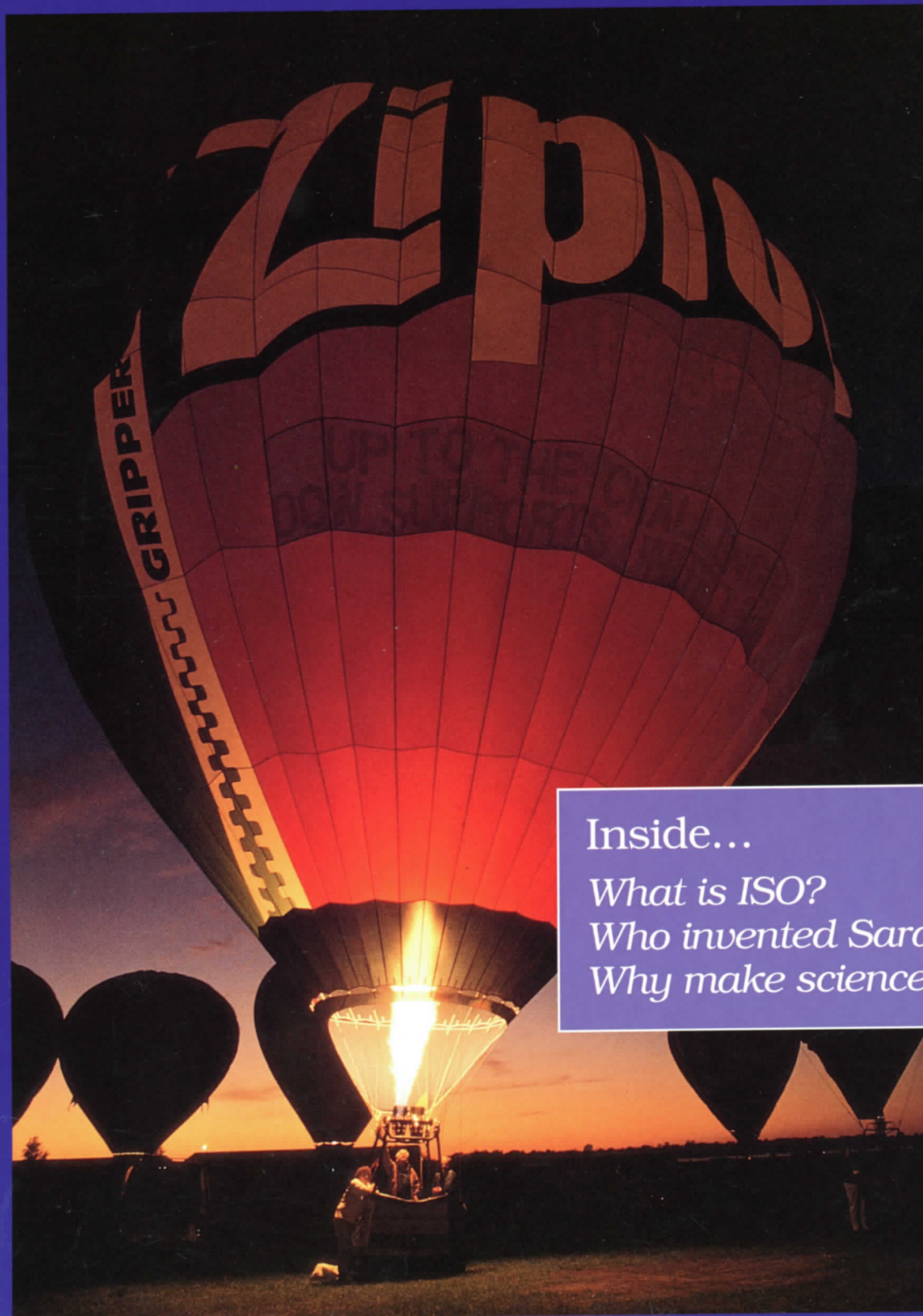


BRINEWELL



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for its employees and retirees and their families.



Inside...

What is ISO?

Who invented Saran?

Why make science real?



Two Generations

Two generations of Dow employees have worked all or part of their careers in the research, production, and marketing of Saran Wrap.

