

*Domestic Turmoil
And Global Rebirth:
The Bailey Controls
Company
1970 - 1991*



The 1970s and 1980s arguably constitute the company's most dramatic period. The '70s were a time of almost continual restructuring. Presidents came and went. Sales suffered. The company was unionized and weathered a tense strike.

As the '80s opened Bailey was reborn, thanks to innovative microprocessor-based controls technology and management in tune with the changing times. The company had a new name reflecting the new era: the Bailey Controls Company.

The passing of E.G. Bailey in 1974 ranks among the notable early events of the period. The founder died quietly at home in Easton – the official cause of death was complications from pneumonia – on December 18, a week short of his 94th birthday.



*E.G. reflects on a lifetime
of achievements, 1968*

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E.G. Bailey – inventor, engineering genius, business innovator, family man – is in retrospect almost larger than life, an American archetype whose presence spans two centuries. His values and ethics were shaped by the 19th century, yet his work played a significant role in the unprecedented technological advances that mark this century.

Typically, E.G. remained active and alert to the end of his life. His wife, Carrie, had died in 1966, so E.G. lived alone, performing daily chores for himself in keeping with his frugal and independent Quaker upbringing. As late as a month before his death he was exercising his prodigious memory in typing letters to Harold A. Bolz, the dean of the Ohio State University's engineering school, discussing the results of boiler tests E.G. had run as an OSU student at the turn of the century. In 1978, the university received a gift from Bailey's estate to establish the Bailey Chair in Energy Conversion in the college of engineering.

E.G.'s death occasioned national attention. It was reported in a seven-paragraph obituary in *The New York Times*, as well as in numerous trade journals. The Rev. Robert G. Sandercock, pastor of the College Hill Presbyterian Church in Easton, eulogized Bailey, "He was a man of principles and convictions," Sandercock said. "He attempted to be a good steward of the time and talent which God gave to him. His was a rare talent, and God gave him a long lifetime."

With Paul Dickey leaving the company's presidency in 1969, Bailey Meter found itself adrift. The founder had always been an advocate of a strong two-man team running the company. Up until Joe Dennis took over from Dickey, these teams grew out of a kingdom-like line of succession. First it was Bailey and Coffin, then Coffin and Dickey, then Dickey and Harve Gorrie, who retired shortly after Dennis became president.

Management turnover was partly responsible for the company's drifting. Because of the line of succession, the company had only three presidents between its founding in 1916 and 1969. It had the same number in the '70s alone.

Apart from turnovers at the top, opinions on the struggles during these years vary with the perspective of the teller. Dick Richardson says some of the problems resulted from the decision to split the company into systems and products divisions. "The problem with that was we didn't really have any products to peddle," Richardson says. "We were a systems company. The products we did have weren't priced competitively."

Former President and Chief Executive Officer Marion A. (Bud) Keyes IV says the company did not translate its technical leadership into marketing gains. Bailey was one of the first companies to utilize distributed control technology for electric utility power plants – a market that had always been Bailey's domain – but competitors had introduced similar technology several years before Bailey was able to gain a large market share in the industrial process control business.

"We installed systems for the utility industry that were extremely reliable but more costly than our competitors," Keyes says. "That was okay when we were the only player. But when others came out with distributed digital control systems that could be used for process industries and utilities, our protected niche was no longer tenable."

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Electric utilities provided early product dominance



Clayton Barnard, who retired as vice president of international operations in the early '70s, remembers the difficulties during the period. "It seemed like things just sort of broke down. We were shipping orders anywhere from six to 14 months late. There wasn't much sense of direction."

Paul Dickey's successor as president, Joe Dennis, had been with the company since 1937. He resigned at the end of 1971, just two years into his tenure, and shortly thereafter retired. His replacement was Dr. Charles E. Jones, who had been the director of research at Babcock & Wilcox.

Jones represented a break from the tradition of internally trained leadership that E.G. Bailey had installed through the Cadet Program. Though a determined man, Jones was seen as an outsider not quite attuned to the company's unique culture. His term, which lasted until November, 1974, ended without a significant shift of sales and earnings.

Management instability was partly responsible for one of the most dramatic changes in Bailey's culture – the unionization of its hourly workers. The company had always prided itself on its family-like atmosphere and good relations

between hourly and salaried workers – a closeness that developed as Bailey cadets spent a good portion of their training on the factory floor. Because of these warm relations, hourly workers had found little need for union representation.

