

**THE PLASTICS INDUSTRY AND MARINE  
DEBRIS: SOLUTIONS THROUGH EDUCATION**

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**ABSTRACT**

Over the past several years, intense media attention and congressional debate have focused on the problems caused by plastics discarded or lost in the marine environment. Less well known are the efforts of the plastics industry, through its major trade association, The Society of the Plastics Industry, Inc. (SPI), to help find solutions to these problems. Since 1986, SPI has been working with the Center for Marine Conservation--formerly the Center for Environmental Education--and the U.S. National Oceanic and Atmospheric Administration to implement public service educational campaigns with specific messages targeted to selected audiences.

When the marine debris problem is examined in detail, it is clear that among the various types of plastic debris, all but one end up in the oceans as the result of activity by individuals beyond the "control" of the plastics industry. The one exception involves resin pellets, the raw material for making plastics products. This presentation will examine how the plastics industry has responded to the marine debris problem in general, and specifically to the presence of resin pellets in the aquatic environment.

**INTRODUCTION**

Over the past several years, intense media attention and congressional debate have focused on problems caused by plastics that have been intentionally discarded or accidentally lost in the marine environment. Less well known are the efforts of the plastics industry, primarily through its major trade association, The Society of the Plastics Industry, Inc. (SPI), to help find solutions to these problems.

Since 1986, SPI has been working with the Center for Marine Conservation (CMC)--formerly the Center for Environmental Education--and the U.S. National Oceanic and Atmospheric Administration (NOAA) to develop and implement a public service educational campaign with very specific messages

targeted to selected audiences. This paper will examine that segment of the public service campaign targeted to the plastics industry, as well as other activities aimed at educating plastics companies about the role of discarded plastics in the marine environment and what should be done about them.

#### THE SOCIETY OF THE PLASTICS INDUSTRY POLICY STATEMENT

The SPI's educational efforts have been strongly backed at the highest levels of the organization. Their board of directors developed and passed on 18 September 1987 an official policy statement on marine debris that pledged the industry to help solve the problem.

That policy stated, in part:

"The SPI supports the responsible use of its industry's materials and proper disposal of those products when they become waste. Plastics should not be discarded into the ocean or any other body of water.

- "Plastics Resin Pellets--The SPI is dedicated to working with its member companies to eliminate circumstances that result in resin pellets being lost in manufacturing or transportation and possibly rendering harm to animal or marine life that mistake the pellets for food.
- "MARPOL Ratification--The SPI supports U.S. ratification and implementation of the Annex V of the MARPOL Convention, which would prohibit the dumping of plastics waste into the ocean.
- "Degradability--The SPI endorses continued research and development on degradable plastics. However, it believes there are limitations on what products are suitable to be made degradable. Performance and safety requirements should not be compromised in order to make a product degradable. . . .
- "Public Education--The SPI supports public education encouraging the proper disposal of plastics and other materials as the most effective way to reduce harm to the marine environment. The association is willing to work with other organizations sharing this position on projects to further education on the proper disposal of plastics in the marine environment."

In addition, SPI invited CMC President Roger McManus to make a special presentation on the subject to its board of directors' Issues Management Committee on 12 May 1988, and CMC staffer Kathy O'Hara has addressed the SPI Issues Communication Committee and other industry audiences on several occasions. These presentations were particularly helpful in raising the level of sensitivity and responsiveness within the industry.

### THE SOCIETY OF THE PLASTICS INDUSTRY SUPPORTS MARPOL ANNEX V

In 1987, when the U.S. Congress was considering ratification of Annex V, many organizations--including the plastics industry--spoke out in support of it. The SPI was emphatic in its view that the time has come to stop discarding trash of all kinds into the marine environment. Testifying before a subcommittee of the U.S. Senate Committee on Environment and Public Works, SPI's Lew Freeman, vice president of government affairs, said:

" . . . To the extent that plastics are part of the marine debris problem the SPI and the plastics industry will continue to work with government, environmental groups, and other industries to develop responsible and effective solutions. But marine debris is more than just a problem of 'plastics pollution,' the term so frequently used to describe it. It is a broader problem of debris from all types of materials being discarded in the oceans.