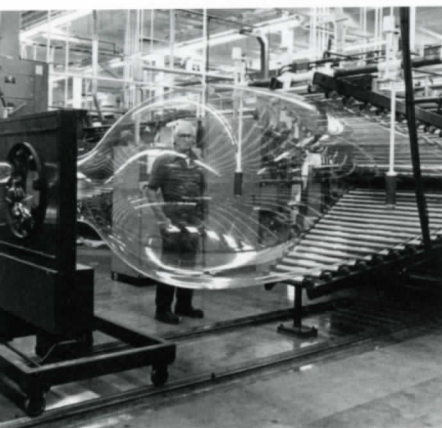
THE FIRST GENERATION of co-workers that began the production of Saran Wrap together, shared memories of their accomplishments during a late summer picnic in 1993. Now retired, they include (l to r, front) Will Perry (1956-86), Bruce Wade (1951-86), Walter Boubonce (1955-86), Jake Herman (1953-81), (back) Norm Young (1951-84), Don McClintic (1951-84), John Swebe (1955-82), Lawrence "Dick" Tracey (1952-84), and Louie Vallaincourt (1953-82).

Saran Wrap in the '90s

Today Saran Wrap* plastic film can be found in supermarkets and general merchandise stores in cities across North America as well as in Europe and Asia. Consumers look to the premium quality wrap for its superior long-term food protection. And, the wrap's high cooking temperature tolerance and resistance to hot fats and oils make it the best plastic wrap for microwave use, a benefit consumers weren't thinking about back in 1953.

Saran Wrap still outperforms other wraps, thanks to the strength of its clear crystalline structure. In fact, it's currently number one in grocery sales.

The product's packaging has been enhanced over the years. The recycled paperboard



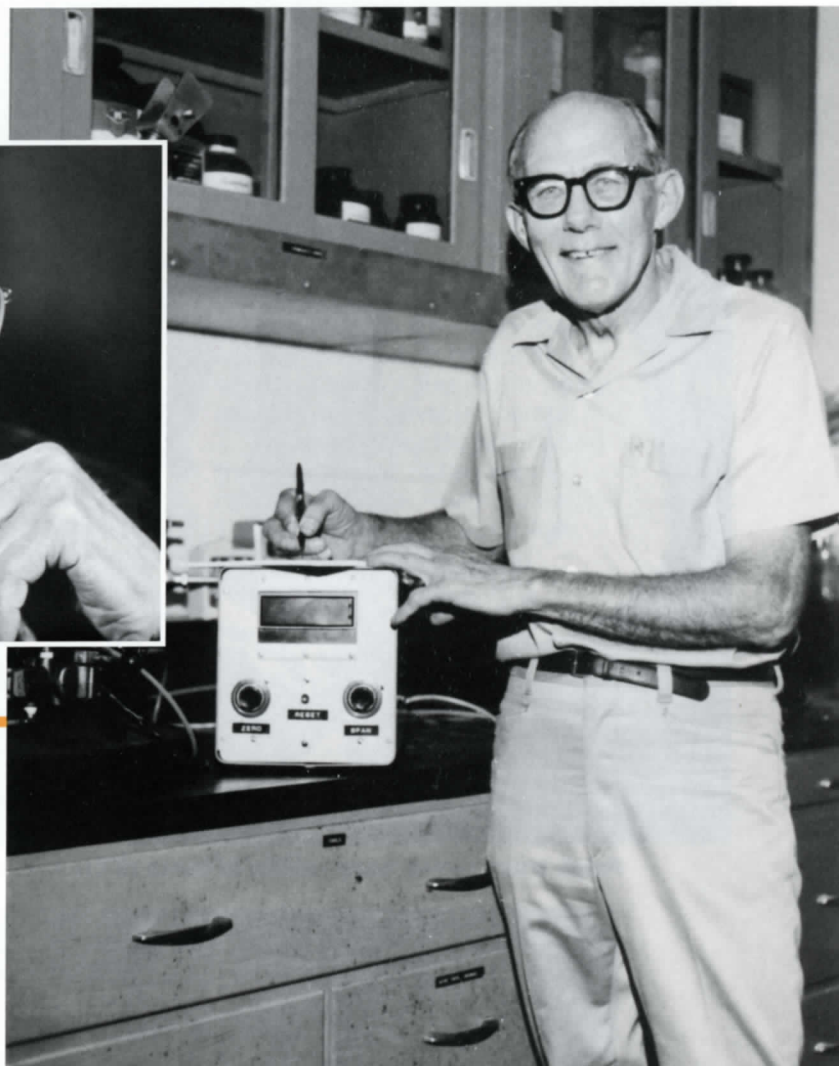
Louie Vallaincourt and the "bubble," 1972



A SECOND GENERATION of co-workers make Saran Wrap today, many not yet born when the product was launched in 1953. Today they interrupt production for special Safety Days to share new ideas.

packaging is designed to dispense wrap with ease. A unique cling strip was also added in 1992 to prevent the film from sliding back onto the roll. Saran Wrap is currently available in 50-square foot, 100-square foot, 200-square foot and 65.5-square foot (extra wide) rolls.

