# DEATH BY PLASTIC

**Robert J. Cope II**
**Athenaeum Society**
**December 1, 2022**

Walter Brooke was an American actor born on October 23, 1914 in New York City.

He played several naval officers in *McHale's Navy.*

Brooke's Broadway credits include *Hide and Seek*, *Seagulls Over Sorrento*, *Twilight Walk*, *Two Blind Mice*, *The Barber Had Two Sons*, and *Romeo and Juliet*. Brooke was active in the American Federation of Television and Radio Artists, serving as a director at both the local and national levels, and he served as an officer in Actor's Equity.

Brooke died at the age of 71 from emphysema in Los Angeles on August 20, 1986. He was survived by his first wife, Elizabeth Wragge Brooke, and their two children, Thomas Brooke and Christina Brooke.

Brooke's film career stretched from *You're in the Army Now* to *Jagged Edge*. One of his best-remembered roles was that of Mr. McGuire, a friend of Benjamin Braddock's parents in *The Graduate* (1967), who confides one sacred word to young Benjamin: "Plastics."

As Mr. McGuire, little did he know the fuss he would cause when he recommended to his friend's son at a graduation celebration a possible occupation to consider.

It all began on December 22, 1967. A young man, Ben, had just finished college and was living in his parents' house in a suburb of Los Angeles trying to figure out what he was going to do with his life. Seduced by a bored housewife and friend of his parents he instead fell in love with her daughter and received career advice from her father's friend. I quote, "I want to say one word to you, just one word. Plastics. Think about it. There is a great future in plastics. Will you think about it?" Mr. McGuire is important for one reason and one reason only: he drops the most famous line in the whole movie. Walter Brooke, as Mr. McGuire in 1967's THE GRADUATE with Dustin Hoffman, uttered the #42nd greatest movie quote of all-time, according to the American Film Institute.

**The topic of my talk is *Death by Plastic.***

Plastic built the modern world. Where would we be without bike helmets, baggies, toothbrushes, and pacemakers? But a century into our love affair with plastic, we're starting to realize it's not such a healthy relationship. Plastics draw on dwindling fossil fuels, leach harmful chemicals, litter landscapes, and destroy marine life. As journalist Susan Freinkel points out in her engaging and eye-opening book, ***Plastics, A Toxic Love Story,*** we're nearing a crisis point. We've produced as much plastic in the past decade as we did in the entire twentieth century. We're drowning in the stuff, and we need to start making some hard choices.

Freinkel gives us the tools we need with a blend of lively anecdotes and analysis. She combs

through scientific studies and economic data, reporting from China and across the United States to assess the real impact of plastic on our lives. She tells her story through eight familiar plastic objects: comb, chair, Frisbee, IV bag, disposable lighter, grocery bag, soda bottle, and credit card. Each one illuminates a different facet of our synthetic world. And together they give us a new way of thinking about a substance that has become the defining medium – and metaphor – of our age.

Her conclusion: we cannot stay on our plastic-paved path. And we don't have to. *Plastic* points the way toward a new creative partnership with the material we love to hate but can't seem to live without.

# PARADISE LOST

"**Kamilo**" means "twisting of currents" in Hawaiian, so it's an apt name for the beach near the southernmost tip of the island of Hawaii. Early Hawaiians combed the white sands of Kamilo Beach for driftwood; they used the enormous evergreen logs that had traveled there on ocean currents from the American Pacific Northwest to make dugout canoes. Today, the same ocean currents bring a different kind of debris to the beach, along with a new moniker - "Plastic Beach" - and the distinction of being one of the dirtiest beaches on earth.