But labor-management relations were less than optimal under the stress of the internal changes. In February 1973, by a vote of 472 to 322, the United Auto Workers was selected as the bargaining agent for the 1,100 hourly workers at the Ivanhoe Road and Wickliffe plants.

Not all the company's problems were internal. New market forces were at work. The Arab-Israeli war of 1973 caused a disruption in America's oil supplies. The price of oil quadrupled. The country was forced to conserve and the utility industry began to slump. At the same time, public ambivalence about nuclear power caused orders for new nuclear plants to dry up.



By 1975, Robert Campbell was president of Bailey Meter. Like Jones, Campbell was a stranger to Bailey's ranks. Although Campbell was an engineer, he also had a background as a management consultant. "Babcock & Wilcox brought in Campbell as a turnaround specialist," explains Sam Dukelow. "He took the job with the understanding that he would get a lot of autonomy."

Campbell helped set the stage for Bailey's recovery by committing the company to vital research that would later produce the NETWORK 90 system, the company's most important process controls breakthrough to that time. Bud Keyes, who was then Bailey's vice president of engineering, oversaw the team of engineers who developed NETWORK 90 under Campbell.

Several other events of note occurred during Campbell's term. One was McDermott International's acquisition of Babcock & Wilcox, which had owned Bailey since 1925. This began when United Technologies attempted an unfriendly takeover of Babcock & Wilcox. McDermott International, a New Orleans-based conglomerate specializing in building offshore drilling rigs, averted the takeover by waging a successful stock bidding war against UT. Bailey was not directly affected; it simply was made a division of its former parent, Babcock & Wilcox.

Also that year, Bailey Meter changed its name to the Bailey Controls Company. This was long overdue. Decades had passed since the company had progressed from simple meters to sophisticated process controls.



*Bailey T.V.F.I. 90
distributed systems
deliver integrated
platform automation
and control*



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*Bailey acquires
General Electric
controls technology.
1974*

*B*ut the most convulsive event of the era began in June 1979, during the last year of Campbell's term as president. Bailey Controls and the UAW were unable to come to terms over a new contract. The company claimed it could not grant the pay increases the union was seeking because of the federal wage guidelines then in effect. The result was a 21-week strike, which turned bitter on several occasions.

The strike was a fitting culmination to a bleak decade. But at this dark moment the company rebounded, propelled by its new technology and new management. The research and development seeds that had been planted for several years finally blossomed in 1980 when Bailey introduced the NETWORK 90 process control system. The system had been developed under the leadership of Bob Campbell. That same year, the company's helm was passed to Bud Keyes.

Keyes had joined the company in 1975 as vice president of engineering after many years with the Taylor Instrument Company. He went on to serve two terms as president of Bailey Controls. A physically imposing man at six feet, seven inches tall, Keyes was a basketball player at Stanford University as well as an intellectual. He was recognized for his technical expertise – he held or shared credit for 46 patents – and was regarded as a demanding leader.

At the close of the 1970s, with the first signs of improvement in Bailey's operations now evident, the introduction of NETWORK 90 brought the turnaround the company had been waiting for.

*N*ETWORK 90 was Bailey's first microprocessor-based distributed control system, and was much faster and more powerful than the digital-based technology the company had been using. It was a standardized system, built around processor modules that take commands from plant operators and translate them into instructions for controlling the operations around the plant. The "distributed" nature of the modular system permitted easy expansion and removed the potential single point of failure found in central computer-based systems.

The processor modules that drive NETWORK 90 and its successor, INFI 90, are manufactured in Bailey's Williamsport, Pennsylvania plant. The company has had a presence in Williamsport since 1974, when it bought the plant for the manufacture and assembly of General Electric's line of 7000 Controls. Bailey purchased the rights to the 7000 line in 1972.

NETWORK 90 enabled Bailey to attain a long-held goal: diversifying within the process control market. While Bailey's utility customers used NETWORK 90 for monitoring and controlling



*1972
Bailey
calenda
card*

boiler operations, the system's technology was equally applicable to processing industries such as chemicals, refining, and pulp and paper.

