THE LITERARY DIGEST
OCTOBER 19, 1937: p. 15

Plastics: Newest Chemical Magic

Heraclitus's Dictum "Everything Flows," Forgotten 2,300 Years, Creates Modern Industry; Substance Repairs Man's Torn Skull

"Everything flows," declared the Greek philosopher Heraclitus, about 500 B.C.

Forgotten more than 2,300 years, this truth recently was rediscovered. Even steel creeps slightly in bridges, glass in windows, and marble in monuments. Heraclitus's remark to-day is the motto of a group of specialized scientists known as *rheologists*.

Last week the Society of Rheology, official organization of this young science, held its seventh annual meeting in New York. Papers were delivered on the flow of liquids, of starch paste, of rubber, of asphalt used for covering roads and roofs.

But widest in application were the papers that dealt with conditions of flow in the molding of the newest of modern materials, the "synthetic plastics."

"When you look at the face of your watch, switch on the radio, press the starter button of your car, or unscrew the cap of your fountain-pen, the chances are you make use of plastics," explains John E. Lodge in the current *Popular Science Monthly*.

"Telephones, radios, chairs, dishes, buttons—all sorts of useful articles, from steering-wheels to surgeons' masks, from safety glass to fishing-reels, from false teeth to bird-cages, are now made, wholly or in part, of plastics.

Chemistry's Magic

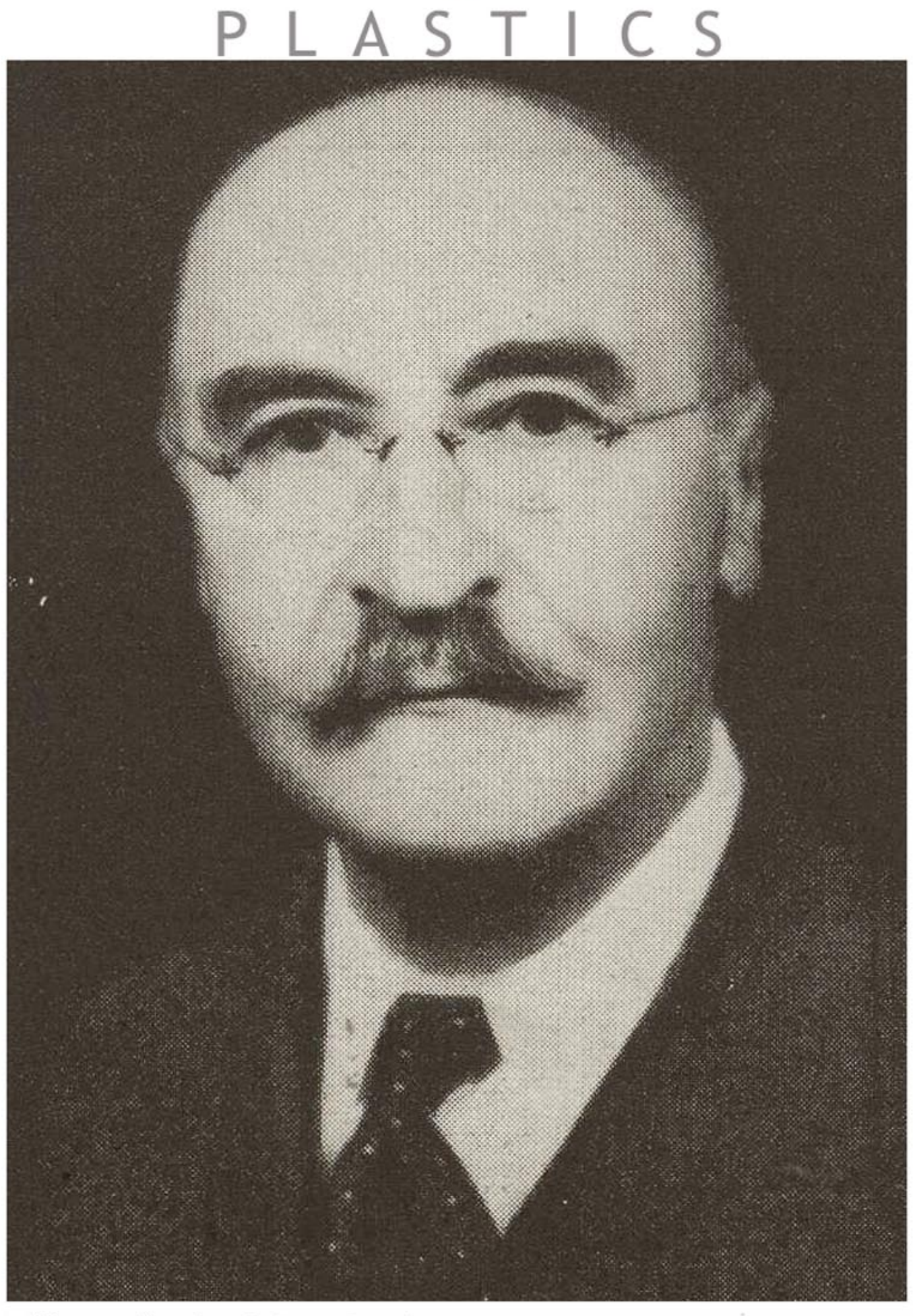
"The magic of modern chemistry has produced these materials, which are unlike any natural substances found on earth or in the sea."

