

Trespass Against Us

Dow Chemical & The Toxic Century

Jack Doyle

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The Environmental Health Fund (EHF) is an education and advocacy organization working to protect people's health through reducing toxic chemical exposures. EHF is one of the founding members of Health Care Without Harm, the Campaign for Environmentally Responsible Healthcare (www.noharm.org). EHF is also working to hold the chemical industry accountable for its global contamination, and has published a report entitled "Beyond the Chemical Century: Restoring Human Rights and Preserving the Fabric of Life." The Environmental Health Fund is presently collaborating with several United Nations agencies (including UNDP, UNIDO and WHO) to involve civil society organizations in implementing the Stockholm Convention on persistent organic pollutants (POPs). The Environmental Health Fund can be reached at 41 Oakview Terrace, Boston, MA 02130; phone (617) 524-6018; fax (617) 524-7021.

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The Dow story that follows is not a strict business history, told in a dollars-and-cents way, or from a process engineer's perspective, or that of chemist. For those accounts, there are other books, such as Dow's more or less official biography mentioned above. Rather, the book that follows here looks at Dow through a different, more critical lens—that of Dow neighbors, workers, public health advocates, and those harmed by its chemicals. The opening pages provide an introduction to the reality of persistent chemicals—those found, uninvited, in the environment and in the human body, contributing to a “body burden” that we all carry: a quantity of synthetic substances in our persons as a consequence of the chemical revolution. Subsequent chapters tell of Dow's business and history with various chemicals, from World War I warfare gases and Vietnam's Agent Orange defoliant, to dry cleaning chemicals, pesticides, and polyvinyl chloride. A chapter on Union Carbide, a company now owned by Dow, covers some of that firm's past as it relates to Dow, with attached concerns of asbestos liability and the 20-year-old problems left at Bhopal, India. Dow's political history and corporate philosophy are also explored, as are the company's environmental and public-relations strategies. There are separate chapters covering Dow

in Canada, Louisiana, Texas, New Zealand, and Michigan. Added to these are profiles of Dow as government contractor managing the Rocky Flats nuclear complex in Colorado; its involvement in the Dow Corning silicone breast implant fiasco; and some accounting of its record with chemical plant accidents, toxic gas releases, and chronic pollution. Altogether this is not a flattering profile of the Dow Chemical Company, though it recognizes and acknowledges Dow's ingenuity and business acumen. Rather, this is a work directed at bringing more public attention to the very real problems of invasive synthetic chemistry and toxic chemicals, and to changing corporate behavior in that arena.

Jack Doyle
Washington, DC
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Introduction

The Dow Chemical Company has been trespassing on private property for decades, crossing private boundary lines without the owner's permission. The boundary lines being crossed are unseen for the most part and the property is personal, even sacrosanct. For what is being violated is the biological common, or rather, "all of us," one-celled and many-celled; paramecium and orangutan; Mom, Dad, and the kids.

The trespass in this case is harmful and it is toxic. For the transgressors at issue are man-made synthetic chemicals, more than 100,000 of which have been "invented" and let loose in the world since the 1930s. These are the chemicals that make up the good life, we're told, for products that make our lives better. Yet many of these chemicals are toxic to life and have been doing harm for years, insinuating themselves into blood, body tissue, sperm and egg. On that course, they have been trespassing: invading biology's inner sanctum, violating life-sustaining processes, and creating undesirable changes that last not just for a day, but in some cases, generations. The guilty parties in these transgressions, however, have not been brought to account, and they have not been stopped. To this day, "toxic trespass" continues, and it is poisoning all of us.

This book is one account of that trespass; a story of how one company's chemical products and byproducts have damaged, and continue to damage, public health and the environment. It is not a pretty picture; there are cancers, birth defects, deformed babies, healthy lives turned unhealthy, broken people, injured and sickened workers, and poisoned communities.

The central character in this story is the Dow Chemical Company of Midland, Michigan. Dow is a century-old company and currently the world's largest chemical corporation. By most conventional yardsticks, Dow is a terrifically productive and inventive company, with a growth and prosperity record envied the world over. On Wall Street, Dow's stock is found in many investment portfolios, and on Main Street, in many retirement accounts. Dow Chemical is also a "founding father" of the synthetic chemical revolution, and today, one of its most determined boosters. Yet there has been, and continues to be, a major flaw in that revolution. Despite the benefits that have poured forth from modern chemistry's Golden Horn, too many of its substances have been found to pose grave risks to public health and safety.

