, I find it difficult to justify the vast noise disturbance of this aircraft in light of the small domestic value derived. The plane has no defense value, will cost the Government a total of \$1.29 billion, out of a total development cost of \$1.51 billion, and its flights have been estimated to disturb 20 million groundlings every time the SST flies from coast to coast.

The repercussions of the noise problem have just begun to be understood and much has been done to alleviate the noise onslaught on our environment. For instance, New York City has a law requiring walls soundproof enough to reduce any airborne noise passing through by 45 decibels. Some construction companies have proved that buildings can be constructed quietly, by muffling blasting by special mesh blankets, welding instead of using the horrendous racket of riveting or bolting. New machines have been offered on the market which have a vast reduction in decibel rating over their old predecessors such as a new compressor which reduces the decibel level from 110 to 85 decibels and a new paving breaker that has had its sound reduced by two-thirds.

New York, California, New Jersey, Minnesota, and other States have voted or have pending various legislation on noise abatement particularly in the realm of vehicular noise. Numerous local ordinances deal with specific noise problems of their area offering such things as prevention of transistor playing in public areas, zoning laws, et cetera. Some States have legislation which prohibits vehicles on its public highways that exceed certain established noise levels for that particular vehicle.

All of these are good beginnings, but they cannot be assessed as anything more than just beginnings. What is needed are guaranteed standards for the man on the street, on his job, or in his home. In this category I would like to mention the Walsh-Healey Public Contracts Act which was signed into effect by Secretary of Labor Shultz on May 17, 1969. This act provides for a limit of on-the-job noise levels at 90 decibels at any frequency. This regulation only applies to firms that have a \$10,000 or better contract with the Federal Government during the course of 1 year. The Walsh-Healey Act is a step in the right direction but again it is only a beginning. It only affects certain segments of workers and sets as a standard a noise level which is of debatable safety for an occupational level.

The real question at hand in the consideration of the noise level of our society is whether we are going to preserve the basic amenities of civilized life in the onslaught of technological advance.

As one noted figure in the noise abatement field, William H. Ferry, once said: "We have been neither interested nor successful in

neither interested nor successful in coping with technology."

Some 60 years ago Robert Koch, a bacteriologist and Nobel Laureate predicted:

"The day will come when man will have to fight merciless noise as the worst enemy to his health."

That day is not so far away. The problem must be faced now before it is beyond our control. So I offer a few suggestions from my meager knowledge of the problem of what may prevent a continuation of the insult of noise on the future sensibilities of our Nation. The problem of our "cacophonous republic" requires education, public awareness, increased research and greater application of economical acoustical materials, and a great deal of cooperation and coalition of effort between industry, business, government, health officials and community groups in order to find and carry out solutions to local, regional, and national noise problems.

We need a uniform noise control standard for all industrial and office workers—a Walsh-Healey Public Contracts Act of more encompassing and more rigorous standards.

We need to educate consumer demand that will call for quieter jobs and products in order to make it desirable for industry to compete to produce both at less cost.

We need the city code level to handle such noise sources as garbage collection, construction, loud speakers, and motor vehicles. We need a regional approach to the research and development of programs directed toward the alleviation of the noise that plague particular areas of the United States. Lastly we need the full cooperation of the Federal Government in assisting, coordinating and financing these efforts to provide a quieter environment.

As Dr. William H. Steward of the Public Health Service once stated:

"Those things within man's power to control which impact upon an individual in a negative way, which infringe upon his integrity, and interrupt his pursuit of fulfillment, are the hazards to the public health."

Noise can and must be controlled as a danger to the public health and economy, but above all else we must commit ourselves to the control of the noise in our society on the basis of civilized standards.

[From the CONGRESSIONAL RECORD,
June 21, 1971]

NOISE CONTROL ACT OF 1971—
AMENDMENT
AMENDMENT NO. 216

(Ordered to be printed and referred, jointly, to the Committees on Commerce and Public Works.)

Mr. HATFIELD, for himself, Mr. HART, and Mr. CRANSTON, submitted an amendment intended to be proposed to the bill (S. 1016), to control the generation and transmission of noise detrimental to the human environment, and for other purposes.

