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Heinz Gasser

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IS ACOUSTIC TRAUMA AN ACCIDENT, and do the Workmen's Compensation Statutes thus save the employer from being sued in Common Law? Or is it considered an occupational disease, and thus not within the Acts?

Hearing impairment resulting from exposure to industrial noise, and the master's possible liability for such injury to the servant, was appreciated as far back as 1831. An English physician (Fosbroke) at that time made the first scientific investigation into the subject. He interviewed boilermakers, weavers, and persons exposed to noise of small-arms gunfire, and found that in many cases the worker's hearing had deteriorated to a point where the man was unable to hear his whispered word.[1]

Ever since this first scientific investigation, researchers have tried to agree on just where lies the dividing line between hazardous noise and non-hazardous noise. Today most authorities agree that it is to be found somewhere between an intensity of 70 and 100 decibels.[2] To be more specific, tones 85 db above .0002 dymes/cm may cause some deafness, temporary or permanent, but the main area of concern lies in noise levels above 100 decibels.

For the purpose of comparison, here are some of the standard acceptable noise levels:

Hospitals	35 to 40 decibels
Private Offices	40 to 45 decibels
Factories	45 to 80 decibels

Although it has been demonstrated that small, furry animals, such as mice, can be killed by high intensity ultra-sonic noises, these high frequency sounds ordinarily will not cause acoustic trauma in humans, and in spite of what one may read or hear in many contemporary science fiction dramas, they are not dangerous to man, because a smooth human skin will reflect about 95%

* B. A., University of Cincinnati, and a second year student at Cleveland-Marshall Law School.

1 Fosbroke, J., Practical Observations on the Pathology and Treatment of Deafness, 19 Journal-Lancet 645-648.

2 Kryter, K. D., Speech & Hearing Disorders, p. 37, Monogr. Supp. 1 (1950). See also: Guttman, Deafness, Head Injury, and the Medico-Legal Ear, 33 Eye, E., N. & Thr., Month., 734 (1954); Proctor, G. & W., The Ear in Head Trauma, 66 Laringoscope (1) 16 (1956).

of these high frequency sound waves at 6000 cycles/sec. and an even higher percentage at 18,000 cycles/sec.[3] This means that it is very unlikely that there will be any employers' liability claims arising out of this source.

It seems that the most dangerous noises are those with a frequency between 3000 and 5000 cycles/sec. (In the musical scale, this would be about the 4th octave above middle C.) People affected by acoustic trauma are usually deaf, or at least partially deaf as far as this tone range is concerned, but can hear higher or lower tones well.[4]

Is traumatic deafness a disease or is the disease caused by trauma? This is the principal question raised in almost all workmen's compensation cases involving traumatic deafness. This is because in the states which do not have occupational disease statutes the worker may sue the employer at common law for a disease arising in the course of his employment, but must claim under the statute if it is held to be a traumatic injury. One of the leading cases where this was the main issue was the case of *Winkelman v. Boeing Airplane Co.*, a Kansas case.[5] The plain-

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[3] Eldrege, D. H., Jr., Sound Problems in the Air Force. United States Armed Forces Medical Journal 449-461 (1950).

[4] Kryter, K. D., supra, n. 2.

[5] 166 Kan. 503; 203 P. 2d 171 (1949).

The court further summarizes as follows: "In Kansas recovery for industrial disease unaccompanied and unrelated to any injury by accident does not come under the act . . ."

Chop v. Swift & Co., 118 Kan. 35, 37, 233 P. 800 (1925). Here a girl was carrying strings of cold sausages continuously from the ice compartment to a conveyer belt. Musculospiroparalysis was not held to be the result of an accident and did not come under the Statute.

"There is a twilight zone between clear personal injury by accident, covered by the act, and disability (occupational disease) not covered by the act. Each case depends on the facts involved: Hoag v. Kansas Independent Laundry Co., 113 Kan. 513, 516-518, 215 P. 295 (1923). An engineer coming out of a boiler was overcome by the heat and subsequently contracted pneumonia. It was held that the disability was not caused by accident. The worker's resistance to pneumonia germs was lowered due to an accidental exhaustion. This is not a Bodily Injury.