Not every single chemical is a problem, of course. But the damage wrought by some—especially those that persist, accumulate, and magnify in the biota—is especially worrisome. And the latest revelations are even more

troubling. For some synthetic chemicals intrude into the developing fetus, create havoc with hormones, and/or lodge in the DNA—there, in effect, for generations. Complicating this picture historically is the fact that synthetic chemistry’s most obvious damage did not emerge until some years *after* the prosperity—after the capital investment, after the profits, and after the embedded uses and dependencies. This lag effect is owed, in part, to disease latency, the time it takes for diseases to reveal themselves and take their toll. It is also owed to poor industry testing of chemicals prior to their use. In addition, proving cause and effect—a disease/chemical link—hasn’t always been possible or definitive. In this process, vested interests like Dow, have moved to keep things in play, using the due process of law and regulation to guarantee protracted contests, chemical by chemical. This maneuvering and politics is also part of the story.

At The Headwaters

Dow Chemical, it turns out, is an especially important player in the synthetic chemical revolution. For Dow has been at the headwaters of modern chemical development from practically day one; a key “first source” generator of building-block chemicals that allowed a frenzy of combinational wizardry to proceed with few questions asked. Dow’s chlorinated compounds, in particular, became first-source chemicals for a major part of the modern synthetic revolution. Once known for its *Saran* wrap and *Ziploc* bags, Dow is today the world’s largest chemical company with \$32 billion in annual sales. It is also the world’s largest chlorine producer and one of the world’s leading plastics producers. Dow’s chemistry is deeply embedded throughout the global economy, found in countless products—from plastic toys and compact discs, to vinyl siding, shower curtains, running shoes, and automotive dashboards, to name a few. Every day, the company handles upwards of 7,000 chemicals and chemical products in its research, manufacturing, and marketing. Yet much of what Dow makes and sells goes unnoticed. For Dow—known at times as “a chemical company’s chemical company”—sells in bulk, in truck-load and train-car lots, to other companies which in turn make a vast array of products. Dow’s chemistry then, is often a “behind-the-scenes” type of chemistry, though key in stoking a burgeoning chemical commerce—and global chemical proliferation.

About *every ten seconds*, a new chemical substance is discovered; new chemical compounds enter commerce at an average rate of about *three per day*. Tens of thousands of chemicals have been released into the environment—and because of their persistence, hundreds today are found still lodged in biological food chains, in birds and wildlife, and in human beings. New chemicals continue to be released without adequate testing, amounting to a grand chemical experiment on all of us—a global toxic trespass; what some

see as a fundamental violation of human rights. As this book will show, Dow Chemical has been and continues to be at the headwaters of that process.

“Better Living . . .”

Since the 1890s, Dow has had a fairly dramatic and prosperous ride—from brine-derived bleach and medicinal bromides through the early 1900s; magnesium and gasoline additives in the 1930s and 1940s; to a booming world pesticide and plastics market through the 1950s and 1960s. During those times and today, Dow has been in a more or less constant formulating and expansionist mode, always developing new chemicals. Dow even became a pharmaceutical power for a time, producing all manner of products, from cholesterol drugs to artificial kidneys. It also became an energy company, involved with oil, gas, and even nuclear power. In fact, it appeared there was little Dow couldn't do. Supremely confident in its abilities—owing in part to the Horatio Alger-style rise of its independent founder and inventor, Herbert Dow—the company took on any charge, whether producing mustard gas for the government in World War I, napalm and Agent Orange in Vietnam, or running a government factory for making nuclear bomb triggers. Yet these missions were loaded with risk, and as will be shown, some peril for people and planet.

In the 1950s and 1960s, “Better Living Through Chemistry” was the touchstone philosophy that informed and molded the world view at Dow and other chemical companies. Dow's managers, scientists, and executives believed their products were promoting better living and economic growth. Substantiated by the success and booming chemical growth of the 1950s and early 1960s, Dow's outlook for the next half century was also built on this philosophy. A manifest, beneficent chemistry became bedrock at Dow, shaping a corporate culture that was imbued at times with patriotic overtones. What could possibly go wrong? Dow became a bit intoxicated with itself and its science. It got into the habit of thinking it was always right.

