

Lillian Moller Gilbreth, Ph.D.

A Legend in her own time — and now!

Like women today, Dr. Gilbreth faced questions related to her roles as a wife, mother, daughter, and professional, including the issue of how to balance the demands of work and family. In the meanwhile, she advised five U.S. presidents on labor and employment issues, guided industry in ways to deal more progressively with workers, and suggested better ways of teaching future generations.

DEE ANNE FINKEN, SWE CONTRIBUTOR

Margaret Pritchard, a longtime Pacific Northwest Star Region SWE member (Portland, Ore.), remembers with pride and affection the 24 hours she served as aide de camp to the best woman engineer in the world. “She ran the legs out from under me,” Pritchard recalled.

“Pritch,” as she is known affectionately and respectfully by many within SWE, was reminiscing about the winter day in 1965 when she had the opportunity to accompany the woman many in engineering consider the matriarch — Lillian Moller Gilbreth, Ph.D. — during one of Dr. Gilbreth’s rare stops in Portland.

Her visit was a whirlwind, a dizzying stopover, which, Pritchard recalled, prompted hundreds of area scientists, engineers, students, university professors, and civic and business leaders to drop their books, slide rules and briefcases to steal away a few hours from their busy schedules for the chance to hear Dr. Gilbreth’s inspired take on life and work.

Simply put, Pritchard said she was “amazed” by Dr. Gilbreth’s energy, grace, intelligence and warmth — from the instant that dark December afternoon they met to the next day, when fast-friends “Pritch” and “Dr. G” exchanged good-byes and Dr. Gilbreth went off to spend the winter holidays with her daughter and family in Washington state.

From interviews to informal cocktail-hour conversations, from brainy exchanges with other professionals to bits of advice to young engineering students, Dr. Gilbreth was a masterful study in motion and personality, as well as being very much in demand during her brief visit, Pritchard said.

Despite her advanced age — she was in her 80s at the time — Dr. Gilbreth rarely paused or slowed down. Nor did she really lean on Pritchard. At one point, though, at the venerable Benson Hotel following a late-afternoon meeting with university students, and prior to an “adjustment hour” hosted by the local chapter of the American Society of Mechanical Engineers, Dr. Gilbreth directed Pritchard to “find me a chair — out of sight.”

Almost always on the move, it seems Dr. Gilbreth also was great on catnaps. “She was an expert on them, and so I tucked her in the back of the cloak room on a chair where she took a cat nap before her presentation,” said Pritchard.

Awakened a few minutes later by Dr. George Gleeson, then dean of engineering at Oregon State University, Dr. Gilbreth went on to pre-

sent a spell-binding lecture to an audience of 500, who, as so many others before them had, responded with a standing ovation.

After dinner, Pritchard recalled, it was upstairs to Dr. Gilbreth's suite, where nearly two dozen more fans had gathered in hopes of grabbing a few minutes to mine some of her wisdom and insight. "It was the first time in my life that I got to tell presidents of engineering firms to go out and line up in the hallway," said Pritchard. "I had a list of all of the people who asked to have time to talk with her," said Pritchard. "But finally, when it was midnight, I finally had to draw the line."

Wasn't she the mother ...

Among those in the know, Dr. Gilbreth's name is synonymous with an arm's length of accomplishments and honors, the foremost perhaps her admission into the ranks of the National Academy of Engineering. But to the non-engineering public, and perhaps even to a number of engineers, Dr. Gilbreth is perhaps better known as the good-natured mother in the memoir *Cheaper by the Dozen*.

A best seller upon its release and regular reading for the young-at-heart a few decades ago, *Cheaper* also was made into a movie in 1950, starring Clifton Webb and Myrna Loy. Steve Martin and Bonnie Hunt starred in a 2003 remake that hardly resembled the memoir or the first movie except to parrot a busy household with 12 children.