"There will be a marine debris problem with or without plastics as long as a growing and affluent world population continues the overt--and sometimes covert--practice of using the oceans of the world as a convenient place to put waste. . . . Clearly, plastics waste does not belong in the oceans. However, neither do glass, metal or even paper wastes" (Freeman 1987).

### RESIN PELLETS

When the scope of marine debris is examined in detail, it is clear that the problem stems from many sources. In the CMC's 1987 report for the U.S. Environmental Protection Agency, at least nine distinct sources were identified: commercial fishing operations, merchant shipping, naval and research vessels, plastics manufacturing, offshore drilling operations, recreational boaters, docks and marinas, municipal stormwater and sewage systems, and general littering by beachgoers. All but one of these "sources" are the result of activities that are beyond the sphere of direct influence of the plastics industry. That one exception involves resin pellets, the raw material for making plastics products.

Resin pellets, while not particularly an aesthetic problem in the marine environment, have been identified as a hazard to seabirds who ingest them. Although resin pellets are not as abundant as other debris items in the ocean, they seem to be preferred by seabirds. In studies of plastic pieces in the North Pacific (Wilbur 1987), only 0.5% of the pieces of plastic collected from surface waters were pellets. Yet these pellets form about 70% of the plastic found in the stomachs of seabirds.

### BRIEFING FOR RESIN PELLET PRODUCERS

One of SPI's first steps in dealing with the question of resin pellets in the marine environment was to alert companies that produce these materials. In September 1986, SPI hosted a briefing in Washington, D.C. which

featured a presentation by Kathy O'Hara from CMC on the marine debris problem and a videotape on resin pellet reclamation produced by Dow Chemical Co., an SPI member company. Virtually all the major resin-producing companies sent representatives. Discussions at that meeting yielded insights that later would be incorporated into a variety of public service materials. The foundation also was laid for an informal survey of the pellet-handling practices of resin producers. While not a definitive study, the results showed that containment procedures for handling resin pellets generally were implemented in the early-to-mid-1970's and that current practices at resin plants seem to preclude significant losses into the environment. Less was known about the thousands of companies that process the resin pellets into final products; thus materials were developed to inform them of the problem as well as of corrective actions to be taken.

#### PUBLIC SERVICE ADS AND BROCHURES

As noted in the Introduction, the plastics industry was one of three audiences initially targeted by the SPI/CMC/NOAA public service campaign. Materials developed under the joint logo included a full-page, black-and-white magazine ad (Fig. 1) for use in plastics industry publications and an eight-panel collateral brochure. The ad, which shows an enlargement of a resin pellet, carries the headline "A seabird could mistake this resin pellet for a fish egg. And die." The copy reads:

"One little pellet may be insignificant to your plastics processing operation. But to thousands of seabirds, it could lead to a fatal error.