By the late 1960s, however, that world view began to change. Dow soon discovered it could be held accountable for the things it made, especially if those things created harm. Its wartime contracts supplying napalm and Agent Orange during the Vietnam War had more light shed on them than earlier, anonymous work in World War I and World War II. Its domestic pesticides drew fire too, and a few bad drugs put Dow on the defensive as well. When federal agencies such as the U.S. Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA) were created or given broader mandates in the 1970s, Dow's unfettered world of turning science into products was suddenly put upon. But rather than developing a new strategic model and business plan that built in more precaution, Dow decid-

ed to fight. In a number of confrontations, Dow dug in its heels and insisted that its science was correct, its products safe, and that workers and communities had nothing to fear. The 1980s, however, produced a decade of revelations about things Dow was hiding; about its workers, the safety of its products, and the real toxicity of some of its chemistry—particularly that revolving around a family of byproduct chemicals called the dioxins. These revelations did not come willingly from Dow, but rather were forced into public light by litigation, journalists, and government officials. Dow's science was not all Dow claimed it was.

Toxic Trespass

Granted, many of Dow's chemicals today are beneficial to society and do improve the quality of life. Yet some have and are creating egregious harms. The harms created are not typically catastrophic, acute, or highly visible—though there is some of that with ongoing emissions, spills, and chemical plant accidents. Rather, the chemicals of continuing concern are those that cause damage over time; those that plant the seed for cancer or a mutation. These are chemicals that can do damage even after one fleeting exposure, at levels that seem impossibly small—at the trillionth- and quadrillionth-part levels; where angels dance on the heads of pins. Still, at the same impossibly tiny levels—and within the exquisite biochemistry that is a seal pup, a lioness, a blue whale, or a human being—there is the delicate dance of life going on within cells, within DNA, and among biochemical messaging molecules. When these processes are invaded, if only for a moment in time, the balances and messages can be disrupted; the normal formings and joinings can be set askew, and a birth defect or health effect is set in motion—in the gene, in the sperm, in the hormone, in the reproductive cycle. This is toxic trespass at the sub-obvious level; at a level perhaps not conventionally recognized by courts as a tort trespass, such as when a factory's toxic emissions damage a neighbor's land, or a pesticide spray drifts onto an adjacent vegetable field. Yet clearly, this is a kindred damage, and potentially far worse in consequence since it can live beyond the initial assault, as in birth defects or chemically-induced mutations. It is also, as in any trespass, an uninvited intrusion. And the damage created, in the aggregate, is an alteration of the global common; a subterfuge of public health and environmental safety. As long as such toxic chemistry persists, the public health and safety is placed in continuing danger.

Altering the global common with dangerous chemistry is certainly not the planned intention of any good chemist working hard at his or her craft. Nor is it the intended design of any good business manager or CEO. Yet modern commercial chemistry has too often been an experiment on unwitting subjects—launching products with too little precaution and too much

marketing enthusiasm. What *is* the fault and intention of Dow and its industry trade groups on too many occasions, is holding back information on the chemicals developed, promoted, and sold. Dow's knowledge about its chemicals and products, it turns out, was often different from that which the public had, or even some of its best customers. The first signs that something was amiss with Dow's chlorophenol products—an early indication of the embedded dioxin problem—emerged nearly 70 years ago, in the 1930s when Mississippi lumberman and Dow workers in Midland began to have rashes and other problems. Dow's early knowledge of potential health effects from other chemicals—pesticides such as 2,4,5-T, DBCP, and chlorpyrifos; plastics and plastic ingredients such as polyvinyl chloride and bisphenol-A; silicone and silicone ingredients; benzene and epichlorohydrin in the workplace; and war-time products such as Agent Orange—wasn't always shared promptly, and in fact, was sometimes held back. And in the absence of complete and perfect evidence that a chemical was harmful, but suspected as such, or even shown fairly strongly to pose a risk—as in the case of 2,4,5-T—Dow would push out the legal appeals or stretch out the regulatory process as far as possible to ensure more marketing time. This is perhaps the unforgivable trespass; the mortal sin of commercial synthetic chemistry: the after-the-fact defense of chemicals known to do harm.

