

Health

By Mary Desmond Pinkowish
With reporting by Ursula Sautter in Bonn, Germany

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A LEAF BLOWER, SNOW BLOWER, LAWN

mower and two huge dogs—Peter D'Epiro can describe in excruciating detail how his neighbour's lawn equipment and pets ruined summer afternoons and dinner parties for him and his wife for more than a decade in Ridgewood, New Jersey. But he'd rather not. "I can barely think about that situation without rushing for the Valium or the IV gin drip," he says.

With rising emotion, D'Epiro recalls how the neighbour began "warming up his rider mower, converting our idyllic backyard—birds, squirrels, crabgrass—into the sonic equivalent of La Guardia or Heathrow. Yes, he had a large yard, but the job could have been accomplished in 30 minutes, whereas he took, oh, say, six or seven hours on Saturday, often followed by another half-dozen on Sunday." D'Epiro goes on to describe how he and his wife, usually mild-mannered, exceedingly polite people, were reduced to screaming, fist-shaking and cursing in the face of these acoustic offences.

Noise brings out the worst in human beings—noisy people have been injured and even killed by their neighbours—but neighbours are just one source of noise in a world that's increasingly cacophonous. Neighbourhoods can turn into battlegrounds when clubs, restaurants, automobile sound systems and parties are acoustically unrestrained. The roadway clamour made by cars and trucks, the oppressive roar of low-flying aircraft, the rumble of commuter trains and the screeching of subway cars compound the challenges of daily life in the city or suburbs. Construction work generates lots

of noise, and lots of noise complaints to civil authorities. Indoor sources include ventilation systems, office machines, home appliances, TVs and computer games.

Noise isn't just a nuisance; it's positively bad for us. We've known for decades that super-loud noise can deafen us. But damaged hearing is just the beginning. A jet flying overhead or a snoring bedmate can increase blood pressure and heart rate even when we don't stir from our slumber. Stress hormones surge into the bloodstream. Doctors worry that this chain of events creates health problems when it happens all night long, every night of the week. The ability of children to learn is compromised by noise. Noise may worsen some mental illnesses, and even people without previous mental health issues can become downright crazy when exposed to loud noise.

"WE HAVE LOST OUR RIGHTS TO ENJOY our own property without the intrusion of noise," says Ted Rueter, founder and director of Noise Free America, a grassroots outfit dedicated to fighting noise pollution. "Noise is a form of trespassing."

For Les Bloomberg, executive director of the Noise Pollution Clearinghouse (NPC), the whole idea of what constitutes noise needs to change. "The old definition of noise was 'unwanted sound,'" he says. "But we define noise as any sound that impacts or harms the health of people. This definition is more consistent with definitions of other forms of pollution, including air pollution."

Global warming notwithstanding, environmental pollution is easing. In most developed countries, the

air and water are cleaner than they were 30 years ago. Noise pollution, in contrast, is getting worse. Now people are getting mad as hell—and they aren't going to take it anymore.

Complaints about noise pollution are mounting, according to the World Health Organization (WHO). In Europe, 40 percent of the population is exposed to daytime road noise exceeding 55 decibels (dBA), and 20 percent of people spend their days listening to noise that exceeds 65 dBA. According to the American Speech-Language Association, 60 dBA is about the noise level generated by a typical dishwasher. So imagine sitting next to a running dishwasher all day.

WHO data also show that 30 percent of Europeans are forced to sleep in environments with noise that exceeds 55 dBA every night, a level known to disrupt sleep. The European Federation for Transport and Environment estimates that 44 percent of Europeans, more than 200 million people, are exposed to health-threatening noise levels.

The U.S. Environmental Protection Agency (EPA) says that to prevent hearing loss, people should be exposed to no more than 70 decibels of environmental noise in a 24-hour period. But the EPA acknowledges that noise exceeding 55 decibels outdoors and 45 decibels indoors interferes with work and conversation and annoys people. And that annoyance is becoming more pronounced. Of those who participated in the U.S. Census in 2000, nearly one-third complained of noise. More than 10 percent rated the noise as bothersome, and of these, 40 percent said they wanted to move because of noise.