A clockwise pattern of ocean currents called the North Pacific Subtropical Gyre flows south along the west coast of North America, across the Pacific, north along the coast of Japan, and back across the Pacific to complete the circle.
In the middle of this is a calm spot known as the Great Pacific Garbage Patch, less a trash island twice the size of Texas than a soup of microplastics - plastic from North America and Asia that has broken down into tiny pieces, like spices floating in broth. The Hawaiian Islands act as a sieve, catching the debris carried by the vortex of water. An estimated 15 to 20 tons of trash washes up annually on the 9-mile stretch of coastline that includes Kamilo Beach, 90 percent of it plastic from the Great Pacific Garbage Patch.

At just one cleanup in August, volunteers from the Rotary Club of South Hilo and other partners collected 790 pounds of marine litter: 37 bags of trash, 100 pounds of loose plastics, and 300 pounds of nets and fishing lines. Last fall, Hawaii County ended its plastics recycling program, and the club is working with the Hawaiian Wildlife Fund and other partners to find new ways to divert plastic from landfills. "As an isolated island community, we are more directly and severely impacted by our environment than many other communities," says South Hilo Rotarian Keith Greer, who led the project.
"Our footprint is constrained, and if we don't take care of what we have, there is no place else for us to go."

# A NEW LIFE

You've finished your bottle of water, your container of laundry detergent, your milk jug. For you, that's the end of the story. But for your bottle, it's only the beginning. After your recyclables are collected, they're sorted by glass, metal, and type of plastic, then sold to intermediaries that grind the plastics into flakes or pellets the size of rice grains. The pellets, called "nurdles," are then sold to producers that melt them and turn them into new products.

There are seven codes on the bottom of plastic containers, signifying, among other things, the temperature at which they will melt. But only two are routinely recycled. Soda and water bottles - No. 1 plastics - may eventually become carpet or fleece clothing. Milk, juice, and detergent containers - No. 2 plastics - find new lives as decks. buckets, and Frisbees. Technology exists to convert plastic into crude oil and other fuels. But globally, recycling rates hover around 14 percent.

Waste pickers are the backbone of recycling in many parts of the world; they've been referred to as "invisible environmentalists." In Brazil, where waste picking is recognized as an official occupation, the hundreds of thousands of catadores (as they are called) are responsible for 90 per-cent of the country's recycling. Brazil was the first country to incorporate waste-picking cooperatives into its national solid waste policy, and it even contracted with waste pickers to help with recycling efforts during the 2014 World Cup.

In Rio Claro, waste pickers separate plastics according to their type and sell the material to an intermediary that cleans, grinds, and dries it, then sells it at a profit. Through a Rotary Foundation global grant project of the Rotary clubs of Rio Claro-Alvorada, Brazil, and Longwood, Pennsylvania, the local waste pickers cooperative received equipment to process the plastic itself, which will mean a 50 percent income increase and an expansion in the number of catadores who can participate.

In 1950, a Philadelphia toy company came out with a new accessory for electric-train enthusiasts: snap-together kits of plastic buildings for a place it called Plasticville USA, population 7.8 billion. Sets of plastic people to populate the town were optional.

Today we all live in Plasticville. But when, exactly, did we take our first steps into this synthetic world? Some say it was in 1870, when the inventor John Wesley Hyatt patented a malleable compound that was originally conceived as a substitute for an increasingly scarce commodity: ivory. It was created from a natural polymer - the cellulose in cotton - combined with other ingredients; Hyatt's brother Isaiah dubbed the new material celluloid, meaning "like cellulose."

Others fix the date to 1907, when a Belgian émigré named Leo Baekeland cooked up Bakelite; the first fully synthetic polymer, it was made entirely of molecules that couldn't be found in nature. With the product's invention, the Bakelite Corporation boasted, humans had transcended the classic taxonomies of the natural world: the animal, mineral, and vegetable kingdoms. Now we had "a fourth kingdom, whose boundaries are unlimited."

Bakelite was invented to replace another scarce natural substance: shellac, a product of the sticky excretions of the female lac beetle. Demand for shellac began shooting up in the early 20th century because it was an excellent electrical insulator. Yet it took 15,000 beetles six months to make enough of the amber-colored resin needed to produce a pound of shellac. To keep up with the rapid expansion of the electrical industry, something new was needed.