The Big Experiment

“Very few people had even been trained in toxicology at that time,” explained Dow scientist Dr. Ted Torkelson, describing the early 1950s when he first came to Dow as a 22-year-old biochemist. “Fact is, when I was hired, I didn't know what toxicology was.”¹ But Dow did undertake testing—some dating to the 1930s when it first set up its own laboratories. Still, in the 1950s, once some cursory lab tests of a chemical had been finished, companies often put chemical products on the market while continuing to investigate their effects. This happened with the herbicides 2,4,5-T and 2,4-D, and with the fungicide DBCP, made by Dow and others—and many other products and their derivatives. At times, in fact, it seemed the preferred way to fully and finally “test” chemicals was to begin marketing them, wait and see what problems emerged, and then deal with the consequences. Today, world regulators are still playing “toxicological catch-up” with many thousands of chemicals that remain inadequately tested.

But this was the way of the toxicological world in the 1950s and 1960s; a time when patterns and methodologies were set and cast; a time when synthetic chemistry exploded on the world and became embedded in thousands of industrial and consumer products. Dow's Torkelson offered this explanation in one 1980s interview after trouble over DBCP had broken:

...I think science oversold itself, or maybe it was an overzealous press. It goes back to “Better Things for Better Living Through Chemistry” and that kind of thing. All you had to do was wait a day, and there’d be a new food additive or a new whitener for your clothes or a new floor polish or a new paint or a new weed killer, a new this, a new that—you know, chemistry will take care of us. And finally the pendulum just went the other way, and people started to see bad things about chemistry, and that’s all they saw. But I don’t think the people here at Dow have lost faith in technology.²

Indeed, the people at Dow for the most part, did not lose faith in their technology or their hard-charging corporate approach, even after they were taken to task for some toxic problems in the 1970s and 1980s. In fact, like Torkelson, they became more determined to validate their model. Dow became imbued by the infallibility of its own mission; a company whose “we-can-do-no-harm” culture gave it a wrongly self-centered air of entitlement. Dow dug in too deeply on more than a few occasions to make sure its brand of chemistry and/or management style prevailed, damn the consequences. And perhaps that’s one reason why Dow today remains one of the most sued companies in existence.

Toxic Torts

Litigation aimed at Dow for its wayward chemistry—whether of the leaking and polluting varieties, or the longer-term invasive kind—has been with the company from practically the beginning. Neighbor- and worker-filed lawsuits dating to 1900 were filed against Dow’s Midland, Michigan operation. Since the 1960s, Dow has been in court almost constantly, beginning with pesticide cases, as well as those involving some pharmaceutical products. Agent Orange claims by Vietnam veterans, and litigation with Dow and Dow Corning over silicone breast implants, have resulted in some of the largest and most controversial mass toxic tort cases ever. Today, with Union Carbide, Dow faces still more litigation, with cases pending on matters related to asbestos, old Carbide mining operations, and Bhopal. Neighbors continue to sue Dow, too—for vinyl chloride drinking water contamination and adverse health effects in Plaquemine, Louisiana; for leaking chemicals in an underground storage cavern and an old landfill in two Texas communities; and for pesticide exposures ranging from 2,4-D to *Dursban*. With *Dursban*, in fact, there have been some 270 lawsuits since 1990. Workers’ widows have sued Dow in wrongful death actions in several states, and fisherman in Brazil have sued Dow for pesticide contamination of fishing waters. Dow, along with Shell, is also mired in current litigation in Nicaragua and the U.S., filed by banana workers alleging health effects, including sterility, suffered from

the use of the fungicide DBCP. In New Zealand and Vietnam, lawsuits are being filed or prepared for Dow and/or Dow subsidiaries alleging continued health effects and damages of Agent Orange chemicals. In 2003, the U.S. Supreme Court found that Agent Orange litigation is still ripe for U.S. Vietnam war veterans, despite previous attempts by manufacturers and some judges to close it off. And as this book goes to press, nearly 2,000 potential plaintiffs along the Tittabawassee River in Michigan await word on their standing to sue as a class in dioxin-related litigation aimed at Dow. These actions amount to much more than frivolous lawsuits; they are actions speaking to real and aggrieved losses, and in total add up to a substantial pattern of Dow's continuing toxic trespass.