The WHO reports that transportation—road, rail and air traffic—is the major source of noise pollution. Things haven't changed much in the past few thousand years. The ancient Romans suffered so much from the noise made by iron-wheeled wagons driven over stone pavements that they enacted laws to regulate the use of these vehicles. This is a continuing legacy in the city of Rome. Virtually every review of Rome's hotels makes note of the amount of traffic and road noise guests can expect.

"IT IS IMPORTANT TO DIFFERENTIATE between effects like hearing loss and stress effects like high blood pressure, because two different sound sources are concerned," says Wolfgang Babisch, senior research officer at the German Federal Environmental Agency in Berlin. "On the one hand, there is industrial noise and leisure-activity noise—things such as rock concerts, discos and iPod use—that can cause various degrees of hearing loss and/or tinnitus [a persistent ringing in the ears]. Studies have shown, for instance, that noise levels of more than 100 decibels are absolutely normal on today's dance floors, and young people often complain of hearing problems as a result. On the other hand, there is the so-called environmental noise caused by road or aircraft traffic. Since the sound level is lower in these instances, there are usually no adverse effects on hearing. But they can affect the whole organism by triggering stress responses."

Cars and trucks produce noise in two ways. The engines make noise, and the contact between the vehicle and the road creates noise. At speeds greater than 40 mph (60 km/h), road noise is louder than engine noise.

Trains and other forms of rail transportation make lots of noise too. That unendurable wheel squeal happens when the train goes around tight curves, which are more common in crowded cities. Train stations are noisy because of running engines, engine whistles and loudspeaker systems. High-speed trains, those that travel faster than 155 mph (250 km/h), can mimic the acoustic effect of a low-flying jet directly overhead.

Speaking of jets, it's not just the noise that's disturbing; it's, but the vibration and rattle they cause at low altitudes. Ask people who live near New York City's La Guardia Airport. According to a study published earlier this year in the *Journal of Occupational and Environmental Hygiene*, people living three-quarters of a mile from this airport are exposed to four times as much noise as people living five miles away. Among people whose homes were in the flight path, 55 percent said they were bothered by the noise.

But airports don't just have planes; they

also draw road traffic, and even more people, 63 percent, said they were bothered by road noise leading into and out of the airport. The noise measured in this study translated "to a sound that is perceived to be roughly twice as loud as a more or less constant background noise level in the home," says Beverly Cohen, a professor at the Nelson Institute of Environmental Medicine at the New York University School of Medicine, and one of the investigators involved in this study.

The sounds of construction, especially in cramped urban areas, are another major contributor to noise pollution—pneumatic hammers, air compressors, bulldozers, loaders, dump trucks and pavement-breakers. Hospitals can be as noisy as construction sites, and a recent study conducted at the Queen's Medical Centre in Nottingham in the UK makes it difficult to believe that people are expected to recover from illness there. The WHO guidelines for hospitals stipulate that neither daytime nor nighttime noise levels should exceed 30 and 40 dBA respectively. Noise in the Nottingham hospital was measured and analyzed over a 24-hour period on five general surgical wards. On all of them, peak noise levels exceeded 80 dBA during the day. On one ward, the peak level was an astounding 95.6 dBA. That's like having a cement truck drive past your bed—repeatedly.

Similar results come from a study performed in Madurai, India, in which the obstetrics and gynecology unit was the noisiest (72 dBA) and the quietest was the morgue (57 dBA). At least the patients in the morgue are less likely to complain.

IT'S A STAPLE OF CARTOONS AND SIT-coms: A red-faced guy is sitting in a chair trying to read the paper, but the veins in his temple are bulging and steam is coming out of his ears because of a) noisy neighbours, b) a barking dog, c) a jackhammer, or d) planes flying overhead. The steam out the ears is an exaggeration; the bulging veins aren't. Chronic exposure to loud noise is bad for the cardiovascular system.

Researchers with the Hypertension

and Exposure to Noise near Airports (HYENA) project in cities across Europe conducted blood pressure measurements at 15-minute intervals, or about 30 measurements each night, in 140 people sleeping near major airports. Noise levels were measured at the same time. Even when the overhead airplane noise didn't wake the study participants, systolic blood pressure (the top number on a blood pressure reading) increased by 6.2 mm Hg and diastolic blood pressure (the bottom number) by 7.4 mm Hg. Heart rate went up by an average of 5.4 beats per minute. For someone whose blood pressure is generally in the low or normal range (120/80 mm Hg or



lower), this might not be hazardous. But for people whose blood pressure is already too high, these constant spikes may increase the risk of stroke, heart attack or heart or kidney failure.