Despite her real-life pursuits, in both the memoir and the film, Dr. Gilbreth appears as second-string to her husband, Frank Gilbreth, the successful builder and businessman who went on to become a world-recognized efficiency expert, a pinnacle attained in large measure with the assistance — some might say because of — his dedicated and loving wife.

Frank Gilbreth never attended college, although the Massachusetts Institute of Technology had accepted him, and so Lillian Gilbreth actually was the more formally educated. She earned bachelor's and master's degrees from the prestigious University of California, where she also did some doctoral work, before eventually earning a Ph.D. in educational psychology from Brown University.

Over the years, Dr. Gilbreth also received so many honorary degrees and awards for her efforts to improve the lives of workers and the health of the workplace, that it was hardly an overstatement to say she had more degrees than a thermometer.

In 1900, she was the first woman to speak at a University of California graduation; in 1926, she became the second woman member



Dr. Gilbreth (standing) at tea with Katharine Stinson, SWE's third president.

of the American Society of Mechanical Engineers. Frank Gilbreth's sudden death at the age of 55 stunned the family, especially his wife, but Dr. Gilbreth took up the reins and continued alone the work they had pursued as a couple.

In 1935, she became the first female professor in the history of Purdue University's School of Engineering. Beyond the 1954 declaration that she was the best woman engineer in the world, a designation bestowed upon her by the largest professional engineering societies, it was the 1965 appointment to the National Academy of Engineering that made Dr. Gilbreth stand apart from the crowd. This was the first time in its history that the academy had appointed a woman.

Even more accolades followed suit. A year after the NAE appointment, the chemical, civil, mining and electrical engineering societies awarded her the coveted Hoover Medal as well.

That Dr. Gilbreth was so prolific in her

work was particularly noteworthy in the context of the number of women in engineering during her professional years. The underrepresentation of females in engineering today pales when compared to those years. According to the 1938 edition of *American Men of Science*, which listed 1,821 women, only five were identified in engineering.

Donna Calvert, corporate operations manager for the Institute of Industrial Engineers, acknowledged Dr. Gilbreth's reputation in the field, pointing out that her portrait appears on the institute headquarters' walls, where it pays "respect to her many contributions to the industrial engineering profession."

Similarly, the Frank and Lillian Gilbreth Industrial Engineering Award "is the highest and most esteemed honor presented by the Institute ... and recognizes individuals who have distinguished themselves through contributions to the welfare of mankind in the field of industrial engineering" said Calvert.

Nevertheless, to most people outside of the field, Dr. Gilbreth remains the mother in *Cheaper*.

And that is where Brown University historian Jane Lancaster, Ph.D., started from in her doctoral thesis on Dr. Gilbreth, appropriately titled: "Wasn't She the Mother in *Cheaper by the Dozen?*" For the reading public, Dr. Lancaster went on to write, *Making Time – Lillian Moller Gilbreth – A Life Beyond "Cheaper by the Dozen,"* published last year by Northeastern University Press.

Dr. Lancaster's book provides a terrific overview of the professional life and accomplishments of Dr. Lillian Moller Gilbreth, as well as an intimate account of a woman who, though she died more than 30 years ago in 1972 at the age of 94, continues to influence the profession and practice today.

Efficiency at work and at home...

Newlyweds Frank and Lillian Gilbreth loved children, babies in particular. Intelligent and confident adults in the early years of the 20th century, they also sub-

scribed to the philosophy and practice of eugenics — the breeding of an improved human race by genetic control. While other eugenics proponents supported forcible sterilization of the infirm or the poor, the Gilbreths believed that they, as good stock themselves, should do their part by increasing the number of intelligent newborns.

"They were positive eugenicists," offered Dr. Lancaster. Indeed, by the end of her child-bearing years, Dr. Gilbreth had given birth a dozen times, hence the title of the book by daughter Ernestine Gilbreth Carey and son Frank B. Gilbreth Jr., which they wrote largely in honor of their father.

Certainly being parents to 12 children involved an enormous commitment of time and energy. In addition, while the Gilbreths always had household help, they employed a number of techniques and philosophies that went hand-in-hand with their study and practice of industrial engineering.