Hard-Nosed Dow

In its litigation and courtroom dealings, Dow is a hard-nosed player, not above using intimidation or outside influences to move the process in its favor. In Michigan recently, Dow deposed potential witnesses for hours trying to intimidate and confuse them. In one Louisiana breast implant case, Dow was accused of jury tampering and using advertising to influence prospective jurors. Still, a few juries have made some not-so-flattering findings of Dow conduct, verdicts which Dow typically appeals and appeals, until in most cases, they are overturned or watered down. Like other corporate litigants, Dow prefers out-of-court settlements where possible, meaning most case details and proceedings are sealed from public view.

Dow's lobbyists, too, are ready to nip "trouble" in the bud, wherever it may appear. In the fall of 2002, Dow spent \$90,000 in a few weeks during a special session on tort reform in the Mississippi legislature to make sure caps were placed on punitive damages—with no exceptions for jury awards in environmental cases. In 2003, along with two other companies, Dow hired former Clinton and Reagan administration officials to repeal Nicaragua's DBCP victims law. As homeland security legislation worked through the U.S. Senate in 2002, Dow lobbied against key provisions of the Chemical Security Act, including one to require inherently safer technologies to help minimize and eliminate hazardous risks at chemical plants. Yet with the other hand, Dow's advertising money is used to tell the public it is doing "great things" or "improving life daily."

Still, a few who have studied Dow for years conclude there is no intentional wrongdoing at the company. "... I found no case where the corporation (as contrasted with an individual within the corporation) knowingly engaged in wrongdoing of any nature," writes E. N. Brandt, in his Dow biography, *Growth Company*. "If there is such a thing as a 'corporate' conscience, I am convinced Dow has one."³ Yet, the accounts of people and places subjected to Dow chemicals that follow in this book, tell a somewhat different story.

Real People

There is Billie Shoecraft, the spunky 53-year-old wife and mother who was sprayed in 1969 with a Dow 2,4,5-T herbicide by the U.S. Forest Service near her home in Globe, Arizona. Shoecraft, perfectly healthy at the time of the spraying, began a long and painful ordeal with cancer shortly after the incident, and died in 1977. Similarly, stories of 1970s miscarriages and birth defects in heavily sprayed areas of Oregon implicate Dow herbicides—the same herbicides used in Agent Orange and Agent White defoliant concoctions in the Vietnam War. Accounts of returning Vietnam veterans before Congress are here too, telling of their herbicide poisonings—such as that of Michael Ryan’s and his daughter Kerry, born with severe birth defects. North Vietnamese veterans too, have horror stories of what Agent Orange and other herbicides continue to do to their homeland and people. The Agent Orange legacy, in fact, continues to surface today, with some horrific birth-defects stories coming out of locations such as New Zealand, where a Dow subsidiary helped supply war needs. Back in the U.S., a parade of individuals tell tales about how Dow’s insecticide and termite killer, *Dursban*, changed their lives through toxic exposure—among them, a high school student, a pest exterminator, an office worker, and two children with various maladies attributed to possible pre-natal *Dursban* exposure.

In the national travail over silicone breast implants—still ongoing with pending lawsuits and appeals as this book goes to press—Dow Chemical is implicated as a partner and owner of Dow Corning, the implant maker. Amid the abbreviated history of that story in Chapter 12 are the personal accounts of Colleen Swanson and Charlotte Mahlum; women irreparably harmed and made ill by Dow Corning implants that Dow Chemical claims it had no role in making. Yet a trail of silicone research between the two firms over the years, plus shared reports, scientists, and executives, appears to suggest otherwise.

Mike Trout, an Occidental Chemical worker in Lathrop, California and young family man in the 1970s, became afflicted with a brain cancer from which he initially rebounded, but was also made temporarily sterile after working with the Dow-supplied chemical, DBCP. The fungicide was turned out in quantity at the Occidental plant and sold in various remixed formulations. Trout died in 1979 of his brain cancer when he was 27 years old. There are also other workers’ stories here too, but these are told more anonymously in groups, as in vinyl chloride workers suffering health effects of vinyl chloride monomer; dry-cleaning workers and nearby residents suffering the ill effects of the solvent perchloroethylene; Dow workers of the 1970s handling benzene and epichlorohydrin found to have chromosome damage; and plutonium workers suffering various maladies and dangers at Dow’s poorly-managed Rocky Flats nuclear complex.