Blood pressure and heart rate reactions "were similar regardless of the noise source—aircraft, truck, or partner snoring," says Lars Jarup, a researcher with the Imperial College of London, England, and one of the principal investigators. That's right—a partner snoring is right up there with aircraft noise as a cause of nighttime blood pressure spikes.

"We believe that it is likely that frequent repeats of nightly acute blood pressure elevations will affect blood pressure chronically, but that needs to be studied further,"



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says Jarup, who adds there's no evidence that people become habituated to a noisy sleeping environment.

"Long-term exposure to environmental noise, especially at night, causes chronic disturbance of the natural sleep pattern—even if you don't wake up completely," says Babisch of the German Federal Environmental Agency. "Studies in sleep labs have proved that persons exposed to this type of noise show increased levels of the stress hormones adrenalin and noradrenalin. These hormones regulate metabolic functions that affect risk factors such as the blood fat level and blood sugar level."

Babisch adds that these reactions occur even in people who consider themselves injured to noise and don't report disturbed sleep. "There is no 100 percent noise habituation. The ears don't switch off when we sleep. The brain still registers the information about what's going on around us."

NEUROSIS, HYSTERIA, ANXIETY, stress, nausea, aggression, argumentativeness and social conflict—these are just a few of the emotional problems linked to uncontrolled noise. And while noise may not cause mental illness, it's believed to worsen disorders like depression and anxiety. According to a 2004 study published in the *British Medical Journal*, people living near the Schiphol Airport in Amsterdam, the Netherlands, were more likely to need sleep medication, take pills for heart disease and report poor general health.

Noise may not make kids dumb, but it does make it hard for them to learn. The Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health (RANCH) project is a multinational study designed to assess the relationships among road and aircraft traffic noise and reading comprehension. Included in its 2006 findings are data from more than 2,000 kids ages 9 and 10, enrolled in 89 schools near airports in three European cities. The verdict: A direct relationship exists between aircraft noise exposure at schools and problems with reading comprehension, even after the investigators account for socio-demographic factors known to interact with reading comprehension.

"Most of the long-term effects of chronic noise are detrimental to attention, learning and concentration," says Lorraine Maxwell, associate professor of design and environmental analysis at Cornell University in Ithaca, New York.

"These are psychological and learning

effects," according to Maxwell, not hearing problems.

She and her colleagues have also studied the effects on learning of road and air traffic, and the difficulties caused by noise in daycare centres and schools. "We know that very young kids in daycare learn to screen noise so they can stay on task," she says. "But they can get too good at this. By the time some of them are in elementary school, they've learned how not to pay attention to the classroom instruction."

Maxwell adds that noise is highly detrimental to kids when they're trying to focus on a task that happens to be difficult for them, like a math skill, for example. Noise is also a disaster for children with learning disabilities or for whom the classroom language isn't their native tongue.

"It takes too much energy to pay attention in a noisy environment," explains Maxwell. "As adults, we can usually call ourselves back to attention when it's important, but children who learn this pattern at a very young age don't do that."

THE MARCH 5, 1907, EDITION OF THE *New York Times* ran a story about a meeting of The Society for the Suppression of Unnecessary Noise, an organization dedicated to "an aggressive campaign against the useless and nerve-racking noises of the street." The Society reported progress in getting automobile owners to avoid driving past churches, hospitals and schools. If drivers couldn't avoid these institutions, they were asked to do two things: reduce their speed and refrain from using the horn. At about the same time in Boston, Massachusetts, hurdy-gurdy players were required to tune their instruments at least once a year.

The gentlepeople of The Society for the Suppression of Unnecessary Noise would be disheartened by the situation today. But to the NPC's Les Bloomberg, things are looking up. "One reason for my optimism about noise pollution is that it's hard to imagine it getting worse," he says. "For 50 years, people with means have moved to suburbs to escape noise. But that option doesn't work anymore. Now we take the noise with us to the suburbs, and suburban noise levels have increased."

Bloomberg cites the usual suspects, some of the stuff that made Peter D'Epiro's life miserable: leaf blowers, lawn mowers, nearby highways, air-conditioning units and booming car stereo systems.