In the 1990s, Saran Wrap is categorized as a "mature brand" in the consumer products business as it begins its fifth decade. Mature, yes. Outdated, never. Quality lasts. ♦



Remembering five decades of research for Saran.

Ralph Wiley, **INVENTOR** OF SARAN

**"The heck with it,
I'm goin' to Midland"**

It was 1933 and times were tough. "Brother can ya spare a dime," was the song everyone knew. College graduates couldn't find jobs. But Ralph Wiley had a professor looking out for him. And he didn't wait for formal introductions. If he had, perhaps Saran and Saran Wrap would never have happened.

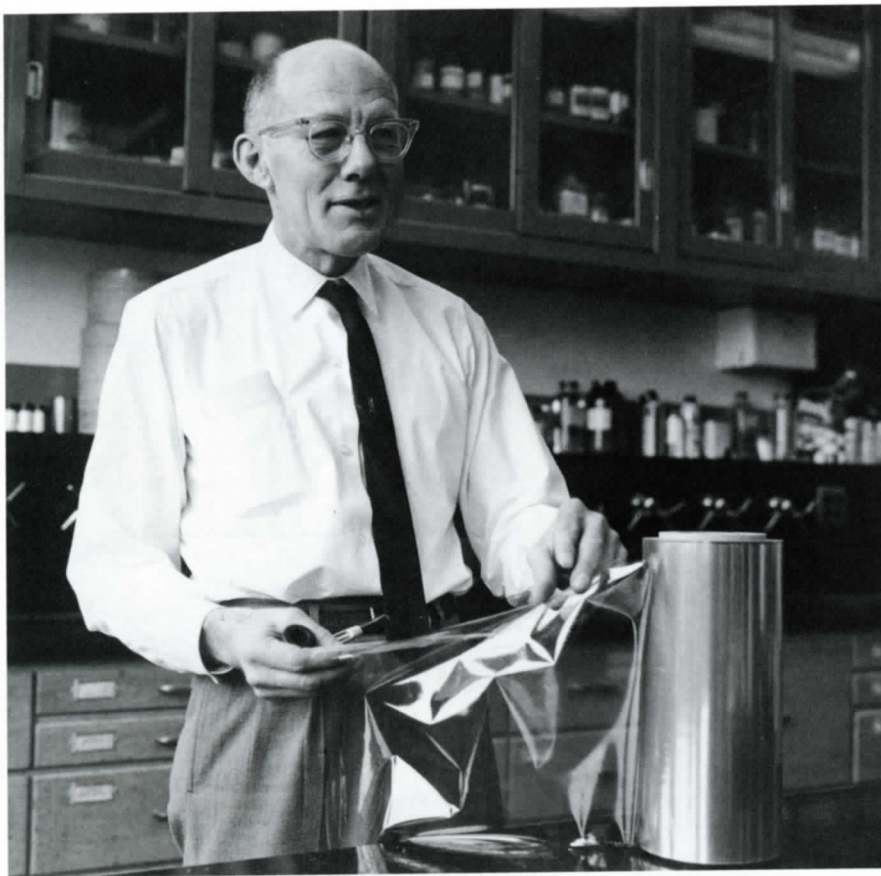
At Antioch College, then as now, a year of co-op work in industry was a requirement for graduation. The determined professor appealed to Willard Dow to find places for his students, especially Ralph. Willard agreed. So Ralph waited for the call from Dow, armed with a letter of introduction from his professor to John Grebe, Willard Dow's lab director.

Christmas vacation came and passed. Still no call. Ralph could wait no more. "The heck with it... I'm goin' to Midland!"

"I barged in on Grebe and he called Willard," Ralph recalls, "and Willard remembered his promise and said we'd better take him on as a lab assistant, a helper."

Ralph's first duties were washing dishes and beakers and mopping up at day's end. But soon he was asked to work on experiments. With an eye on the emerging dry cleaning industry, Dr. Grebe asked him to work on finding a way to make perchloroethylene from chlorine (something Dow had a lot of) and something they

continued



Ralph Wiley solved many riddles of Saran in his earlier lab days.

called "wild stuff" coming from the distillation waste at the Pure Oil refinery across the river.