As it turned out, the plastic Leo Baekeland invented by combining formaldehyde with phenol (a waste product of coal) and subjecting the mixture to heat and pressure was infinitely more versatile than shellac. A dark-colored, rugged material with a sleek, machinelike beauty, it could be precisely molded and machined into nearly anything. Contemporaries hailed its "protean adaptability" and marveled at how Baekeland had transformed something as foul-smelling and nasty as coal tar-long a discard in the coking process - into this wondrous new substance.

The 1920s and '30s saw an outpouring of new materials from labs around the world. One was cellulose acetate, a semi-synthetic product (plant cellulose was one of its base ingredients) that had the easy adaptability of celluloid but wasn't flammable. Another was polystyrene, a hard, shiny plastic that could take on bright colors, remain crystalline clear, or be puffed up with air to become the foamy polymer DuPont later trademarked as Styrofoam.

DuPont also introduced nylon, its answer to the centuries-long search for an artificial silk. When the first nylon stockings were introduced, after a campaign that promoted the material as being as "lustrous as silk" and as "strong as steel," women went wild. Stores sold out of their stock in hours, and in some cities, the scarce supplies led to nylon riots. Across the ocean, British chemists discovered polyethylene, the strong, moisture-proof polymer that would become the essential product of packaging. Eventually, we'd get plastics with features nature had never dreamed of: surfaces to which nothing would stick (Teflon), fabrics that could stop a bullet (Kevlar).

Though fully synthetic like Bakelite, many of these new materials differed in one significant way. Bakelite is a thermoset plastic, meaning that its polymer chains are hooked together through the heat and pressure applied when it is molded. The molecules set the way batter sets in a waffle iron. And once those molecules are linked into a daisy chain, they can't be unlinked. You can break a piece of Bakelite, but you can't melt it down to make it into something else.

Polymers such as polystyrene and nylon and polyethylene are thermoplastics; their polymer chains are formed in chemical reactions that take place before the plastic ever gets near a mold. The bonds holding these daisy chains together are looser than those in Bakelite, and as a result these plastics readily respond to heat and cold. Unlike Bakelite, they can be molded and melted and remolded over and over again. Their shape-shifting versatility is one reason thermoplastics quickly eclipsed the thermosets.

It's understandable why many at the time saw plastics as the harbinger of a new era of abundance. Plastics, so cheaply and easily produced, offered salvation from the haphazard and uneven distribution of natural resources that had made some nations wealthy, left others impoverished, and triggered countless devastating wars. Plastics promised a material utopia,

available to all. At least, that was the hopeful vision of a pair of British chemists in 1941. "Let us try to imagine a dweller in the 'Plastic Age,'" Victor Yarsley and Edward Couzens wrote. "This 'Plastic Man' will come into a world of color and bright shining surfaces ... a world in which man, like a magician, makes what he wants for almost every need."

That world was delayed in coming. Most of the new plastics discovered in the 1930s were monopolized by the military over the course of World War II. Production of plastics leaped during the war, nearly quadrupling from 213 million pounds in 1939 to 818 million pounds in 1945. Come V-J Day, all that production potential had to go somewhere, and plastics exploded into consumer markets. Just months after the war's end, thousands of people lined up to get into the first National Plastics Exposition in New York, a showcase of the new products made possible by the plastics that had proven themselves in the war. For a public weary of two decades of scarcity, the show offered an exciting and glittering preview of the promise of polymers. Here was the era of plenty that the hopeful British chemists had envisioned. "Nothing can stop plastics," the chairman of the exposition crowed.

