The Perils of Plastic  *(Time Magazine)*

By Bryan Walsh Thursday, Apr. 01, 2010

On the first Earth Day, celebrated 40 years ago this month, the U.S. was a poisoned nation. Dense air pollution blanketed cities like Los Angeles, where smog alerts were a fact of life. Dangerous pesticides like DDT were still in use, and water pollution was rampant — symbolized by raging fires on Cleveland’s Cuyahoga River, captured in a famous 1969 story for TIME. But the green movement that was energized by Earth Day — and the landmark federal actions that followed it — changed much of that. Today air pollution is down significantly in most urban areas, the water is cleaner, and even the Cuyahoga is home to fish again. Though climate change looms as a long-term threat, the 40th anniversary of Earth Day will see a much cleaner country.

But if the land is healing, Americans may be sickening. Since World War II, production of industrial chemicals has risen rapidly, and the U.S. generates or imports some 42 billion lb. (19 billion kg) of them per day, leaving Americans awash in a sea of synthetics. These aren’t the sorts of chemicals that come to mind when we picture pollution — huge plants spilling contaminated wastewater into rivers. Rather, they’re the molecules that make good on the old "better living through chemistry" promise, appearing in items like unbreakable baby bottles and big-screen TVs. Those chemicals have a habit of finding their way out of everyday products and into the environment — and ultimately into living organisms. A recent biomonitoring survey by the Centers for Disease Control and Prevention (CDC) found traces of 212 environmental chemicals in Americans — including toxic metals like arsenic and cadmium, pesticides, flame retardants and even perchlorate, an ingredient in rocket fuel. "It’s not the environment that’s contaminated so much," says Dr. Bruce Lanphear, director of the Cincinnati Children’s Environmental Health Center. "It’s us."

As scientists get better at detecting the chemicals in our bodies, they’re discovering that even tiny quantities of toxins can have a potentially serious impact on our health — and our children’s future. Chemicals like bisphenol A (BPA) and phthalates — key ingredients in modern plastics — may disrupt the delicate endocrine system, leading to developmental problems. A host of modern ills that have been rising unchecked for a generation — obesity, diabetes, autism, attention-deficit/hyperactivity disorder — could have chemical connections. "We don’t give environmental exposure the attention it deserves," says Dr. Philip Landrigan, director of the Children’s Environmental Health Center at New York City’s Mount Sinai Medical Center. "But there’s an emerging understanding that kids are uniquely susceptible to environmental hazards."

The Low-Dose Threat

His name was Theophrastus Philippus Aureolus Bombastus von Hohenheim, known to his contemporaries as Paracelsus and to students of science as the "father of toxicology." The 16th century Swiss physician pioneered the use of chemicals in medicine. His dictum "The dose makes the poison" — that even toxic substances can be safe as long as the amount remains below a certain threshold — is still a bedrock principle for modern toxicologists.

That helps explain why industrial chemicals never received the stricter regulatory oversight that drugs and pesticides did. Even if the chemicals used to help make a plastic bottle could infiltrate the human body, the thinking went, surely the dose would be too low to do any harm. But as biomonitoring improved — we can now detect human exposure levels as small as one part per trillion, or about one-twentieth of a drop of water in an Olympic-size swimming pool — scientists realized that people were carrying far more chemicals than we’d thought. At the same time, scientists learned that some toxins
could harm at extremely low levels; the limit considered safe for lead, which can directly reduce IQ, has been lowered from 60 micrograms per deciliter of blood in 1970 to 10 micrograms today. Some chemicals like BPA may have strange effects even at very low doses. Invented in 1891, BPA has been used since the 1940s to harden polycarbonate plastics and make epoxy resin, used in the lining of food and beverage containers, among other products. Polycarbonates can be identified by the recycling number 7 on the bottom of some plastics containing it. Other plastic ingredients — including potentially dangerous ones — are also indicated by the recycling number, known as the resin identification code.

BPA does its job well, and today some 6 billion lb. (2.7 billion kg) of the chemical are produced globally each year. The problem is, BPA is also a synthetic estrogen, and plastics with BPA can break down, especially when they’re washed, heated or stressed, allowing the chemical to leach into food and water and then enter the human body. That happens to nearly all of us; the CDC has found BPA in the urine of 93% of surveyed Americans over the age of 6. If you don’t have BPA in your body, you’re not living in the modern world.

The levels observed are considered well below the federal safety threshold of 50 micrograms per kg of body weight per day. But that recommendation was made 22 years ago, and in the time since, scientists have learned more about the effects of even a bit of BPA.

(article has been edited from the original version...you can read the rest of the article online– “The Perils of Plastics” into any search engine)