One of the byproducts of the distillation during his efforts to make perchloroethylene was discovered to be 1,1 dichloroethyl, a monomer of the, as yet unnamed, Saran plastic.

"If you didn't clean up the beakers and test tubes at night, it wouldn't dissolve the next day," explains Ralph, "and it was my job to get it clean."

Jack Reilly's Great Stuff

Jack Reilly challenged him to find a way to make a new plastic from it, calling it "great stuff." The 1930s were the upstart days of plastics, and Ralph considered Jack to be "an intuitive engineer."

So Ralph kept trying to determine the melting point of the "great stuff" without decomposing it — no small task. He used whatever means

he could find, including a new electric iron that belonged to another researcher, Sylvia Stoesser. The iron didn't fare too well, but Ralph got his data.

In those days, Dow management and the sales department were not very interested in plastics. They were in the business of bulk chemicals.

"H. H. Dow's philosophy had always been to make chemicals in tonnage quantities and sell it to others to make the retail products," explains Ralph, "and they thought of plastics as just combs and household items."

"Of course, Sylvia and Bobby Dreisbach were interested in styrene, which was more acceptable because it didn't smoke or stink like the stuff I worked on."

Once when Jack Reilly and Ralph were distilling the crude perchloroethylene made in the pilot plant, they observed that the inside surfaces of the large distillation flask became white

from some substance in the crude liquid. They became curious and recovered some of the material by scraping it from the flask. Grebe saw them doing this and said, "Forget that stuff; do not waste your time; work only on perchloroethylene."

But they both knew John's bark was worse than his bite and they kept on working. Later they isolated a portion of the material and analyzed it as vinylidene chloride, an essential component of the future wrap product. While John's bark was ignored, Ralph and Jack could not ignore the bark of exploding experiments.

Determined Researcher

Management began threatening to shut down research and production on Saran for safety reasons. A determined researcher, Ralph used an anvil and a ballpeen hammer to solve the riddle of why Saran sometimes exploded during fabrication and extrusion. For many weeks explosive sounds reverberated through the lab. But Ralph concluded that if oxygen were excluded from the raw materials prior to and during copolymerization, it would not explode.

To put all this research effort into perspective, it's important to remember that this was 1935. Only wet chemical analysis techniques were available and there was no infrared spectroscopy and polymer chemistry was in its infancy.

Management Hard To Convince

"Staying in the early plastics business, especially the retail and commercial end of it, was a wrenching thing for management," says Ralph.

He recalls that at one critical point in the company's beginnings in the plastics industry, Dow tried to sell the newly developed styrene to the founder of the Bakelite Company. That company kept the product for a year or so and then returned it to Dow.

Eventually, Dow executives began to see the potential for plastics in the marketplace, but it would take World War II and a few stubborn believers in high places along the way.

Saved By a Patent Attorney

Once when Willard Dow concluded plastics wasn't a viable business for Dow, he told

Saran Goes to War

During the early years of World War II, Saran film was used to package and protect armaments subjected to salt spray and moisture at sea. Those same moisture barrier properties would one day make it the best food protector on the market.

Stopping the Saran Name Rumor

After the war, when Dow sales people decided the useful plastic needed a name to help it sell, the researchers kept coming up with ideas that sounded like chemicals. That wouldn't do for sales manager Bill Goggin.

"Bill searched for a name until he found one

Firestone had for the plastic they were using for streetcar seats," remembers Ralph. "He helped Dow get the rights to the name from Firestone, and it's been Saran ever since."

Ralph hopes that explanation should put a stop to the legendary story of the name being a blend of two wives' names.

"I suspect Ray Boyer started the rumor that Saran was named for Jack Reilly's wife Sarah and my wife Julia Ann, even if Saran sounds like SaraAnn."

