The AOCS Laboratory Proficiency Program (LPP) through the years

Rebecca Guenard

Frank Hahn can tell you the details of a method off the top of his head. Want to know the moisture content in cotton seed? "You weight out 10 grams of cotton seeds into a dish and put it in an oven for 3 hours at 130 degrees C," says Hahn. "At the end of three hours, you take it out and re-weigh it. Your loss is what is evaporated out. That is your moisture."

Hahn owns and operates Hahn Laboratories in Columbia, South Carolina. The company has served as an analytical support laboratory for seed oil manufacturers for over 70 years. Hahn's father, Col. Edward R. Hahn established the company in 1947. They are part of a cluster of independent laboratories whose oil chemists established the American Oil Chemists' Society (AOCS). Such laboratories are still dedicated Society members and provide an important service in the industry.

- **Multigenerational laboratories have been part of the American Oil Chemists' Society (AOCS) since its inception, and value the accreditation that the AOCS Laboratory Proficiency Program (LPP) brings.**
- **The LPP gives analytical laboratories the opportunity to evaluate their performance against more than 500 other participants.**
- **The program is looking to the future, rolling out a new series in 2020, and considering untapped product areas that need standardized methods.**

Michael Hawkins started working in his father's lab in 1983, but the legacy of Barrow-Agee, in Memphis, Tennessee, stretches back a hundred years. Hawkins says he has seen a lot of changes over the years—new technology has made some analysis methods faster and safer—but the AOCS Laboratory Proficiency Program (LPP) has been a constant. "The benefit to us is showing your customers that you are doing good work," says Hawkins. "It is a valuable tool for the lab and a necessary one too. We also use it for quality control."

AOCS has been central to the lives of Hahn and Hawkins for decades. Though their fathers have passed, the two men continue serving the analytical needs of companies in the fats and oils business guided by the standards established by AOCS methods. They are proud to be a part of the LPP to provide validate product composition data to their customers.

SIMPLE BEGINNINGS

Like AOCS itself, Hahn Laboratories can credit its start to cotton. Edward Hahn attended Georgia Tech University in Atlanta, Georgia, in the 1930s. As a chemical engineering major, he had the opportunity to co-op with a local business to put himself through school, working one semester then taking classes the next.

After the American Civil War ended in the late 1800s, the city of Atlanta rebounded from the destruction it suffered by focusing on manufacturing. Cotton was the primary crop in the region. Large cotton textile plants in the city originally viewed cotton seeds as waste, but eventually realized seeds could be monetized. Oil in the seeds was purified and sold as cooking oil, and remaining seed cake was processed into agricultural feed and fertilizer.

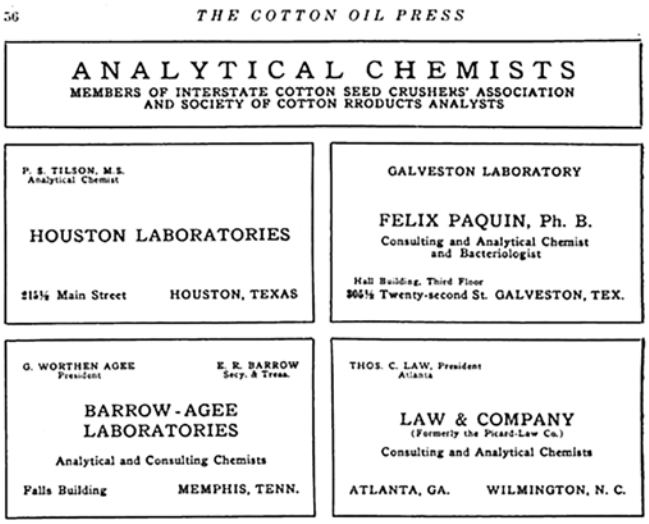
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FIG. 1. Advertisements from a 1919 issue of *The cotton oil press*: official monthly bulletin of the Interstate Cottonseed Crushers Association.

As the industry grew, business owners determined that they could measure the value of their seed products by quantifying the moisture content in the seeds. Analytical chemistry proved to be an asset in securing the highest possible price for cotton seed oil by proving its superior quality. At the turn of the nineteenth century more cotton oil seed manufacturers included chemists among their staff, but smaller companies without this internal resource relied on private outside labs to validate their products.

To establish industry standards for analytical procedures, these chemists formed what would eventually be named the American Oil Chemists' Society. One of the founding members, Thomas C. Law, started Atlanta's first industrial laboratory devoted to oil mill work in 1903. Thirty years later, while a student at Georgia Tech, Edward Hahn spent a semester working with Law in his oil analysis lab.

"He worked with a lab in Atlanta, by the name of Law & Company one summer while he was going through school," says Hahn. "T.C. Law had a testing laboratory in Atlanta, and that is how my dad got his start."