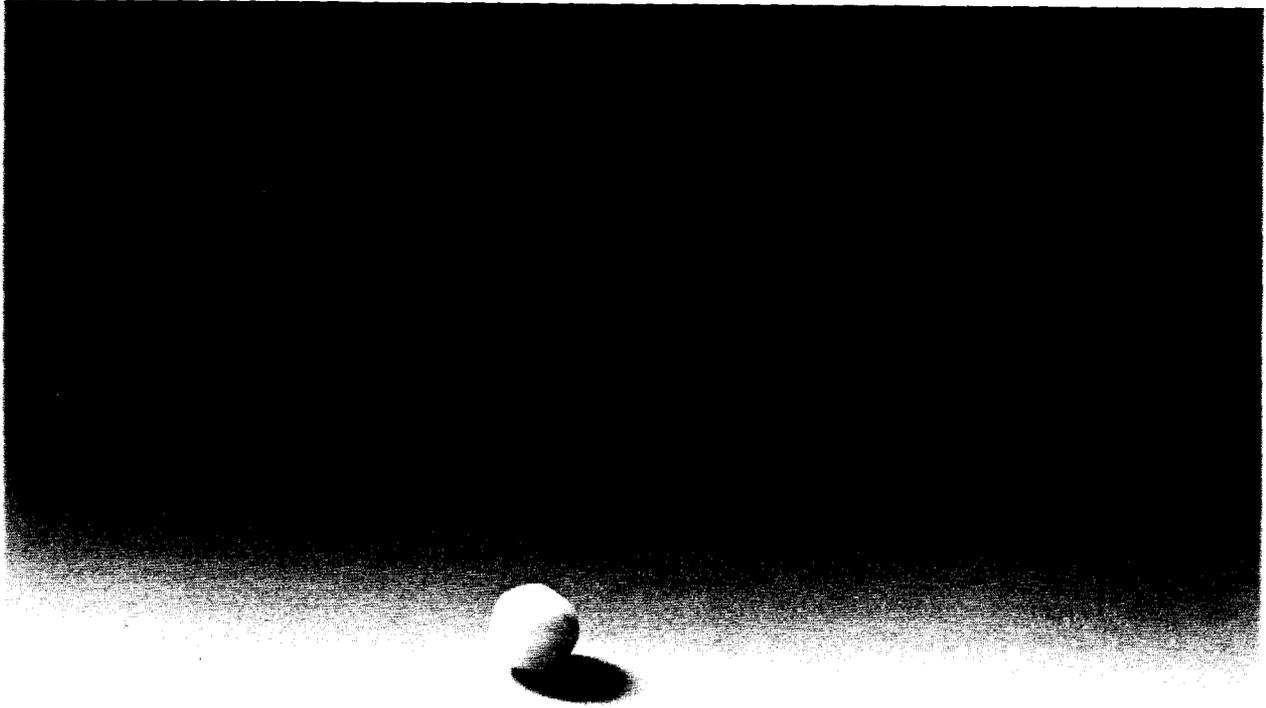
"These pellets, in many shapes and sizes, can be washed down drains as waste or reject material, or spilled in the course of normal handling. But ultimately, they may find their way to bodies of water, where the real trouble begins.

"When eaten in sufficient quantity by a seabird, they can block digestion or sometimes fool the bird into thinking it is not hungry, causing eventual starvation. Fish and sea turtles can suffer the same fate.

"The growing problem of plastic trash in our oceans threatens more than wildlife. This critical issue is destined to invite increasing public and government scrutiny unless we take action to solve it.

"So please: see that resin pellets are reclaimed or disposed of properly. If we ignore the problem we--like the unfortunate seabird--will be making a serious mistake."

Camera-ready reproduction materials (negatives and veloxes) were made available free-of-charge to plastics trade publications, and readers of the ad were invited to write to SPI for additional information. Initially, that consisted of an eight-panel brochure, which offered these recommendations:



## A seabird could mistake this resin pellet for a fish egg. And die.

One little pellet may be insignificant to your plastics processing operation. But to thousands of seabirds, it could lead to a fatal error.

These pellets, in many shapes and sizes, can be washed down drains as waste or reject material, or spilled in the course of normal handling. But ultimately, they may find their way to bodies of water, where the real trouble begins.

When eaten in sufficient quantity by a seabird, they can block digestion or sometimes fool the bird into thinking it is not hungry, causing eventual starvation. Fish and sea turtles

can suffer the same fate.

The growing problem of plastic trash in our oceans threatens more than wildlife. This critical issue is destined to invite increasing public and government scrutiny unless we take action to solve it.

So please: see that resin pellets are reclaimed or disposed of properly. If we ignore the problem, we—like the unfortunate seabird—will be making a serious mistake.