From Saran to Saran Wrap

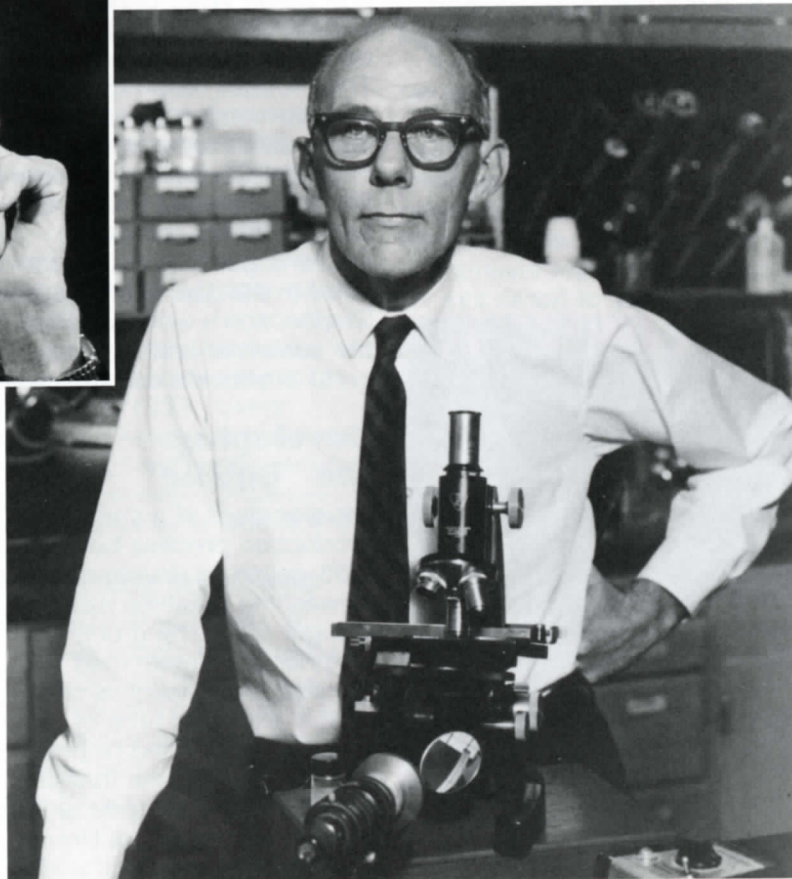
As the post-war boom on the homefront began, new products were in great demand. Companies were scrambling to

continued



Ralph and his lab team they had to stop all Saran research immediately. Ralph turned to Tom Griswold, then head of Dow's patent department.

"I went to Tom and told him about Willard's orders and he said, 'Oh, he can't do that, we have all this covered tightly with patents. I'll go see him.'" And, to Ralph's surprise, "Sure enough, he saw Willard and in a day or two, Willard changed his mind."



Ralph knew Saran had a future beyond World War II.

find new applications for wartime materials. Ralph knew Saran had a future, but he believed it would be in fabric, not film.

"I was proved wrong on that one because, Saran as a fabric doesn't absorb moisture — the very thing that makes it a success as a wrap."

Saran, the product Ralph had invented and made by hand in the lab before the war, now needed a new process for producing it commercially. Commercial development and sales was never Ralph's favorite thing. So he chose to stick to his research and leave the commercial process to Wilbur Stephenson.

"Most important invention... was Wilbur Stephenson's"

"I invented the Saran product, but the process for producing it commercially belonged to Wilbur Stephenson," Ralph stresses, "and he very rarely got much credit for it."

The process Stephenson ultimately developed was the familiar "bubble," which Ralph considers the major invention in the progress of Saran film.

Almost Not a Dow Product

After the war, in 1947, two Dow employees believed in the potential of making a household food wrap from Saran film. Russ Ludwig and Carroll "Curly" Irons started a separate operation outside of Dow, in a building on Bay City Road. They bought the big rolls of the commercial film, slit the film into 12-inch widths, and packaged them into 25-foot lengths. They called it "Cling Wrap," and it was an instant hit with homemakers. Dow noticed their success and bought out their interests in 1948, at the urging of Dr. Strosacker.



"A Little flash of pride" for Ralph at age 83.

Modestly he says, "By far Saran's most important invention is not mine at all — it's Wilbur Stephenson's."

Stephenson, before the war, had been trying to extrude tubing from Saran and had made some crude samples of a film from a partially expanded tube. This film turned out to be the first Saran Wrap plastic film and he received the first patent on the film's blowing process. The process received very little attention until the sales department asked for a film for the Frigidaire Division of General Motors to serve as a flexible barrier film for packaging machine guns to ship to the Allies in Europe. Samples from Stephenson's work satisfied the customer and spurred Dow on to produce it commercially.

Developing the "Bubble"

Development of a commercial production process began with a 55-gallon oil drum and a pair of washing machine rubber wringer rolls. The group with Stephenson determined that the size and thickness of a freshly extruded tube of Saran could be controlled to produce a uniform thickness that could be blown by a trapped air bubble into a continuous film of remarkable clarity and unifor-

mity. This work was the beginning of the process that is still used today.