Dow's workers, in fact, stand out in these pages, emerging as some of the most important heroes in the struggle to move Dow to improved safety and environmental responsibility. Repeatedly, from Canada to Texas, organized labor stands up to Dow, and in some ways, workers are the first to raise the larger environmental and public health issues. Labor leaders such as Ivan Hillier at Sarnia, Ontario, or O. D. Kenemore from Brazoria County, Texas, while representing their members' interests economically, also pushed the envelope on community health and safety and environmental protection. Dow, however, appears to be no friend of organized labor, and is often found trying to break unions.

In Dow communities, too, there are more people stories. Central Michigan landowners in the vicinity of Dow's old brine wells and pipeline system—such as Erich and Edna Tessin of Saginaw County, Michigan—have stories about leaks, spills, property damage, and contaminated drinking water. Some believe there was more in the brine than just brine, with reports of deformed and diseased farm animals and some unexplained cancers. In Plaquemine, Louisiana, Dow's sprawling 1,500-acre complex has leaked chemicals from toxic waste dumps into the underground aquifer—a leak some charge has contaminated the drinking water of Myrtle Grove residents with vinyl chloride, suspected of contributing to a number of miscarriages there. Spills, fires, explosions, and toxic gas releases occurring at Dow operations—in Arkansas, California, Florida, Louisiana, Michigan, Texas, West Virginia, Canada, Italy, Germany, Switzerland, and various other locations—suggest it is dangerous to live near Dow. Dow plants in the U.S. and Canada are still among the top industrial polluters, and the company has a long record of fines and citations in the United States and abroad for violating environmental, health, and worker safety laws.

Some of this Dow history has been covered before, and a number of the stories included here have appeared elsewhere. Yet they are important to tell again and compile in one place, “old news” or not. For taken together, these incidents show a pattern of performance and reveal a corporate resume that is not always seen at initial reporting.

No Trespassing

In business, however, Dow Chemical is an impressive company, no question. Dow's rise from Michigan's Tittabawassee River basin of the 1890s to become the world's largest chemical company is a story with many admirable qualities. Imbued with the persistence and ingenuity of young Herbert Dow, the new Dow Chemical Company made its mark, and after a few setbacks, rose to considerable success. One hundred years of jobs, prosperity, and economic growth followed, bringing value to workers, local communities, and the larger society. Dow Chemical, on this level, has made

the world a better place. Yet still, there is a substantial reality of chemical consequence that must be laid squarely on Dow's doorstep; an unpleasant reality of people and communities poisoned; of disease, birth defects, and ruined lives.

Dow's liabilities and failings are not simply matters of a few passing pollution episodes or neglected toxic waste dumps. Rather, they involve broadly an entire branch of toxic, persistent chlorinated chemistry that has permeated much of the world's economy. It is this toxic chemistry that is creating daily very real and ongoing public health effects for millions of people, altering the entire living world. It is a toxic legacy that may soon affect Dow's balance sheet as well.

We have been sold a bill of goods with the wonder products of the synthetic chemical revolution—not all of which have proven so wonderful. We are now up to our necks in the stuff, with hundreds of substances permeating our living fiber in detrimental ways. This toxic chemistry is so intricately woven into our lives and economies, that separating from it will become a major economic undertaking. But separate we must—and soon.

Dow Chemical, a dominant firm in its industry with \$32 billion in 2003 sales, is still in toxic denial; the company appears to believe it can continue business as usual. Yet a new accounting is coming to Dow and companies like it. Those harmed are not sitting still. New coalitions of victims, workers, investors, and public health leaders are now forming. They are pursuing legal and economic strategies to bring toxic trespassers to account. There is still time for Dow to take the high road, of course. Dow could commit to inventing the safer course, leaving the damaging and persistent branches of chemistry behind; shedding its most toxic lines immediately. For that is the course of action that more people and governments the world over see as necessary—and will be demanding. No more toxic trespass; that is the message—a new kind of property rights revolution is taking form.