NETWORK 90 and the entree it provided to the process control market could not have come at a better time. Oil prices had escalated dramatically in 1978-79 for the second time in five years. The U.S. economy experienced virtual back-to-back recessions from 1980, when NETWORK 90 was introduced, to 1983. The result was hard times for utilities.

Describing NETWORK 90 in McDermott's 1984 annual report, Keyes wrote, "We can sell the same product line to a corn-processing plant in China, a utility in Cleveland, or a pulp and paper mill in Canada. That means our customers need only one set of instruction manuals, they need to train only one group of operators, and their

A vital feature of NETWORK 90 was its flexibility. It was built to be compatible with all the products and systems Bailey has introduced since then.

"What we saw during the 1960s and '70s was that every new electronic line to come out obsoleted all the previous ones," says former Bailey President Doug Cannon, who succeeded Keyes's first term in 1985. "We were committed to never doing that again, to not leaving our customers hanging out there with an outdated system every time something new came down the pike."

NETWORK 90 was an instant success. Says Keyes, "Our customers by and large were pretty conservative in their outlook, and we thought it would take them a good five years to get used to the idea of microprocessor-based controls. What we found instead was that in a year we weren't selling any of our previous systems. Everyone wanted NETWORK 90."

"If we had not penetrated the process control markets, we would not have been able to survive," Doug Cannon declares. "That's really what got us through. Our top five customers in 1980

were all power companies. By 1989, at least two of the top five were in process controls."

The shift in Bailey's customer base was indeed dramatic. In the company's 1979 fiscal year, the last one before it introduced NETWORK 90, 82 percent of its sales were to the utility industry, with the balance going to process industries. A decade later, 56 percent of the company's revenues came from process industries, while 44 percent were from its traditional utility customers.

Other shifts were also in the works. In 1985, Bud Keyes was promoted to group vice president at Babcock & Wilcox. His replacement at Bailey, Doug Cannon, had been vice president of manufacturing under Keyes.

A member of the Bailey cadet class of 1962, Cannon began his career at Bailey in the San Francisco and Los Angeles sales offices. In 1969 he became a project manager and worked his way up to director of planning and market development in 1978. Among the projects he oversaw that year was the planning for NETWORK 90. In 1982 he was named vice president of manufacturing.

Cannon was in some ways a Keynesian, but he says he differed from his predecessor by trying to balance market share with profitability. "In the early part of the 1980s, we had taken a lot of market share without worrying too much about the effect on the bottom line. I tried to change that."

Cannon also steered Bailey toward a growing emphasis on quality control through a program known as the Total Quality Initiative. It utilized many of the quality control concepts coming into vogue among American manufacturers of the time.

"I was trying to institutionalize what I think a lot of Bailey employees already felt intuitively, which was to always be on the lookout for ways to serve our customers better," says Cannon. "If what drives the employee is to do what's best for the customer, and if the employee feels he has management support, that's the most valuable thing management can do."

This focus on quality paid off in 1990 when Bailey became the first controls supplier to achieve dual quality management certification from both the International Standards Organization (ISO) and the Canadian Standards Association (CSA).

Cannon's term was also noteworthy for Bailey's 1986 acquisition of TBI, Inc., its first in 20 years. Located in Carson City, Nevada, TBI manufactured devices used for analyzing water, especially the acidity and concentration of dissolved solids in waste water. Although relatively small – \$4 million in annual sales – TBI played an important role in Bailey's continuing penetration of the process control markets.



*1990 brings ISO
and C.S.A. quality
management
certifications*

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*"Smart" field instrumentation
marks further control
advancements*

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"Almost every process industry uses water and needs to clean it up. TBI gave us an important product line we could offer to complement our systems," Cannon says.

Concurrent with the rapid growth of NETWORK 90 technology, Bailey devoted great emphasis in the 1980s to the introduction of "smart" field instrumentation. The comparatively crude meters that marked early 20th century controls evolved into highly sophisticated devices to measure, indicate and adjust such variables as pressure, temperature, level and flow.

The "smart" devices feature on-board processing capabilities that permit remote communication, calibration, and diagnostics between the field instruments and the host control system. This greatly reduces the need for in-field maintenance of the devices and yields more accurate and more useable signals from the devices.

Bailey brought out many such new products in the 1980s, but NETWORK 90 remained its bread-and-butter system. As such, the company continued to modify it, making it more powerful and adding new features. By 1988, enough changes had been made to warrant reintroducing NETWORK 90 under a new name – INFI 90.