*To learn how you can help, write: The Society of the Plastics Industry, 1275 K Street, N.W., Suite 400, Washington, D.C. 20005.*

A public service message from:  
The Center for Environmental Education  
The National Oceanic and Atmospheric Administration  
The Society of the Plastics Industry

Figure 1.--Full-page public service ad developed for plastics industry publications has been published more than 25 times. Value of the donated space exceeds \$100,000.

- Conduct an "audit" of manufacturing facilities to seek out and eliminate practices which could allow pellets to escape into the environment.
- Initiate an awareness and information program within the company.
- Install closed-loop pellet containment and collection systems in resin production facilities.
- If resin pellets are spilled during processing, clean them up promptly and either recycle them or dispose of them in ways that prevent their release into the environment.
- When cleaning hopper cars, do not flush residual pellets into the environment.
- Instruct employees to close valves on the unloading shoes of rail cars and hopper trucks after they have been unloaded. (If left open, small quantities of pellets stuck in the corners may vibrate loose and be scattered along railroad tracks and highways, ready to be washed by rain into the nearest stream.)
- Do not store or dispose of pellets in areas subject to flooding.
- Make sure resin pellets are used only as intended--for manufacture of plastics products.

Subsequently, a 20-piece marine debris information kit (described in detail on the following pages) was provided to all who wrote or called for more information. Individual companies also prepared materials. Dow Chemical Company produced and made available a videotape as well as a special flyer on resin pellet containment procedures.

#### **PLASTICS MEDIA BRIEFINGS**

Upon completion of the public service ad, brochure, and a special flip-chart presentation, a two-person SPI/CMC team set out to inform editors and publishers of major plastics industry publications on the importance of the marine debris issue. During the fall of 1987, the briefing team personally met with Bob Martino, editor, and Bob Leaversuch, senior editor, at Modern Plastics; Doug Smock, editor, at Plastics World; Matt Naitove, editor, and Bob Burns, associate editor, Plastics Technology; Bob Forger, publisher, and Abe Schoengood, editor, Plastics Engineering; and Peter Sullivan, group vice president, Suzanne Witzler, executive editor, and Mel Friedman, editor, of Edgell Publications (formerly HBJ Publications, which includes Plastics Machinery and Equipment, Advanced Composites, Plastics Compounding, Plastics Design Forum, and Plastics Packaging). The readers of these publications represent a "Who's Who" in plastics, reaching virtually every segment of the industry.

In each case, the overall marine debris problem was discussed with emphasis on the resin pellet aspect, and the publication was asked not only to write about it but also publish the ad on a public service basis.

#### PLASTICS MEDIA RESPONSE

The response to the visits by the briefing team was overwhelming, and some publications continue to run the ad nearly 18 months later. (In the summer of 1988, two smaller versions of the ad were developed and reproduction materials provided to each of the publications.) Through February 1989, plastics industry publications have devoted more than 1,000 column inches of space either to the ad or to news coverage of the marine debris issue. The ad alone has been published on at least 25 occasions by 10 different publications. Their combined circulations in conjunction with the number of publication times means that more than 1.1 million magazine pages featuring the resin pellet ad are now circulating within the plastics industry. It is estimated that the donated advertising space alone would have cost in excess of \$100,000 had it been purchased at the regular rates.

Not only was the ad published with great frequency, but it also was read! Plastics Design Forum (circulation: 47,500 design engineers) reported that a Readex study of its January 1988 issue showed the resin pellet ad was "the second best read ad in the whole issue" (second only to a multipage, full-color special section). "I think that says a lot of things--both in terms of the quality of the ad, but maybe even more significantly, in terms of the importance of the message," commented Peter Sullivan in reporting the results of the study to SPI.