The German Federal Environmental Agency's Babisch thinks new technologies can help turn down the volume. "Technological advances have caused some noise sources to quiet down," he says. "Cars and aircraft are less noisy than they once were, and countless noise barriers have been erected. But this is compensated for by the increased volume of traffic, so overall noise exposure hasn't changed much."

Babisch believes additional technological advances will be necessary to keep us from getting stuck in the present moment, noise-wise. Acoustical engineers are finding ways to reduce noise in hospitals, prisons and schools. Solutions range from the simple—carpeting—to the novel—antibacterial fibreglass, which absorbs the noise created by ventilation systems, hospital equipment and human speech. Road surfaces are constantly refined to reduce the amount of noise that bounces off nearby homes.

Worried that a snoring spouse may shorten your lifespan? Consider popping in some earplugs at night. There's no evidence yet that you'll live longer, but at least you'll sleep better. (For more technological fixes to noise pollution, see "Soft machines" on p. 46.)

Technological fixes aren't the only way to control noise. Legislation helps. A pub-noise crackdown is underway in the UK, while lawmakers in Brevard County, Florida, in the U.S. have enacted a law to force drivers to keep car stereos turned down. More than 600 citations were issued in accordance with similar legislation in the city of Melbourne, Australia, in 2007.

The European Federation for Transport and Environment suggests a number of measures municipalities should adopt to get a better grip on noise, including reducing city traffic by offering park-and-ride lots and pedestrian-only areas, replacing old stone pavements and brushed concrete with sound-absorbing surfaces and using small roundabouts and interactive speed-restriction signs to slow traffic instead of speed bumps and traffic obstacles, which can increase traffic noise.

NOISE FREE AMERICA WANTS EACH state in the U.S. to declare noise "a dangerous form of pollution" and adopt a noise code. The proposed code would ban gasoline-powered leaf blowers, car alarms and

loud exhaust pipes. The code would outline fines for the owners of barking dogs, set time frames for construction work and garbage collection and establish a rule stating that electronically amplified sound coming from a car can't be audible more than 10 feet from the vehicle. Other provisions include limits on the use of power equipment, Jet Skis, dirt bikes, snowmobiles, sirens and train horns.

More colourful is the approach of activists in Thailand protesting the noise around Suvarnabhumi Airport near Bangkok. On several occasions in the past 18 months, they threatened to release bunches of balloons to disrupt air traffic in protest against the noise between 9 p.m. and 7 a.m. Last February, they made good on their

We don't care about our neighbours. We don't know our neighbours." As a result, we don't necessarily care if we keep them awake at night or disrupt their quiet summer afternoons.

His solution? Throw a party or start a carpool. Bloomberg says you're less likely to offend a neighbour if you drive each other's children to school each day. Bloomberg tells the story of a former neighbour who was a musician and liked to give boisterous parties. "I'm sure he broke our local Montpelier, Vermont, noise ordinances on many occasions. But he invited me to the parties! Problem solved." If the party continued after he went home and stayed loud, it only took a phone call to get the music turned down. "We were friends.

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promise, costing the airport more than \$500,000 in compensation to airlines for the ensuing delays. That's above and beyond the earplugs and sleeping pills airport officials have been providing area residents since Suvarnabhumi opened. When faced with the possibility that neighbours would launch homemade rockets along with the balloons, however, civil authorities began negotiations for financial compensation of people living near the airport.

Bloomberg's solution is even more radical than balloons, bans and rockets. "The individualistic solution to the noise problem—moving to the suburbs—is no longer working. Now we need a more collective or community-oriented solution, because one person's noise trumps everyone else's quiet. We need to create community and interdependence."

Citing local governments (noisy trash pick-up) and businesses (noisy trucks), Bloomberg says it's easy to pollute when you're anonymous. "In many places, our sense of community has broken down.

He borrowed my ladder; I had some of his tools. We were interdependent."

While passionate about fighting noise pollution, Bloomberg also observes that silence really isn't found in human communities. "You need to go to a cave or a federal wilderness area for silence," he says. "A totally silent human community would be a poor human community."

He tells of a day a few years ago when a family of former neighbours returned for a visit. "We had little kids running around the yards of three families who had come out to see them, yelling and laughing. But we weren't imposing on anyone because we were all out there visiting. We made a small footprint of noise," he says, a footprint of happy human voices.

Which is further evidence, if we needed it, that peace and quiet begin at home.

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