Explains Cannon: "INFI 90 was a way of communicating to the marketplace that this clearly was not the same system we introduced back in 1980. It was a way of collecting all those changes we had made in the intervening years and packaging them in a way that would be most valuable to our customers."

*W*ith INFI 90, Bailey introduced the new and extraordinary controls philosophy of Strategic Process Management. Among INFI 90's many enhancements was its ability to communicate with a company's other computerized systems, permitting for the first time simultaneous, real-time access to not only process data but business data as well, such as economic and market forecasts, production analysis and product mix. Hence the name Strategic Process Management.

By 1990 thousands of NETWORK 90 and INFI 90 systems had been installed around the world in a wide variety of process industries. A study released that summer by an independent marketing firm showed Bailey with the largest share, 33 percent, of the U.S. process control market.



As important as NETWORK 90 and INFI 90 were to the company in the 1980s, there was another vital evolution at Bailey Controls during that period: an aggressive, well-organized effort to export Bailey's "smart" products and systems and establish a major international presence – an effort that was to have as profound an impact on the company as its new technology. Bailey not only established its future as a major vendor in the global controls market, but it attracted a corporate parent of enormous international stature.

While the company's foreign activities dated to 1921 with the opening of a Canadian subsidiary, Bailey Meter had made little effort to expand its overseas presence beyond a handful of other countries.

The first stirrings of change were initiated in 1977 by M.N. (Mike) Zaharna. Born in 1941 in what was then the West bank of Jordan and educated in the U.S., Zaharna joined Bailey in 1966 as a contract engineer. From there he advanced to assume numerous engineering positions, including manager of Bailey's industrial programs office. In 1977 he was appointed manager of international marketing and sales.

"Our international operation then was meager at best," Zaharna says. "It consisted of me and a secretary, who I shared with someone else, and a budget of \$200,000."

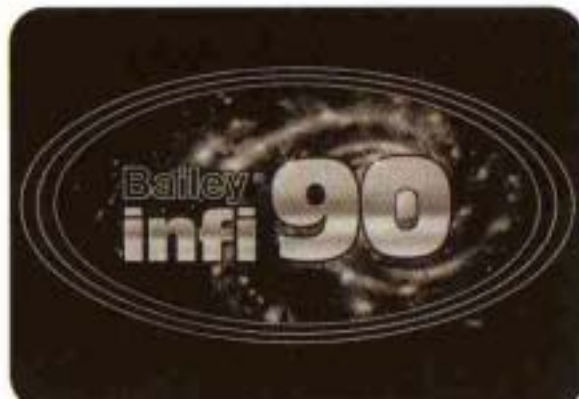
Zaharna began looking for ways to market Bailey products abroad, including joint ventures and licensees. Among the latter was an Italian company named Esacontrol, a subsidiary of Elsag. Elsag is part of a large Italian conglomerate, Finmeccanica Societa' Finanziaria per Azioni, which in turn, is part of a still larger entity, Istituto per la Ricostruzione Industriale (IRI Group). A \$60 billion holding company headquartered in Rome, IRI is among the largest corporate structures in the world.

In 1983, Bailey licensed Elsag to manufacture and market its products in Europe. This began the highly successful relationship that led to Bailey's acquisition in 1989.

In the meantime, Zaharna became vice president of international operations and later executive vice president of global operations. By the end of the '80s, Bailey owned subsidiaries in Australia, Brazil and Canada, had licensees in India, Italy and the U.K. and joint ventures in the People's Republic of China, Mexico, Norway, Venezuela, Jordan, Japan and Saudi Arabia, with immediate prospects in Korea and the Soviet Union.

As the 1990s dawned, Bailey was truly a global company. Some 65 percent of its revenues came from foreign sources, almost an exact reversal of the situation a decade earlier. As if to carve in stone Bailey's new stature, in September 1989 McDermott International announced the company's sale to Finmeccanica for \$295 million – a dramatic difference from the \$50,000 that seeded the company in 1916.

According to Doug Cannon, Finmeccanica first considered purchasing only a partial stake in Bailey as a way of gaining a foothold in North America and obtaining access to Bailey's advanced technology. But McDermott had heavy cash needs and welcomed the chance to sell Bailey – all of it.