As gratifying as the advertising support has been by plastics industry publications, even more crucial has been their editorial endorsement of the need for the plastics industry to respond to the problem of plastics in the marine environment. Within months of the visits by the briefing team, four of the largest publications devoted their editorial pages (Fig. 2) to the subject. An example is this excerpt from Modern Plastics (Martino 1987, p. 41):

"Goodbye, George F. Babbitt.--The era of Babbittry has ended--at least in plastics. Sinclair Lewis' fictional businessman might still find a home in the backwaters of industry, but here in the mainstream Babbitt's boosterism and distrust of skeptics no longer has an audience. We see this clearly in environmental issues. There is a new generation of plastics leadership--mindful that plastics surround citizens in daily life, pragmatic enough to listen to these citizens, and responsible enough to want to listen.

"One hopes that the passing of Babbitt will be mirrored by the passing of those who have made it their personal mission to save the world from plastics. The need for cooperation between industry and citizens on environmental issues is so apparent that responsible people should no longer have patience with this sort of axe grinding. . . .



"Babbitt could never have coped. We, however, can draw encouragement from the Society of the Plastics Industry's dealings with one special form of solid waste problem: marine litter. Instead of knee-jerk defense of plastics, SPI's response to reports that plastics litter kills ocean animals was to take the reports seriously enough to realize that they were accurate accounts from sensible people. It then undertook practical, reasonable measures to help attack the problem. The latest, joining with a government agency and an environmentalist group--that's right an environmental group--to warn about the dangers of plastics marine litter will go far toward convincing outsiders that in plastics Babbitt is dead" (Martino 1987).

Closer to home, SPI has published the full-page public service ad several times in its President's Report to the Members, distributed quarterly to 4,000 leading executives in the plastics industry. In addition, stories have been carried in that same publication as well as in Plastics News Briefs, also published by SPI and distributed to nearly 11,000 people in the industry.

#### PLASTICS MARINE DEBRIS EDUCATION KIT

While publication of the public service ads, editorials, and news stories in the plastics trade press was raising the awareness level of the issue within the industry, SPI was busy developing additional materials for use with its members. Those materials took the form of the Plastics Marine Debris Education Kit (Fig. 3), which was distributed in May 1988 to some 1,500 resin-producing and processor companies on SPI's membership list. The cover letter, distributed with the kit and signed by SPI President Larry Thomas, said in part:

"As you know, the problem of plastics in the marine environment has gained widespread attention over the past year from both the media and government officials. For the most part, the situation is out of our hands--obviously it is difficult for us to keep track of how the end-user disposes of our products, and the vast majority of the plastics in the marine environment were dumped there by others.

"But the problem of resin pellets in the ocean is ours alone.

"It is time to escalate our education efforts to be sure that pellets are not escaping during routine handling, transportation and shipping procedures. . . . I urge you to make this education effort a priority. Employees who manufacture, ship and handle resin pellets need to become more aware of the importance of careful handling procedures. . . ."

The information kit, which carried the resin pellet theme from the public service ad and brochure, was designed to enable any company to carry out its own internal information campaign. Included in the kit were:

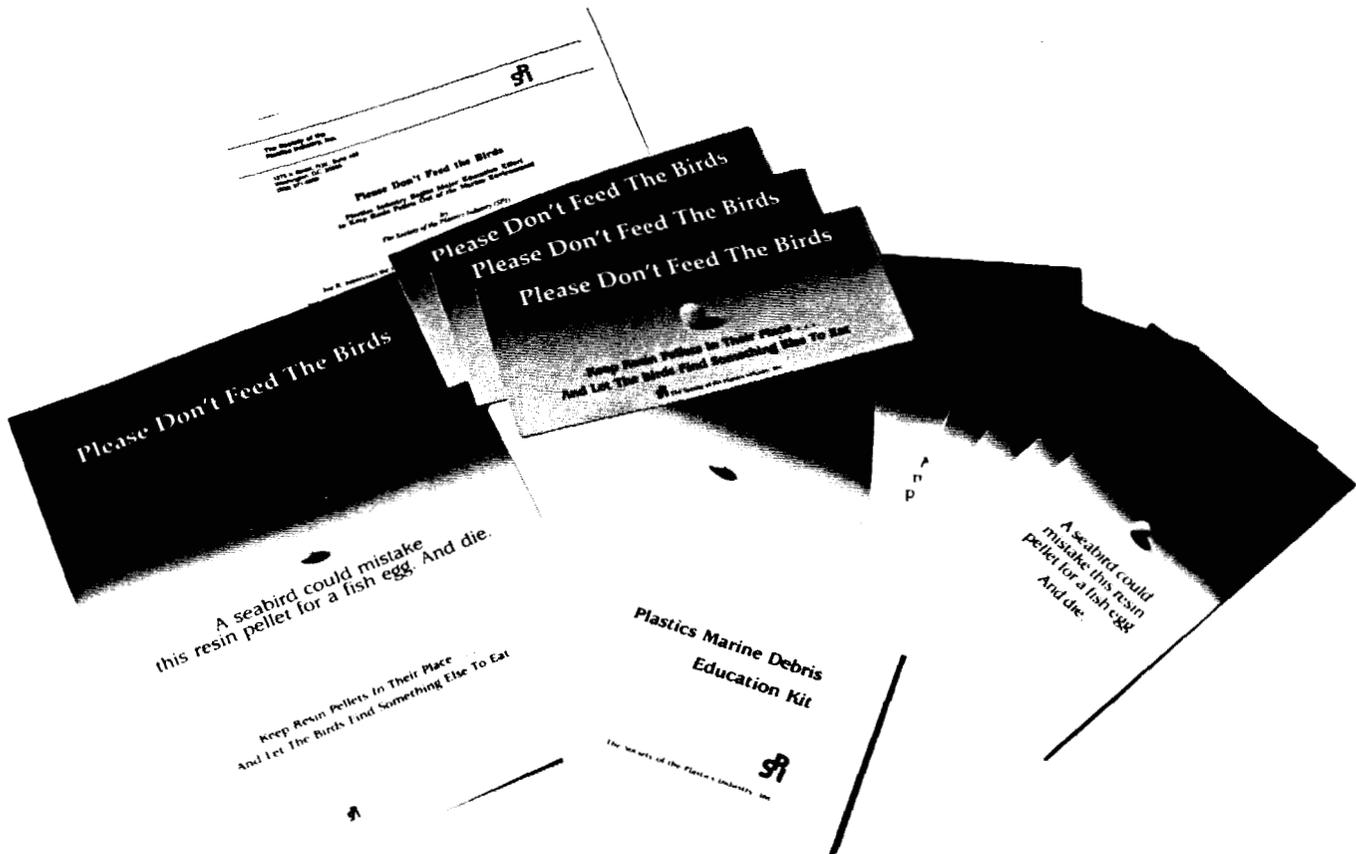


Figure 3.--Plastics Marine Debris Education Kit developed by The Society of the Plastics Industry, Inc., was mailed to some 1,500 of its member companies.

- Posters (in two sizes) for placement on bulletin boards or in well-traveled areas of the plant.
- Stickers for placement on trash cans and other appropriate waste disposal containers.
- A feature article about marine debris and resin pellets for use in company magazines or newsletters.
- Brochures with additional information for distribution to employees.
- Order form to secure additional quantities of any of the printed materials.

The SPI has filled many orders for kits and individual parts of the kit, both from SPI members and nonmembers, many of whom were alerted to the availability through the public service ad. In addition, kits were distributed via other means, such as SPI resin producer member companies to their customers in the processing business.

The information kit also has been distributed to the plastics industry on the international scene. In the summer of 1988, SPI's Thomas presented copies of the kit to attendees at a meeting of the International Plastics Associations Directors (IPAD) held in Berlin, West Germany. The IPAD periodically brings together the chief executive officers of the 50 worldwide plastics associations to exchange information.

