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DOES CIVILIZATION CAUSE ASTHMA?

by ELLEN RUPPEL SHELL

Asthma is growing at an alarming and puzzling rate in industrialized countries, and the answer to the mystery of its origins may lie in our very attempts to prevent childhood disease

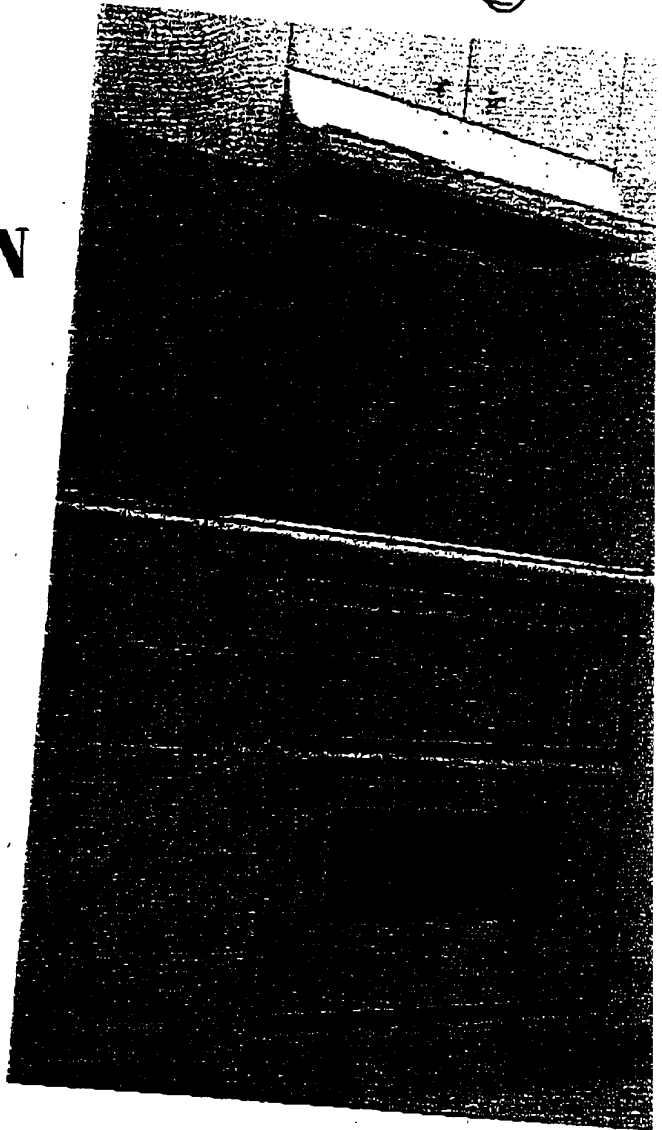
SCOTT Schroeder, a pediatrician and an associate professor at Montefiore Medical Center, in the Bronx, is a rugged-looking man in his mid-forties who was good enough at basketball to have played in college but not, he says, for the pros. He has furnished his cramped office clubhouse-style, with sports paraphernalia and souvenirs. Its only window is an ersatz one, with curtains that Schroeder sketched on the cinder block in colored marker. When we met recently, his phone rang constantly with questions from anxious patients, and he answered each call with a jaunty mixture of benevolence and locker-room sarcasm. For Schroeder, who specializes in the treatment of asthma, taking on a patient means taking on a long-term relationship. His appointment book is full.

The Bronx is the U.S. epicenter of asthma. Rates of death from the disease are three times as high here as they are in the United States as a whole, and hospitalization rates are almost five times as high. In some Bronx neighborhoods 20 percent of the children have asthma, and so do a goodly number of

adults. A local rap group wrote a song titled "Ventolin," named for a popular asthma reliever.

The Bronx may serve as a harbinger for the world. Australia, New Zealand, South Africa, Singapore, Hong Kong, parts of South America, and much of Western Europe struggle mightily with the disease. In the United States 15 million people have asthma, five to six million of them children—more than double the number in 1980.

Asthma kills at least 5,000 Americans annually—not a terribly large number compared with the toll other diseases take. But what the condition lacks in lethality, it more than makes up for in morbidity: it wears people down, crushes their spirits, and threatens their livelihoods. Asthma is the most common chronic disorder among children and the leading cause of both childhood hospitalizations and school absenteeism, rob-



ress has twenty-four dust mites, and each dust mite produces seven fecal particles a day," Rosenstreich told me. "There's a quarter of a million fecal particles in every ounce of mattress dust. So you can see the difficulty."