"Accident" is simply an undesigned, sudden and unexpected event, usually of an afflictive or unfortunate character and often accompanied by a manifestation of force. Gilliland v. Ash Grove Lime & Portland Cement Co., 104 Kan. 771, 180 P. 793 (1919). The court further remarked that the elements in the above definition apply to the workmen and not to the employer or someone else. The accident may result from the intentional performance of usual acts in the usual way. It refers to the resulting harm rather than to the cause.

There are numerous cases allowing recovery under a Workmen's Compensation Act for injury arising out of and in the course of employment, even if the total injury has been caused gradually and from a series of events.

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tiff, Winkelman, was the assistant instructor of plant guards on the defendant's premises and was in charge of the shooting practice, which for a period of time was held indoors in a rather confined room. His hearing gradually deteriorated from the noise of the firing of the .38 calibre pistols.

In reversing judgment for the plaintiff, the court held that the plaintiff's sole remedy lay under the statute and that his deafness was compensable as an accidental injury; that each single shot and the effect thereof on his hearing was sudden and he did not expect the injury to be permanent. The court went on to say that even assuming that traumatic deafness may in some sense properly be denominated an industrial disease, the fact remains that here a portion of the man's physical structure was definitely broken down by accidental injury, and that under such circumstances the court would not be justified in denominating the injury solely and purely an industrial disease and thereby denying a workman's compensation recovery under the Act.

Dr. Ernest M. Seydell, a witness for the appellant company, and a specialist in otolaryngology, offered the following expert testimony upon cross-examination:

> "There are two types of deafness, one where the organ of hearing is destroyed at once and the other in which there is a gradual deterioration or loss of hearing; where the explosion is only moderate, the gradual constant hammering will cause a laying down of the white corpuscles in the blood; there is some scar tissue in the white corpuscles and the scar tissue ultimately destroys the organ of hearing.
>
> Q. Is this a disease or is it a trauma?
>
> A. It is a trauma.
>
> Q. In other words, this would be caused, in your opinion, from a definite trauma he had on the job out there?
>
> A. Yes, sir.

(Continued from preceding page)

Webb v. New Mexico Publishing Co., 47 N. M. 279, 141 P. 2d 333, 148 A. L. R. 1002 (1943): A printer allergic to the soap supplied in the employer's washroom.

Harris v. Southern Carbon Co., 162 So. 430 (La. App., 1935): A telephone lineman's blisters on legs becoming infected.

American Maize Products Co. v. Nichiporchik, 108 Ind. App. 502, 29 N. E. 2d 801 (1940): Here a riveter-helper had his hand subjected to a number of traumatic concussions over a period of years. This was held to be accidental and not an occupational disease.

Downey v. Kansas City Gas Co., 338 Mo. 803, 92 S. W. 2d 580 (1936): A pipefitter's helper repeatedly wiped off sweat from his brow with a soot-covered hand and sleeve. The resulting eye injury was held accidental.

Victory Sparkler & Specialty Co. v. Francks, 147 Md. 368, 128 A. 635, 44 A. L. R. 363 (1925): Phosphorous poisoning over a period of time was held to be an accident under the statute.

Q. And that trauma is what caused a deterioration of these little nerve ends as I understand it?

A. That is correct.

Q. But the original source would be the trauma that occurred on the job in your opinion.

A. That is correct, yes, sir; in my opinion."

The court further held that the mere fact that the workman is not, during the course of his employment, cognizant of his injury or the extent thereof, of course does not necessarily mean the injury did not result from an accident arising out of his employment.

In many of these traumatic deafness cases, the injured person does not realize the fact that his hearing is starting to deteriorate. There usually is no pain involved. Only when the intensity of the sound is very substantially above the danger point will one feel pain. At the intensity of 120 decibels most persons feel a tickling or other uncomfortable sensation in their ears; at 140 decibels most feel pain, and at 160 decibels the eardrum is expected to burst.[6]

Opposed to those cases where the trauma is a repeated or constant noise, and where the organ of hearing is destroyed gradually over a period of days or years, we have cases involving an actual perforation of the eardrum, such as in the Oklahoma case of *Andrews Mining and Milling Co. v. Atkinson.*[7] It involved a claim for an ear injury as a result of operating a jackhammer in a small room in a mine for a period of four or five hours. The resulting perforation of an eardrum was deemed an accidental personal injury arising out of and in the course of his employment, and thus was compensable under the statute.