Saran film and the bubble process survived the war years to go on to become a popular consumer product, thanks to hard work and ingenuity of many researchers, engineers, technicians, and plant operators.

A Witness To Change

Ralph has witnessed many changes in research at Dow over the decades of his 45-year career. One of the most significant changes he says took place just before he joined the company.

"When H.H. Dow died, a year before I came to Dow, the technical people feared they'd lose ground," Ralph recalls. "H. H. always thought they were tops and everyone else was there to serve the scientists and engineers." This founder's technical favoritism had been so well-known, Ralph says, that everyone's favorite H.H. Dow quotation was: "If you can produce product that's better and cheaper than the competition, any damn fool can sell it!"

"Since the 1930s, research complaints have always been about the gradual shift to management and financial considerations above research," says Ralph.

Tough Times vs. New Ideas

"Fortunately," says Ralph, "H.H.'s spirit of trying new things was still alive back then, and Dow didn't seem to get hit as hard as other companies by the Depression.

"I knew that if I could convince Grebe something ought to be done, it would get done," Ralph recalls, "because when Grebe was excited about a new idea, management, especially Strosacker and Willard Dow, respected him. Of course, I'd have to be as prudent and economical as possible."

Environment, Safety Evolved from Don Irish

Environmental and safety concerns have evolved gradually at Dow, as Ralph observes. However, he credits Don Irish, another Antioch graduate, for first stirring up interest in this area.

"Don was hired by Willard in 1934 to start the biochem research department," he says, "because we were making agricultural chemicals and sprays and knew we needed a department to test these products.

"Don Irish was testing products and issuing sheets on how to handle the products safely way back in the 1930s and 40s.

"Environmental and safety concern have been a steady evolution at Dow," Ralph says.

"Every year regulations became more strict, with more warning labels and more frequent bulletins and edicts from management saying 'don't do this'," he recalls, "making Dow one of the safest companies to work for.

"Maybe that's why people are so surprised that I'm 83 and still alive after having

breathed all the carbon tet and vinyl chloride all those years," Ralph jokes. "Of course, I had a granddad live to be 94."

Today's Labs Are Full of Computers

"All the labs are full of computers these days," Ralph observes, "and you don't have to sit there with a thermometer and a stop watch in your hand taking readings every half hour — the computer does all that for you — even plots the charts of yield vs. time — it's an amazing thing!

"Science advances faster than any other branch of learning, so what you know becomes obsolete faster than in any other field."

To Class of '93... from Class of '33

Ralph advises today's graduates coming into Dow to "be a little more stubborn and persistent, be a little more resistant to management and adhere to what you believe, even if it's not politically correct." He's quick to add, "Of course, if you want to be a manager, that's not very good advice."

He also shares this advice he received as a student from his professor in 1933: "Make money and keep your belly to the bench...Dow is one of the most progressive companies and you're lucky to work there."

Advice for Retirees

For retirees, Ralph sees an enormous variety of interests to pursue. But for those not yet retired, he says "Save up a little money, buy some Dow stock all along, and decide what works for you on your own."

Ralph and Julia Wiley traveled during the first years of their retirement, including trips to France and Spain as well as Seattle, where one of their three daughters lives. The Riley's also have a son. Today they stay close to home and take it easy. And Ralph enjoys stopping regularly at Woolworth's luncheonette for breakfast with other Dow retirees who like to watch the progress on downtown Main Street.

"A little flash of pride"

Saran Wrap, the household name product his original research helped create, is still going strong in the marketplace after forty years. How does Ralph feel whenever he sees an advertisement for Saran Wrap or a display of the familiar boxes in a super market today?

"I was never much of a TV fan and when I go to the supermarket, I probably take Saran Wrap for granted," he answers, then pausing for a grin, "well, maybe just a little flash of pride." ♦

"Father of Saran" and More

Ralph Wiley is known as the "Father of Saran" because more than half of the early patents on both product and process developments on Saran bear his name as inventor or co-inventor. He also developed the concept of using block copolymers as impact modifiers for styrene plastics, commercially utilized in several Dow ABS resins. Another accomplishment is the "Wiley Feeder," a device for accurate continuous addition of color concentrate into a stream of plastic resin. Ralph has 47 patents to his credit, with 33 relative to Saran.