Mr. HART. Mr. President, the evidence is accumulating that yet another form of pollution has reached serious levels. I refer to noise. Noise is more than a nuisance: Excessive noise, I am told, is a serious hazard to us physically, mentally, and economically. Too much noise can result in temporary, or even permanent, damage to our hearing. Nighttime noise disturbs sleep, while noisy places of work reduce the efficiency of workers. Noise can also influence property values as anyone who lives on the perimeter of an airport or foundry can tell you.

Congress took a major step last year when it created the Office of Noise Abatement and Control in the Environmental Protection Agency. S. 1016, the Noise Control Act of 1971 proposed by the administration, is a further important step in controlling this problem. The President is to be commended for his efforts to bring the seriousness of this problem to the attention of the public and

for his commitment to promote an environment which is free from noise that jeopardizes the health and welfare of the citizens of this Nation.

As I join with the distinguished Senators from Oregon (Mr. Hatfield) and California (Mr. Cranston), to introduce several amendments to S. 1016, I think we should pay tribute to our colleague in the House of Representatives, the distinguished Congressman from New York (Mr. Ryan), who has long been a leader in this field. We thank him for the considerable guidance he has given us in developing our thoughts on noise pollution and its control.

The amendments to S. 1016 which we offer today are, we believe, in harmony with the stated goal of that bill. The amendments requiring the Administrator of the Environmental Protection Agency to set certain noise emission standards within a specified time are designed merely to help him implement the original intent of the law. The addition of a citizens suit provision similar to that in the Clean Air Act amendments passed last year is meant to provide an additional vehicle for the enforcement of noise standards. The citizen will be further benefited, it is hoped, by the requirement that products used in and around the home have labels telling the actual level of noise generation. Thus the consumer will be able to choose products on the basis of their noise generation characteristics as well as price, color, and so forth.

Mr. President, the time has arrived to take positive action toward controlling undesirable noise. The administration has come forward with a very useful proposal. The House began hearings on that proposal and several others last week. The Environment Subcommittee of the Senate Committee on Commerce is scheduled next week to begin consideration of S. 1016 and the amendments introduced today. Let us hope that the momentum of our present efforts will not be lost, but will result in the swift passage of legislation necessary to protect the citizens of this Nation from the hazards of excessive noise.

OPENING STATEMENT, SUBCOMMITTEE ON ENVIRONMENT

(By Senator MARK O. HATFIELD)

The national effort to restore our deteriorating environment has unfortunately neglected one of our most devastating and most common pollutants—noise. Excessive noise threatens not only our emotional well being, but as these hearings will establish, noise can be detrimental to our physical health as well.

For too long, the ecological movement has focused only upon the more obvious forms of air and water pollution. While most Americans are incensed because they are deprived of clean lakes and streams, and rightfully deplore the blight of smog, these same Americans are unaware of the toll which excessive noise extracts from their lives.

For over a century it has been known that noise exposure of sufficient intensity and duration produces hearing loss. Yet, we have disregarded known facts about noise and advanced to the point where we now have the dubious distinction of being the noisiest nation in the world. In fact, in the United States it is estimated that 10 to 20 million people have some degree of hearing impairment—the primary cause being over-exposure to excessive noise.

It is common knowledge that exposure to a very loud noise such as an explosion, may create deafness—at least temporarily. What is not as well known, but equally as devastating, is that repeated noise builds up to produce the same effect as would a single loud noise. This phenomena, labelled "acoustical fatigue" is capable of producing

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the same harmful effects upon human hearing.

Loss of hearing, however, is not the only concern when dealing with the problem of increasing noise levels. We are all familiar with the annoyance properties of noise—conversations punctuated with the whirr of a blender, television programs disrupted by the passing motorcycle, and a Saturday afternoon nap disturbed by the neighbor's power lawn mower or power saw.

What we do not always realize is that these "irritations" should be regarded as health hazards as well. Although it is more difficult to measure, there is growing evidence that the levels of noise to which urban Americans have grown accustomed are actually capable of inducing a variety of physical, and psychological ills.

Another matter of great concern is that the noise level of the United States is increasing at an astonishing rate. Over the past 25 years the average increase in noise level has been at one decibel per year. When one considers that damage to the ears can occur at sustained exposure to the ranges around 85 decibels and over, and given our present noise levels, it will not be too many years before noise levels in the United States become lethal. To quote Dr. Vern O. Knudsen, physicist and former chancellor of the University of California: "If the noise we make keeps increasing at the present rate, it will be as deadly in thirty years in some of our downtown cities as were the ancient Chinese tortures for executing condemned prisoners."