Over such discussions inevitably looms the legend-creating figure of seventy-one-year-old Dr. Leo Hendrik Baekeland. Twenty-five years ago last week, Doctor Baekeland launched the modern plastics industry with the founding of his General Bakelite Company, now the Bakelite Corporation, at Bloomfield, New Jersey.

Synthetic plastics are man-made substances which not only change shape when molded under heat and pressure, but change their chemical condition as well. Bakelite, the pioneer of them all, is made by combining a liquid and a gas—phenol (carbolic acid) and formalin (formaldehyde)—into a resinous substance. It was Doctor Baekeland's invention, announced February 5, 1909, before the American Chemical Society.

Since then, legends have clustered about the figure of this industry-maker, whose chief pleasure, next to chemical research, is the navigation of his yacht. He was born at Ghent, Belgium. At twenty-two he was an assistant and later an associate professor of chemistry at the University of Ghent.

"My most important discovery at the university," he wrote in 1932, "was that my senior professor of chemistry had a very attractive daughter. Hence, the usual succession of events. Not many years later I



Dr. Leo Hendrik Baekeland: Creator of an Industry

was married and was confronted with the necessity of a more adequate income than the meager salary of a young professor."

At twenty-six he came to this country on a post-graduate traveling fellowship awarded by four Belgian universities. Liking the country, he decided to stay. His first work was with a photographic supply-house.

Later he left the job, formed a company, the Nepera Chemical Company, and established a small laboratory in Yonkers, New York. There he invented a faster form of photographic print-paper, later famous under the name Velox.

Professional photographers were slow to adopt the new material, so Baekeland turned to the amateurs. Soon the experimental photographers were making better pictures than the professionals. The late George Eastman, founder of the Eastman Kodak Company, began negotiations with the young inventor for the purchase of his process.

Gains a Fortune

There is a legend that Baekeland went to Rochester, New York, to interview Eastman, determined not to part with his invention for less than $25,000. But Eastman reputedly offered, instead, $1,000,000. Whether this is the correct sum has not been revealed, but in any case the amount was enough to make the chemist independent for life.

"Thus at thirty-five," Doctor Baekeland recounted later, "I found myself in comfortable financial circumstances, a free man, ready to devote myself to my favorite studies. Then truly began the happiest period of my life."

He began experimenting with the tarry substance produced by the chemical reaction of carbolic acid and formaldehyde, hoping to make a substitute for varnish. He ended by launching a new industry.

The new plastic was first used as a substitute for amber. The chemist even embedded insects and impurities in it to give a better imitation of the natural product. The cheapness of the material and the ease with which it could be molded soon attracted attention to its unique qualities.

Thirty Factories Busy

To-day, in the United States alone, thirty companies are manufacturing the carbolic-acid type of plastics. Their total production is about fifty million pounds a year, worth an average of fifteen cents a pound.

About 45,000 persons are employed.

The success of Bakelite stimulated further research, with the result that synthetic plastics are now made from many other materials beside carbolic acid and formaldehyde. *Machine Design*, in an article on the use of plastics in engineering, recently listed sixty types.

"The British Plastics Year-book" for 1933 required fifty-five pages merely to list the products made from plastics, and thirty pages to list the substances from which synthetic plastics are made.

One of the oddest uses is that made by a Canadian who in 1926 was victim of an accident that tore away part of his head. To-day he owes his life to a molded skull of Bakelite.