Plastics production expanded explosively, with a growth curve that was steeper even than the fast-rising GNP. Thanks to plastics, newly flush Americans had a never-ending smorgasbord of affordable goods to choose from. The flow of new products and applications was so constant it was soon the norm. Tupperware had surely always existed, alongside Formica counters, Naugahyde chairs, red acrylic taillights, Saran wrap, vinyl siding, squeeze bottles, push buttons, Barbie dolls, Lycra bras, Wiffle balls, sneakers, sippy cups, and countless more things. The budding industry partnered with the press to sell consumers on the virtue of plastics. "Plastics are here to free you from drudgery." *House Beautiful* promised housewives in a special 50-page issue in October 1947 titled "Plastics...A Way to a Better, More Carefree Life."

That proliferation of goods helped engender the rapid social mobility that took place after the war. We were a nation of consumers now, a society increasingly democratized by our shared ability to enjoy the conveniences and comforts of modern life. Through the plastics industry, we had an ever-growing ability to synthesize what we wanted or needed, which made reality seem infinitely more open to possibility, profoundly more malleable. Now full-fledged residents of Plasticville, we began to believe that we too were plastic. As House Beautiful assured readers in 1953: "You will have a greater chance to be yourself than any people in the history of civilization."

Today, few other materials we rely on carry such a negative set of associations or stir such visceral disgust. Norman Mailer called it "a malign force loose in the universe ... the social equivalent of cancer."

We may have created plastic, but in some fundamental way it remains essentially alien, ever seen as somehow unnatural - though it's really no less natural than concrete, paper, other manufactured material. One reason may have to with its preternatural endurance. Unlike traditional, plastic won't dissolve or rust or break down in any useful time frame. Those long polymer chains are built to last, which means that much of the plastic we've produced is with us still - as litter, layers of landfill and debris in the ocean. Humans could disappear from the earth

tomorrow, but many of the plastics we've made will last for centuries. Each of them offers an object lesson what it means to live in *Plasticville*, enmeshed in a web of materials that are rightly considered both the miracle and the menace of modern life.

The story of plastics is riddled with those kinds of paradoxes. We enjoy an unprecedented level of material abundance and yet it often feels impoverishing, like digging through a box packed with Styrofoam peanuts and finding nothing else there. We take natural substances created over millions of years, fashion them into products designed for a few minutes' use, and then return them to the planet as litter that we've engineered to never go away. We enjoy plastics-based technologies that can save lives as never before but that also pose insidious threats to human health. We bury in landfills the same kinds of energy-rich molecules that we've scoured the far reaches of the earth to find and excavate. We send plastic waste over-seas to become the raw materials for finished products that are sold back to us.

These paradoxes contribute to our growing anguish over plastics. Yet the plastics-related issues that dominate headlines today surfaced in earlier decades. Studies that show traces of plastics in human tissue go back to the 1950s. The first report of plastic trash in the ocean was made in the 1960s. Suffolk County, New York, enacted the first ban on plastic packaging in 1988.

But the stakes are much higher now. As *Plasticville* sprawls farther across the landscape, we become more thoroughly entrenched in the way of life it imposes. It is increasingly difficult to believe that this pace of plasticization is sustainable, that the natural world can long endure our ceaseless "improving on nature." But can we start engaging in the problems plastics pose? Is it possible to enter into a relationship with these materials that is safer for us and more sustainable for our offspring? Is there a future for *Plasticville*?

Today, for better and for worse, we are firmly in the plastics age and facing frightening intimations of ecological collapse. We have at hand the materials to help avert it, tools with which to create a legacy of sustainability. Will archaeologists millennia from now scrape down to the stratum of our time and find it simply stuffed with immortal throwaways like bottle caps, bags, wrappers, straws, and lighters - evidence of a civilization that choked itself to death on trash? Or will they come upon bridges like the one in Wharton State Forest in New Jersey, bridges that, despite their lack of beauty, (made entirely from recycled plastics), have an important story to tell: that we were a people with the ingenuity to make wondrous materials and the wisdom to use them well.

****

REFERENCES:


1. Plastic A Toxic Love Story, by Susan Freinkel, Copyright 2011 by Susan Freinkel
2. The Rotarian, April 2022