It is my understanding that the witnesses will testify to the extent and character of this growing problem in some detail so I will not dwell further on this matter at this time.

For a number of years I have been personally involved in trying to bring the noise problem to the attention of American people and my colleagues in Congress. I should at this point like to place in the Record copies of remarks I made before the Noise Abatement Council in 1969 and a compilation of State and local noise enforcement laws across the country which was prepared in conjunction with the conference. I am told that this compilation and analysis of existing statutes is the only one of its kind and my office has had numerous requests for it from persons dealing with the noise pollution problem.

I commend the Administration and the Environmental Protection Agency for the bill now before this committee. Too often, legislation follows in the wake of aroused public opinion when the proportions of a crisis have already overwhelmed us. In this case, however, we are presented with the opportunity of being on the offensive—of acting before further damage is done. The Administration has presented us with a bill that would head off what otherwise could be a crisis of the most serious consequences.

The "Noise Control Act of 1971" (S. 1016) if enacted would be a great step forward toward insuring the protection of the human environment from the detrimental effects of noise. This bill allows EPA to co-ordinate all existing Federal noise research and control programs, thus eliminating duplicity and providing for efficient handling of this crucial area.

The Noise Control Act also authorizes EPA to establish criteria for human exposure to noise and authorizes EPA to set standards based upon these criteria to regulate noise emissions on articles which move in commerce. In addition, the bill would authorize EPA to label manufactured goods giving the consumer the benefit of knowing just how noisy a product will be. The bill also provides assistance to states and local governments in establishing noise abatement programs.

The Amendment (216) which has been offered to the Noise Control Act would, in my

judgment, serve to strengthen the bill. By setting reasonable time limits for the establishment and enforcement of standards and requiring rather than authorizing the setting of standards, the Amendment would insure that Americans will be to be subject to any unnecessary delay in realizing the benefits of this legislation. The Amendment would also serve to guarantee the private citizen recourse against the detrimental effects of noise by allowing EPA to initiate legal action and providing for citizen suits.

I hope that these hearings will prove fruitful in bringing to light the nature of the noise problem and the need to enact this legislation.

Mr. MUSKIE. Mr. President, I call up my amendment No. 1740 and ask that it be stated.

The PRESIDING OFFICER. The clerk will read the amendment.

The second assistant legislative clerk proceeded to read the amendment.

Mr. MUSKIE. Mr. President, I ask unanimous consent that reading of the amendment be dispensed with.

The PRESIDING OFFICER. Without objection, it is so ordered.

Amendment No. 1740 is as follows:

On page 63, line 2, following the word "the" insert the following phrase: "sale for use,".

Mr. MUSKIE. Mr. President, I ask for the yeas and nays.

The yeas and nays were ordered.

Mr. MUSKIE. Mr. President, I yield myself 5 minutes.

The PRESIDING OFFICER. The Senator from Maine is recognized for 5 minutes.

Mr. MUSKIE. Mr. President, may I say to my colleagues that we have a 1-hour limitation. I think I can dispense with my case in 10 minutes, so I would expect that there is a reasonable chance for a vote in 20 or 25 minutes. I do not want to delay the Senate unduly.

This amendment is aimed at one point. It is a point I made in connection with the debate on the previous amendment and that is that at the present time some 32 States and numerous localities have adopted or are considering measures to control noise levels for the protection of public health in their communities.

The effect of this bill is to severely restrict, if not entirely eliminate, the right to continue to do so; and when we take that right away from them, then we ought to be certain that we are establishing a Federal policy which will do at least as good a job for them as they are now doing for themselves.

Full implementation of the noise control standards we consider today may be 1 or 2 years away, and the levels of control finally adopted will protect the public health and welfare as perceived on a national basis. They will not meet the needs of many State and local communities which have particularly critical noise problems that require more stringent controls.

The States and localities must have the right to adopt more stringent controls and the ability to enforce them. Use controls alone, without controls on sales, will not be adequate. They will force State and local governments to assume heavy enforcement burdens simply because the Congress was not