There is hardly any room for disagreement with the outcome of this case, since it is, like the one discussed previously, based on the theory that each one of the repeated explosions or noises produced an injury, and that these added up to the resulting disability. However, how would the courts rule in a case where the partial deafness was the result of a constant and continuous noise? We have ten Oklahoma cases involving essentially the

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[6] Eldrege, D. H., Jr., supra, n. 3.

[7] Andrews Mining & Milling Co. v. Atkinson, 135 P. 2d 960 (Okl., 1943).

same factual circumstances.[8] Laborers were engaged in capping a runaway gas and oil well and were exposed to the loud and constant roaring sound of the well for a period of four days. The court again said that the resulting partial and permanent deafness was caused by accident. Each and every single sound wave was deemed to have caused trauma. Thus, the workers were limited to claims for compensation under the Statute.

In the State of New York, and in other states where both personal injury and occupational diseases are regulated by stat-

[8] Indian Territory Illuminating Oil Co. v.
Welch, 156 Okla. 243, 10 P. 2d 678 (1932)
Severe, 156 Okla. 246, 10 P. 2d 681 (1932)
Williams, 157 Okla. 80, 10 P. 2d 1093 (1932)
Sharver, 157 Okla. 117, 11 P. 2d 187 (1932)
Stone, 158 Okla. 262, 13 P. 2d 579 (1932)
Colson, 159 Okla. 299, 15 P. 2d 828 (1932)
Glasscock, 159 Okla. 300, 15 P. 2d 829 (1932)
Warren, 159 Okla. 301, 15 P. 2d 830 (1932)
Barrett, 159 Okla. 302, 15 P. 2d 831 (1932)
Collins, 159 Okla. 302, 15 P. 2d 832 (1932).

In the Williams case above, the court's syllabus includes the following cases: U. S. Gypsum Co. v. McMichael, 146 Okla. 74, 293 P. 773 (1930): The foundation of a Workmen's Compensation claim must be a casualty and it excludes occupational disease.—Here the worker was loading boxcars with gypsum rock and the resulting presence of dust was alleged to have caused the illness and disability. St. Louis Mining & Smelting Co. v. State Industrial Commission, 113 Okla. 179, 241 P. 170 (1925): Here the worker was overcome by carbon monoxide gas while working in a mine for about 30 minutes, where previously dynamite had been exploded. This was held to be an occupational disease and not compensable under the statute.

Young v. Melrose Granite Co., 152 Minn. 512, 189 N. W. 426, 29 A. L. R. 506 (1922): The workman's shoulder nerves degenerated because of a continuous strain in operating a stone surfacing machine, which was defective. This was held not to be covered as an accident under the act.

Mauchline v. State Ins. Fund, 279 Pa. 524, 124 A. 168 (1924): The employee, an engineer, developed bronchitis resulting from breathing smoke and fumes. The resulting emphysemia held not an "accident" under the statute.

Smith v. International Highspeed Steel Co., 98 N. J. L. 574, 120 A. 188 (1923): Disease from breathing small metallic particles held not caused by accident and recovery was held not to be confined to the Workmen's Compensation Act.

Pronse v. Industrial Commission of Colorado, 69 Colo. 382, 194 P. 625 (1920): Death from disease contracted and weakened condition caused by bad air, not due to "accident" within Compensation Act.

Clinchfield Carbocoal Corp. v. Kiser, 139 Va. 451, 124 S. E. 271 (1924): A coke plant employee contracting tuberculosis held not to have suffered an "accident" within Compensation Act.

Industrial Commission v. Russell, 111 Ohio St. 692, 146 N. E. 305 (1924): The action of ultra-violet rays, which injured the optic nerve of a motion picture operator was held not compensable under the statute.

Kinsey Heating & Plumbing Co. v. House, 152 Okla. 200, 4 P. 2d 59 (1931): An employee overcome by heat while digging ditches. Held to be an accidental injury.

Bryant v. Beason, 4 P. 2d 106 (Okla. 1935): Industrial Commission's findings on question whether disability resulted from occupational disease or accidental injury will not be disturbed.

ute, there is no need to strictly construe every loss of hearing as being caused by accident. Thus, in the case of *Slawinski v. J. H. Williams & Co.*[9] the court affirmed an award for partial deafness in both ears as an occupational disease which was described as "tinnitus," and which arose from work in the forge department of the employer's plant. 100 machine hammers were in constant operation there, and subjected this worker to an exceptionally heavy and sustained noise. He was allowed award under the statute. In the dissenting opinion, the Judge remarked that the claimant should not be compensated since the partial deafness did not affect his earning power.