They were the consummate practitioners of efficiency. From motion studies to organization, the Gilbreths were experts. Also, they instilled in their children the confidence that they could handle much of what life presented them. Never do for a child what he or she can do for him- or herself, was one Gilbreth precept.

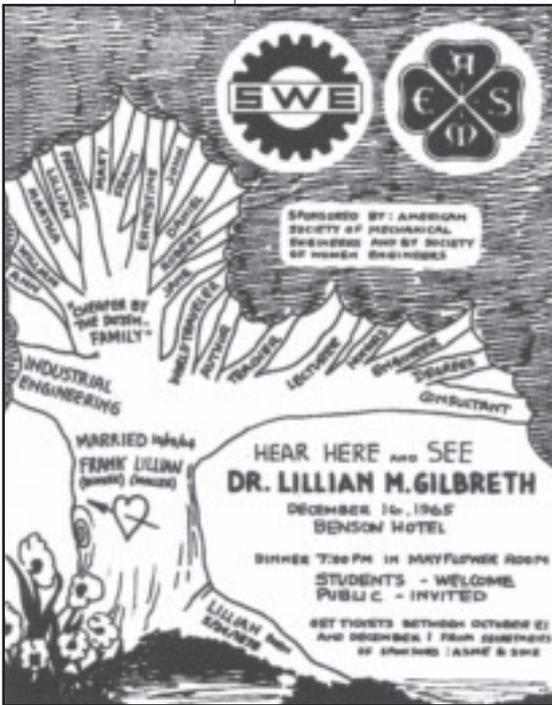
"No household is efficient which cannot run smoothly even though several members who are ranked as heads are removed permanently or temporarily," Dr. Gilbreth wrote. "It is only when we see a 14-year-old or a 12-year-old handle things in an emergency that we realize how little we really use the capabilities around us."

Such independence was not without feeling or concern. In both the guidance they provided as consultants on operations and management in the workplace and in schools and other public institutions, and in how they reared their own family, the Gilbreths were sensitive to human needs.

And in large measure, that is what set them apart.

During the early part of the 20th century, while efficiency-pioneer Frederick Winslow Taylor was busy changing the workplace and affecting the lives of every-day workers by formalizing the principles behind scientific management, it was Dr. Gilbreth and her husband who stopped to consider that the workers were first and foremost human beings.

"Taylor was really all about economic incentives," said Dr. Lancaster. "But she and Frank said you can't make a person work harder than their body will allow them to. She and Frank said let's organize work so it is easier for people to work. Let's put things in



The flyer promoting Dr. Gilbreth's talk at the joint meeting of SWE and ASME in December 1965.

reach for workers; let's ask them for their opinion as to the best way to do things so they buy into the process. And let's adapt teaching techniques so they learn better, too."

Of course industrial engineering....

Though her degrees were not in the field, engineering and more specifically industrial engineering definitely adopted Frank and Lillian Gilbreth. In a nutshell, the Gilbreths practiced an early form of industrial engineering, emphasizing the design and improvement of systems related to people, equipment, energy and other factors.

From the assembly line to the schoolhouse, from the kitchen to the bathroom (Dr. Gilbreth had a hand in designing one of the first modern-day sanitary napkins), the Gilbreths had impact.

And they also saw the future for the formal study of the discipline.

"What Dr. Gilbreth did, as an educational psychologist, was to pave the way for indus-

vate school and in the consultancy services offered by the Gilbreths set the stage for later developments.

Jeremy S. Weinstein, Ph.D., president of the Institute of Industrial Engineers, said Dr. Gilbreth's handprints clearly are evident today in many of the principles of industrial engineering, as well as in emerging trends and practices.

Dr. Weinstein noted the Gilbreths' high regard for designating factors as either valuable or wasteful, as they so noted in their numerous motion studies. For that reason, Weinstein said he believes the Gilbreths undoubtedly would have appreciated the present emphasis in industrial engineering directed toward satisfying the customer. "The absolute focus on the customer is an approach that is very much in line with their philosophies, that is, anything that gives value to the customer is considered good and anything that doesn't is considered wasteful," he explained.

