Celebrating a Century of Textiles

In this issue of *AATCC Review*, and continuing throughout 2021, AATCC is celebrating a century of our technical and publishing heritage by reprinting a series of selected articles published in *American Dyestuff Reporter (ADR)*, the first magazine to publish AATCC activities, reports, and presentations (and also in the AATCC publications that followed *ADR: Textile Chemist & Colorist (TC&C)*, and *AATCC Review*, where history is still being made).

All issues of *ADR* are on file in the Technical Center library and in scanned electronic format: [www.aatcc.org/pubs/adr/](http://www.aatcc.org/pubs/adr/)

Past issues of *TC&C* are available online on the EBSCO Textile Complete database, available from the AATCC website [https://members.aatcc.org/4DCGI/members/index.html](https://members.aatcc.org/4DCGI/members/index.html)

The early history of AATCC may be found throughout issues of *ADR*, as well as the Association’s history book, *Dyeing for a Living, A History of the American Association of Textile Chemists and Colorists: 1921-1996*, by Mark Clark, available for download at: [www.aatcc.org/about/history](http://www.aatcc.org/about/history)

To discuss the articles with members of the task group, click on the “Forum” button at [www.aatcc.org/members/](http://www.aatcc.org/members/), log in, visit the Main AATCC Forum, and join the AATCC Centennial Project topic.
The Development of the Polyester Fiber

Introduction by Ian Hardin

The development of polyethylene terephthalate (PET) fiber begins with the story of Wallace Hume Carothers, truly one of the tragic figures of science.

Beginning about 1929, after DuPont hired him from Harvard and gave him near carte blanche to do pioneering research on polymers, he published numerous articles about condensation polymerization (step reaction). Nylon 66 grew from that work.

He also made polyesters, but he used aliphatic di-carboxylic acids with ethylene glycol and their melting points were too low to be useful as fibers (below 107°C). Carothers almost surely would have won a Nobel Prize if he had lived to see how highly regarded and influential his work was, but his death came even before DuPont started making the public aware of this new nylon (polyamide) fiber in 1939.

In 1941, J. R. Whinfield and J. T. Dixon, along with W. K. Birtwhistle and G. G. Ritchie, had a small lab at Calico Printer’s Association in the UK. Whinfield and the group knew of Carothers’ work. Unlike him, they used a di-carboxylic acid with a rigid benzene ring, para (or tere-UK use) phthalic acid, along with ethylene glycol to create a polyester with a high melting temperature (above 200°C). They called their fiber “Terylene.”

Although Whinfield and Dixon submitted a patent application in July 1941, the publication of the patent was not done until June of 1946. Calico Printers decided to sell the rights to Terylene to Imperial Chemical Industries (ICI) in 1946 and ICI manufactured the first PET fiber.

At that time, DuPont had an agreement with ICI to share information about patents and research developments. DuPont bought the legal rights to the work on polyethylene terephthalate in 1946 and developed their own technology in the late 1940s. A pilot plant was built at Seaford, DE, USA, in 1950. During development, the fiber was known as “Fiber V.” Just before commercialization the brand name “Amilar” was chosen, but quickly withdrawn because of some existing use of that name. The PET DuPont fiber was rebranded as “Dacron” and came onto the market in 1951. From the beginning, it was noted that the PET fiber was difficult to dye in anything but light shades.

Seminal papers that relate to this development are the numerous ones by Carothers in the Journal of the American Chemical Society, the article by Whinfield in Nature “Chemistry of Terylene” (Vol 158: 930-931), the article by W. H. Cady (1946 Olney Medalist) in American Dyestuff Reporter (October 18, 1948) “Terylene, The New British Fiber,” and the article by Whinfield in Textile Research Journal, “The Development of Terylene,” (Vol 23, No 5 : 289-293, 1953). The article by Cady in ADR, which gives a sense of what was to come in research work on dyeing polyester, is the one being introduced here.

Available to members at www.aatcc.org/pubs/adr/centennial-celebrations