Many homes in and around Hunts Point and other inner-city neighborhoods have all the qualities associated with high asthma rates: poor ventilation, uncontrollable heating systems, and water damage that leads to the growth of molds, which are another important allergen. Carpets, Rosenstreich said, are breeding grounds for all sorts of nasty things, as are upholstered furniture and the piles of clothes that tend to accumulate when many people crowd into tight quarters without sufficient storage space. "Five or more might share an apartment with a single bedroom," he said. "When you have so many crowded into such a tight space, you have lots of people showering, cooking, boiling water. That adds to the humidity, which of course is great for roaches."

Given the association of cockroaches and dust mites and mold with asthma, it may seem paradoxical that outside the United States asthma is a disease of affluence. There is, for example, almost no asthma in rural China or sub-Saharan Africa (apart from South Africa), yet it is rampant in Sweden and New Zealand and Australia. One possible explanation is that rugs and upholstery and other items in which insects might want to nest are still luxuries in the developing world. This theory begins to break down, however, when one considers that there are plenty of dust mites and cockroaches in rural China, and that Australians are not notably partial to upholstery or wall-to-wall carpeting. More likely, cockroaches

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and dust mites and diesel fumes and tobacco smoke and dog hair and mold and any number of other things are triggers of asthma—but they do not cause it. Spending nearly all of one's time in a poorly ventilated home, as many inner-city American children do—will surely aggravate asthma, but will probably not bring on the disease in someone not prone to it. What will bring it on? That, says Louise Cohen, the director of the New York City Childhood Asthma Initiative, is "the sixty-four-thousand-dollar question."

IMMUNITY AND GENES

ONLY recently have we understood what asthma is, let alone what causes it. Asthma was traditionally considered a simple allergic reaction that provoked spasms and constriction of the bronchial passages, resulting in wheezing and shortness of breath. But over the past twenty years it has become clear that although asthma attacks are episodic, the inflammation associated with them is chronic, and requires long-term management with anti-inflammatory medication—in some cases for life. Scientists now believe that this chronic state is brought on by something that prevents the immune system from developing properly in the first months of life.

Starting out life with a naive immune system is not a bad thing. Were a fetus to have a mature immune system, it would almost certainly regard the mother as a foreign invader and reject her. A baby is protected for some time by antibodies passed to it through the placenta and, later, in breast milk. At about three months the immune system begins to mature in most infants. But in people who go on to develop asthma, the immune system seems to mature too slowly to be able to differentiate between annoying and serious irritants. As a result, the infant's system musters an armada of antibodies to fight cockroaches or dust mites as though they were deadly microbes. This results in an allergic reaction that constricts the airways and leads to hyper-responsive, or "twitchy," lungs (*asthma* means "panting" in Greek). Not all infants with twitchy lungs show symptoms to the same degree; it is thought that the minority of asthmatics who develop the disease later in life may actually have had mild, undetected asthma from early infancy. In severe asthmatic episodes a minor irritant can set off an immune response that shuts down the airways completely, resulting in respiratory arrest and, in extreme cases, death. Richard Green, the chancellor of the New York City school system, died in such an episode eleven years ago.

Fernando Martinez, the director of respiratory sciences at the University of Arizona, trained in Italy as a pediatrician but decided to do research on asthma when he realized how many of his patients had it. "It was extraordinary, a huge problem," he told me recently. "Like most people, I assumed tobacco smoke and pollution were the problem—this was the politically correct way to think. But these factors turned out not to play a major role. In high-pollution areas, in low-pollution areas, among all ethnic groups, there was asthma. Clearly, something else was involved."

Martinez, who came to the United States after launching his career in asthma research, is one of a number of specialists who believe that modern life may be responsible for the developed world's asthma rates—but in a very unexpected way. It is not tobacco smoke or pollution that is at the heart of the problem, these specialists believe, but modern hygiene practices and antibiotics that foreclose the need for the young immune system to tackle microbial and parasitic challenges. "Just as you need to use your eyes to develop sight and your legs to de-

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