If Dr. Gilbreth were alive today, it also would be fair to say that she would be pleased with the changes underway to train the next generation of industrial engineers, said P. Simin Pulat, Ph.D., chair of the Council of Industrial Engineering Academic Department Heads with the Institute of Industrial Engineers.

Professor and director of the School of Industrial Engineering at the University of Oklahoma as well, Dr. Pulat said she believes Dr. Gilbreth also would look favorably on the new accreditation standards that are shifting the emphasis in teaching to student learning.

"As instructors now, we focus on a set of learning objectives for each course and measure student performance with respect to these objectives," said Dr. Pulat.

Similarly, Dr. Gilbreth believed in getting workers and family members to "buy into" a project or a task, whether it was a decision about workplace improvement, or if the family should buy a new piece of furniture, or how to best teach the next generation of engineering students.

"There is a lot more collaboration, and more specifically, advisory boards and alumni are much more involved in curricular improvements," Dr. Pulat said, identifying the University of Pittsburgh, Arizona State University, and her school, the University of Oklahoma, where those efforts are particularly strong.

REPRESENTATIONS OF THE WISDOM of Dr. Lillian Moller Gilbreth

★ Urging listeners not to become slaves to their plans or systems, Dr. Gilbreth advised, **"A system is there only to simplify things. If it makes you happy to junk it, then you should junk it."**

★ Never willing to lend her name for product endorsements, Dr. Gilbreth said: **"I don't believe in found money. It's much better to depend on one's money earned from hard work."**

★ **"The hand that rocks the cradle rules the world,"** but in a book they were writing, Dr. Gilbreth and her colleagues added, **"Yet sometimes the hand gets tired of 'rocking the cradle.'"**

★ Always both precise and concise, Dr. Gilbreth suggested, **"the answer to home problems is to teach men how to combine a career and a home."**

★ In response to suggestions to fire working women to deal with Depression era unemployment, Dr. Gilbreth shot back with these guidelines for determining who should remain on the job, and who should not: **"I feel very strongly that the proper measuring sticks are efficiency and then need, and that no sex lines or other discrimination should be made."**

★ Ever mindful of the connection between human and machine, Dr. Gilbreth noted, **"A machine should be an extension of one's personality."**

★ Recalling the numerous times one of her 12 children came to her for advice during a busy work day, Dr. Gilbreth observed: **"If we analyze the interruptions of the day, we will find that an awful lot of them are not really legitimate excuses for leaving something that we have decided to do. And on the other hand, others stand for something that we would not give up for the world."**

trial engineering," said Dr. Lancaster. There was no formal industrial engineering curriculum in universities in the 1920s and 1930s; the Institute for Industrial Engineers, in fact, was not established until after World War II. But much of the coursework in their own pri-

Balancing work and family

Like women today, Dr. Gilbreth faced questions related to her roles as a wife, mother, daughter, and professional, including the issue of how to balance the demands of work

A MAJOR LIFE CHANGE, Thanks to Lillian

They never met, but Dr. Lillian Moller Gilbreth influenced the life of biographer Dr. Jane Lancaster, 59, dramatically — professionally and personally. It was in the pages of *Cheaper by the Dozen* that Dr. Lancaster, then a young schoolgirl growing up near Birmingham, in the English Midlands, first learned of Dr. Gilbreth. But just as quickly as she zipped through the light-hearted book, she forgot about the engineer until 1989, when she was teaching history at a private Rhode Island girls school.

While attending a National Endowment of the Humanities Summer School, Dr. Lancaster was preparing the curriculum for a history of science course and had decided to put together a bibliography of women scientists. Rifling through texts in the Brown University library, “I came across Lillian in my research one hot afternoon, read that she was being given a gold medal, and I was a bit intrigued. All I knew about her at this point was *Cheaper by the Dozen*,” she explained.