*B*ailey became part of Finmeccanica's Elsag unit on November 1, 1989. The company asked Bud Keyes to come back from Babcock & Wilcox to serve as president and chief executive officer. Cannon left to become president of ITT Fluid Technology, Inc. in New Jersey.

But Keyes's second term as president was short-lived and he left Bailey late in 1990. He was succeeded as Bailey chief by the man who originally established Bailey's relationship with Elsag. Mike Zaharna became Bailey's chief operating officer.

"I thought it was a good deal then and I still do now," says Cannon of the acquisition. "Because of its cash problems, McDermott was unwilling to invest heavily in Europe. But we had to have a presence there because economic union was coming in 1992. And at the time, Europe was the one place we were not getting the rate of growth we would have liked."

Zaharna notes that being part of Elsag has created a synergy between Bailey and Finmeccanica's other units in such high-tech fields as semiconductors and factory automation. Finmeccanica's willingness to invest in high-tech research and development began immediately to pay dividends for Bailey Controls.



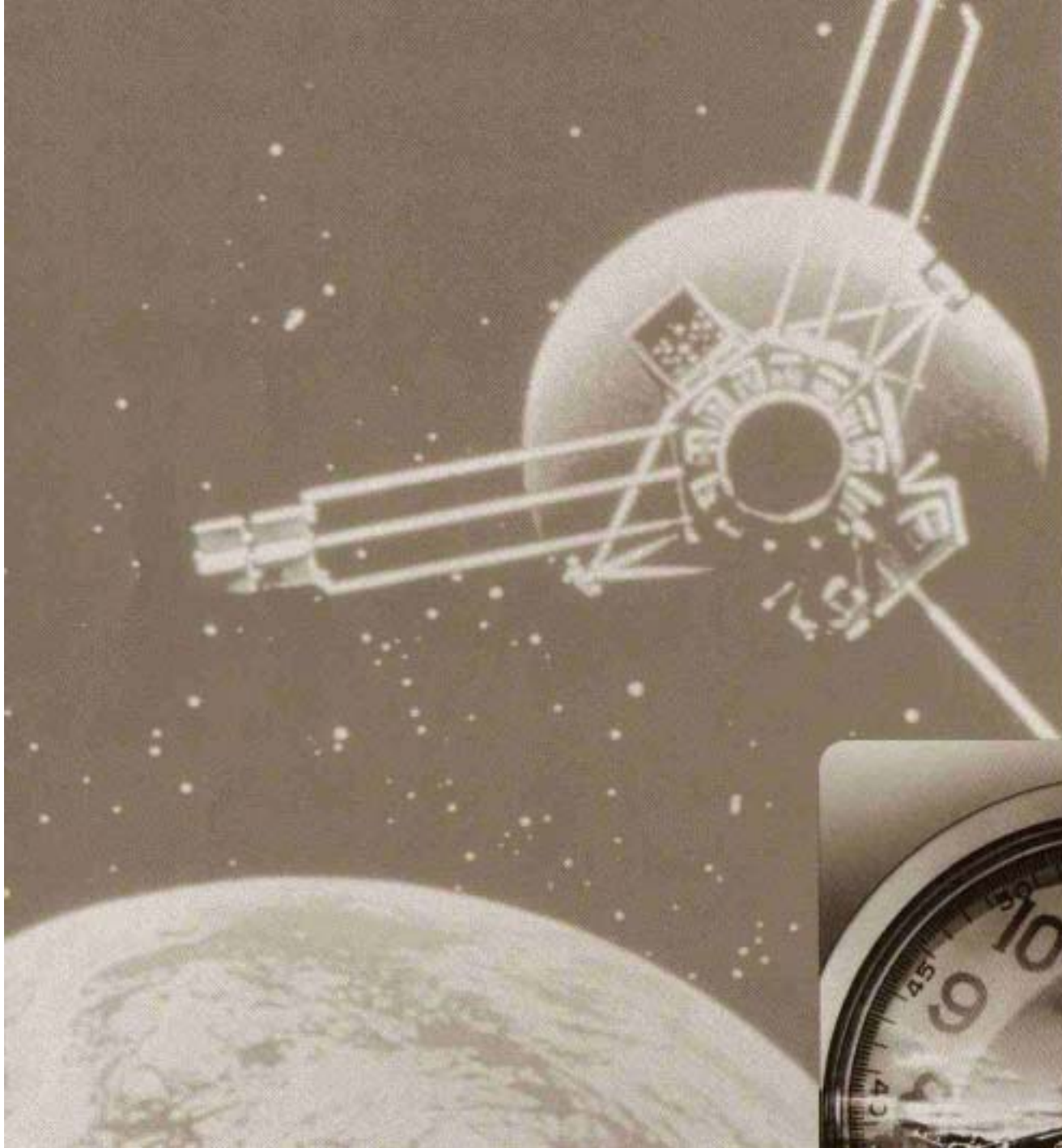
Bailey Serv. S. A. - France

"Since the acquisition, Bailey's business has grown at a healthier rate than ever before," Zaharna says. "Normally our target is to grow at a rate of three to four times faster than the Gross National Product. In the second half of 1990 our growth rate was 25 times that of the GNP."

As part of its drive to increase its presence in the world-wide industrial controls field, early in 1990 Eltag purchased the industrial controls division of the French company Schlumberger Industries, renaming it Bailey Sereg. Further acquisitions strengthened Bailey's global capabilities, prompting Eltag to change its name to Eltag Bailey S.p.A. in early 1991. Bailey Process Automation then was formed as an independent unit to market the Bailey name and technologies worldwide.

"Just about anywhere we look in the world there are significant opportunities for growth, and we are in a strong position to take advantage of them," says Zaharna. "With our financial strength and rich history of being in the forefront of technological innovation, Bailey Controls has a lot to look forward to."

The logo for Bailey, featuring the word "Bailey" in a bold, serif font. Each letter is contained within its own square frame, and the entire word is enclosed in a larger rectangular border.



*Bailey's established
market presence
perpetuates E.G.'s
commitment to
engineering excellence*

Into The 21st Century

P.G. Bailey no doubt would be pleased that his name and company have been carried into the global market. Innovators seek out needs, start trends and look forward to the inevitable. As the 21st century approaches, Bailey Controls is positioned to take further advantage of business and technology opportunities around the world, all geared to its overriding mission – delivering to its customers the best control systems, products, and services.