#### THE SOCIETY OF THE PLASTICS INDUSTRY--PLASTICS WORLD ROUNDTABLE

Representing the plastics industry on the marine debris roundtable spearheaded by NOAA's James Coe, SPI gained a greater understanding of many aspects of marine debris--and saw that the solution must be multifaceted. The many hours of discussion convinced SPI's director of technical and regulatory affairs, H. Patrick Toner, that there must be a role for the SPI beyond what it already was doing.

The plastics industry is noted for its entrepreneurial, turn-a-problem-into-an-opportunity approach to business. The question was how to spark that creative problem-solving for the benefit of the marine environment. As a trade association, SPI does not actually develop specific products. That didn't mean, however, that it couldn't facilitate the process with information.

Working with Plastics World magazine, SPI sponsored in July 1988 a roundtable discussion on the marine debris problem, bringing together representatives from major industries and organizations with a stake in the situation. Participants included:

James Coe, U.S. National Marine Fisheries Service  
 Joe Cox, American Institute of Merchant Shipping  
 William Gordon, New Jersey Marine Sciences Consortium  
 Carl Kirkland, Plastics World  
 Ralph Rayburn, Texas Shrimpers Association  
 Thomas S. Scarano, U.S. Navy  
 Gary Schmidt, American President Lines  
 Mark D. Sickles, American Association of Port Authorities  
 Doug Smock, Plastics World  
 H. Patrick Toner, The Society of the Plastics Industry, Inc.

The result was a five-page story by Smock in the September 1988 issue of Plastics World entitled "Are shipboard plastics all washed up?" Smock (1988) examined the scope of the problem and what options were under consideration, and noted: "Many of the changes being considered will create commercial opportunities for alert entrepreneurs. There are visions of recycling industries sprouting at harbors. And who will manufacture the on-board compactors, incinerators and waste processing equipment being contemplated for marine plastics?"

Clearly, the message had been delivered to the industry. Now, only time will reveal the degree of success.

#### THE SOCIETY OF THE PLASTICS INDUSTRY SYMPOSIUM ON DEGRADABLE PLASTICS

Since marine debris first began showing up in headlines and on the evening news, the notion of degradable plastics often has been posed as a solution. In late 1986 and early 1987, increased references to this prompted SPI to plan a symposium on the subject. As the "voice of the plastics industry," SPI was being called upon to respond to the viability of the idea, but there was not a ready compendium of current information.

The Symposium on Degradable Plastics, held 10 June 1987 in Washington, D.C., helped solve that problem. Ten presentations on the technology of biodegradable and photodegradable plastics, plus additional papers, resulted in a proceedings book that contained the best available public information on the subject at that time.

In his opening remarks to the overflow crowd of nearly 400, C.E. O'Connell, then president of SPI, said:

"I hope that by the end of the day we will have enough information to go away thinking about plastics, and particularly plastics packaging, in a new way. We are being asked to think about product design from the cradle to the grave, and as a responsible industry, we must give serious thought to the ultimate disposal of our products after their useful life is finished.

"I doubt that we will come away with many answers today, but as far as I am concerned, that is not really our goal. If we can come away with an appreciation for the difficult questions, and an awareness of the perceived needs, we will be that much closer to determining just where degradability is truly feasible, both today and in the future."

Perhaps Michael Bean of the Environmental Defense Fund, one of the symposium speakers, summed it up best when he told the audience that day:

"The important environmental questions that must be asked are whether the products of degradation are themselves environmentally safe and whether degradation can occur rapidly enough to reduce significantly the hazards of plastics in the environment. The obvious marketing question is whether plastic products made to degrade can continue to serve their intended function in the marketplace."

Some of the questions posed then still deserve consideration today, but much has happened since that symposium in 1987. Many legislative proposals have been made. Some laws have been passed. A number of companies now offer degradable plastics products.

**CONCLUSION**

Just as the cause(s) of the marine debris problem is largely an accumulation of careless actions over many years, so too will the solution come in the form of years of dedicated efforts on a variety of fronts. The industry is committed to being a meaningful part of that solution--through both cooperative educational efforts and the development of environmentally safe products.

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