One thing led to another however, and Dr. Gilbreth, as it was the case with thousands of other people, had a hand in redirecting the biographer’s life. “If it hadn’t been for Lillian I probably would still be teaching,” she said. It was the drive to learn more about Dr. Gilbreth that prompted her decision to return to school, earn a doctorate and eventually pursue a career as a published historian and lecturer.

After her reintroduction to Dr. Gilbreth through her research, she won a Christa McAuliffe fellowship, entered a graduate program at Brown, and did research while still teaching.

But after two years of juggling both, the demands became too great. “I just couldn’t do both things at once,” she said. She submitted her resignation as a teacher and dove headfirst into finishing her dissertation.

Again, one thing led to another, and after receiving her doctorate, the biographer decided it was time to tell the general reading public about Dr. Gilbreth and the life beyond *Cheaper*.

Not surprisingly, besides the book and career, Dr. Gilbreth’s influence shows up in Dr. Lancaster’s Providence, Rhode Island, home as well. Several years ago, while doing research in the archives at Purdue University where the engineer had taught, Dr. Lancaster said she came home one day and rearranged her kitchen ala Gilbreth.

“I came back and shifted things around to be more efficient,” she said. Where she used to store food items separately from dishes, Dr. Lancaster said she realized it would be more efficient to put some of them together. “Where they are now, I can empty the dishwasher and swivel my hips and put my dishes away. Where they used to be, I had to walk. And I can turn to the same cupboard when I need flour to make a sauce,” she said.

“It may be a little odd, but it is where I need it,” she said, adding she figures Dr. Gilbreth would agree efficiency — at least in this case — is more important than tradition.

and family. Dr. Lancaster in fact, titles one of the chapters in her book with the dramatic: “Am I a Lady or an Engineer?”

According to her biographer, Dr. Gilbreth struggled with some feelings of insecurity and timidity during her younger years. But as best as we can tell, she came to master quite aptly the numerous challenges that came her way.

Many of her challenges resemble those

women face today, ranging from dealing with relatives, including mothers-in-law, to resolving budget deficits in the office, and from catering to demanding clients to tending to sick children at home. Professionally, her accomplishments were grander than most people, ranging from advising five U.S. presidents, beginning with Herbert Hoover, on labor and employment, to guiding industry in ways to deal more progressively with workers, to suggesting to scores of educators better ways of teaching future generations.

She helped manufacturers trim assembly line costs, delivered ideas that helped to make military troops systems more effective and rearranged hospital operating rooms.

How did she do it?

Perhaps her success came in part from her self-acceptance and her keen sense of what was important. In her own home, noting her sons’ neatly pressed shirts were wrinkled before they even arrived at school after walking only three short blocks, Dr. Gilbreth declared an end to ironing. She realized the opportunity to wrestle, shoot marbles and play was important, and that slaving over a hot iron was not.

Likewise, she took advantage of good plans and schedules, but not so much that she let them weigh her down. “A system is only there to simplify things. If it makes you happy to junk it, then you should junk it,” she said.

And despite what society in the 1920s, ‘30s, ‘40s, ‘50s, ‘60s, and even ‘70s might have dictated about gender roles, Dr. Gilbreth did not believe running a household should fall only upon the shoulders of the wife and mother.

So as a consultant advising national leaders on workplace efficiency, Dr. Gilbreth also made popular the study of making the home operate more smoothly, an effort she felt would make men more aware of the challenges she felt should be shared by all in the household. In introducing the concept of sharing duties 50-50, Dr. Gilbreth noted, “For the first time, perhaps, every member of the household will realize *it* is a problem and *his* problem as well as the home-maker’s.”

Doing so, Dr. Gilbreth said, would share the load and free up family members to pursue their dreams and be the best they could be. And that was important, being that Dr. Gilbreth also subscribed to this insightful philosophy:

“The best engineering mind in the family,” she said, “... need not be lodged in a masculine body.” ■