The collapse of Communism in Eastern Europe has presaged the first steps in the modernization of those nations' industrial bases. Similarly, as underdeveloped countries around the world seek to join the global marketplace, they will need new industrial process controls. With Bailey's established presence on every continent, the company has a solid advantage over its competitors in reaching and helping new customers.

*I*n the U.S., Bailey will continue to expand its share of the process control market. Construction of many new power plants is unlikely, but Bailey will continue to retrofit existing plants with the most sophisticated control products and systems in the world. Strong growth resulting from the introduction of new products and processes by the process manufacturing sector also will bolster Bailey's domestic prospects in the foreseeable future.

Bailey Controls technology has advanced light years since E.G. Bailey developed the first basic instrument for measuring steam in a boiler. The company has grown with its technology. From a handful of employees operating out of a few rented offices in Boston, Bailey's global operation today employs some 5,500 people. The future holds equally momentous changes.

The trend for the immediate future can be summed up in three words: More, better, faster. When NETWORK 90 was first introduced, it could process 500,000 bits of information per second. A decade later that was up to ten million bits per second, and that's likely to increase by a factor of 20 in the next five years or so.

"In the next 10 years we are going to see facilities become almost totally integrated, with information instantly available on quality, composition, and all the other variables that affect a product," predicts D.J. Dziubakowski, Bailey's director of product line application engineering. "We're going to see more automation in the way our customers run their plants, which will mean we will provide them with controls that are increasingly automated."

To that end, Bailey has already made significant strides toward the use of Artificial Intelligence (AI) – complex software that virtually mimics the operation of the human brain. For Bailey, the use of such “expert systems” will mean the ability to develop controls automating many more plant functions, minimizing human error or imprecision while providing operators with significant mental leverage through interpretation and prioritization of prolific control data.

There will no doubt be developments no one can imagine – as with the Bailey Boiler Meter before E.G. invented it. But behind all the technology behind all the growth, the company’s purpose remains the same as it was 75 years ago: to provide customers with complete, accurate and timely information about the inner workings of their plants and processes.

*With its history of innovation
and commitment to customers,
the future of
the Bailey Controls Company,
as it celebrates its 75th birthday,
has never been brighter.*

B.G., indeed, would be pleased.