Edward Hahn graduated from Georgia Tech in 1932. Finding it difficult to acquire a job during the great depression, he joined the United States Army in 1940. He planned to serve for only a year according to his son, but in 1941, he was sent to fight in World War II after the bombing of Pearl Harbor. He served seven years in the Army before retiring to start his own laboratory in Columbia, South Carolina, in 1947. Back then, Hahn Laboratories mostly tested cotton seeds for their moisture, fatty acids, and ammonia to provide millers with a grading on the product they were purchasing from a cotton gin.

Michael Hawkins' family business had a similar start. Hawkins' father, Lynn, needed a summer job while attending college in Memphis, Tennessee. "Woodson-Tenent Laboratories called the school looking for some part-time help, and he just happened to be in the office at the moment they called," says Hawkins. "That is how he ended up in this business." His father soon began working there full-time.

The lab was a competitor to Barrow-Agee, one of the first cotton seed analysis labs to open as the seed oil industry grew out of the South and spread into mid-western states. Barrow-Agee was established in 1917, by two of the founding fathers of AOCS, E.R. Barrow and G. Worthen Agee. Hawkins worked for Woodson-Tenet until 1972, when he and a partner opened their own lab. In 1975, the two purchased Barrow-Agee and it has been in the Hawkins family ever since.

Michael Hawkins started working at his father's company in 1983. "I was just following in my father footsteps," says Hawkins. "He told me to go to college and get a business degree, so that is what I did." Hawkins says there was so much work at the laboratory that he quit school a year shy of his degree. "I have been a junior [at the University of Memphis] since 1984," he says with a laugh.

LABS IN THE NEW MILLENNIA

Both Hawkins and Hahn say it has been fascinating to watch their families' businesses change over the years. They have both seen steady growth through the decades. "In 1983, if we got a hundred samples, we thought we were busy," he says. "Now it is not uncommon for us to get in excess of a thousand samples a day." Hahn adds that his business serves a wider audience today than it did when he started. "Instead of just coming from the 48 states, our customers are much more international," he says.

Technology has obviously had a significant impact on the analysis conducted in their laboratories. "Starting in the 80s and doing this for 36 years means seeing a lot of things change," says Hawkins. He says the technical advancements that have led to method improvements have been particularly welcome. One method he and his father were happy to see updated was the Kjeldahl method for analyzing the protein content in meal.

"Kjeldahl was originally a digestion in sulfuric acid with a couple of other chemicals," says Hawkins. "It was a nasty test. Very technique oriented. You had to be really good to perform that test accurately." The advent of the gas chromatograph provided an opportunity for the development of a new method which the Hawkins gladly helped establish. "The combustion method that we use now really impacted our ability to push samples through the lab, because the Kjeldahl method was so labor intensive and slow," he says. "It became a much safer test to run."

Both men say that the LPP has been a valuable measure for how their scientists and the equipment they use are performing. Despite routine calibration of their instruments, they have both had the rare experience of the LPP identifying a quality control problem and providing an opportunity for a correction.

More often, the program provides a sense of pride. "It is valuable in your sales efforts, but it is also valuable in your quality program," says Hawkins. "The LPP series is valuable to our business," says Hahn. "I don't think we would be able to exist without being able to prove we can do what we say we can." Both men look forward to getting their results back from the series and finding that their data coincide with the results

of all the other labs that participated. Hahn says he even keeps the samples to rerun the series months later as an internal check.

THE FUTURE OF THE LPP

Cotton seed is not used for human consumption as much as it was in the past. Hahn Laboratories now mostly analyzes cotton seed that will be added to dairy feed. Hahn says his company also stays busy with a range of tests on the quality of other oils, as well as, fats, grease, and meal. He continues to run the company as he has for the past 30 years. His role is not likely to change any time soon. All three of Hahn's sons have worked in the lab, but have since gone on to other careers. Hahn is happy with the responsibility of maintaining his father's legacy. He once asked his father why he worked so hard. "He said, 'Frank, I am their chemist. They don't have a chemist. So, I am going to make sure that what I do is correct,'" says Hahn.

In 2018, Hawkins sold Barrow-Agee. The new owners adjusted the company's leadership and hired a new CEO. They expanded their analytical capabilities with new instrumentation and with experts in the areas of metal contaminants and biofuels. Hawkins has stayed on to work in grain analysis, one of his primary areas of focus for nearly 40 years.

AOCS continues to adjust and improve methods to keep pace with demands in the fats and oils industries. In 2019, the LPP will add a series on pulses analysis after an introductory partial-year test. The series currently contains five analytical methods, with more being added as the series is expanded to a full year. The organization is also working to adopt ISO (International Organization for Standards) methods for this new pulses series. In addition, AOCS is collecting methods for future LPP series, such as the latest planned for release in 2020.

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References

Atlanta and the cotton seed processing industry, Wrenn, L.B., *Inform 5*: 1, 1994.

1909: Let's meet at the Jockey Club, Willhite, G., *Inform 4*: 19, 2008.

AOCS Official Method Ba 4f-00, Reapproved 2017, Combustion Method for Crude Protein in Soybean Meal

AOCS Official Method Aa 3-38, Reapproved 2017, Moisture and Volatile Matter in Cotton Seeds