Rosati v. Dispatch Shops[10] is another award in New York for partial deafness as an occupational disease. The claimant had been employed for 27 years as a riveter in the defendant's steel plant and had sustained a progressive permanent loss of hearing in both ears.

It is difficult to find a common general trend from these cases. Some hold acoustic trauma to be a disease, others say that it is an accidental personal injury. Whatever the case may be, the courts almost always interpret the Workmen's Compensation Statutes as broadly as possible. Where the Statute does not provide compensation for occupational disease, the term "accident arising in the course of the employment" is construed to include almost any disability having its origin in an occurrence or accident, thus discouraging common law actions and forcing the claimant to look to the statute for relief.

The amounts of compensation vary greatly from state to state, and each jurisdiction has minimum and maximum amounts which could be paid for scheduled injuries. For example, the state of Maine schedules a maximum of only $2,700.00 for loss of hearing in both ears, but under the Federal Employees Compensation Act $24,200.00 can be recovered. The Ohio Statute would pay the maximum of $4,025.00 and, as in many other states, regulates the amount of weekly payments. The Ohio statute allows 66⅔% of the impairment of the worker's earning capacity for a period of 25 weeks in the case of permanent total loss of hearing in one ear, and 125 weeks for a permanent total

[9] Slawinski v. J. H. Williams & Co., 213 App. Div. 826, 76 N. Y. S. 2d 888 (N. Y. 1948), Aff'd 298 N. Y. 546, 81 N. E. 2d 93, Reargument Denied 298 N. Y. 634, 82 N. E. 2d 29 (N. Y. 1948).

[10] Rosati v. Dispatch Shops, Inc., 83 N. E. 2d 860 (N. Y. 1949).

loss of hearing in both ears. The maximum weekly amount is $40.25.[11]

The cases discussed here involve the more common sources of dangerous noise, such as pistol fire, foundry noises, and mechanized hammers. There are other and new sources which may develop as new, larger and more powerful machines are used in industry. An example of a new source might be found in aviation. So far, the cases involving aircraft noise are mostly treated as nuisance cases. However, one must bear in mind that the noise level of today's jet engine is actually dangerous. Just one engine emits about 110 to 140 db, depending on the kind of tailpipe used and the frequency of the sound. The more powerful engines emit an even more intense noise of up to 160 db.[12] It follows that persons, such as maintenance personnel, exposed to this noise, within the radius of about 1000 feet, are endangering their hearing if such an exposure is continuous over a period of time. With the increasing number of commercial jet planes being built now, one might well be concerned.

A case arising out of this hazard would probably, depending on the jurisdiction, be treated similarly to the case of *Vaughn & Rush v. Stump.*[13] There the respondent was working in an oil field about 8 or 10 feet from the exhaust of a pump and for a period of 12 hours. Later he discovered that he could not hear out of his left ear any more. The Court held that this was an accidental injury and confirmed the award as follows: $20.00 total temporary disability, $300.50 as a fair award for approximately 35% partial permanent loss of hearing in the left ear. Note that this was a 1932 case. The awards would probably be higher today.

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[11] Analysis of Workmen's Compensation Laws. Chamber of Commerce of the United States (1954). Also, Page's Ohio Revised Code, Sec. 4123.57 (1956 Supp.).

[12] Eldrege, D. H., Jr., supra, n. 3.

[13] Vaughn & Rush v. Stump, 9 P. 2d 764 (Okl., 1932).

See generally as to noise:

Hodges, The Problem of Acoustic Trauma, 73 Canad. M. Asso. J. (9) 713 (1955); Aiken, Combined Environmental Stresses and Manual Dexterity, Army Med. Research Lab., Project No. 6-95-20-001, Report No. 225 (Fort Knox, Ky., Mar. 7, 1956); Rouge, Environmental Noise, 55 Nord. Med. (5) 165 (Stockholm, 1956).

For an excellent discussion of the balancing of equities in a case where business noise creates a nuisance, see, Payne v. Johnson, 20 Wash. 2d 24, 145 P. 2d 552 (1944). And that even an injunction of such noise-making must be specific and not too sweeping, see, Collins v. Wayne Iron Works, 227 Penna. 326, 76 A. 24, 19 Ann. Cas. 991 (1910).