
The Genealogy of a Corporation: I-T-E

100th Anniversary 1888–1988 Of Circuit Breaker Manufacture

By

W. Maxwell Scott Jr., President, 1942–1967

Chronology

Cutter Electric & Manufacturing Co.	
I T E Circuit Breaker Company	1888–1928
I T E Imperial Company	1928–1967
Gould Company (Chicago)	1968–1976
Brown Boveri Co.	1976–1981
Siemens-Allis Co. — Siemens US Subsidiary	1979–1981–1988
	1983–1986–1988

(Brown Boveri & Siemens remaining until 1988)

(All above companies during their time used I T E trademark until their disappearance from the company control)

Introduction

It was considered appropriate that I. W. Maxwell Scott, Jr. should be the author of this article for a number of reasons. In the first place, I was the son of W. M. Scott, Sr. who joined the Cutter Co. in 1894—as a draftsman a few years after its inception. He then became a partner with Mr. A. E. Newton, who had been with Cutter a few years earlier. W. M. Scott, Sr. later became President and served in that capacity until his death in 1942.

Personally, I worked for just over 40 years, almost my entire business life, with Cutter/I-T-E (1926–1967), being its President the last 25 years of my service (1942–1967). There were also many earlier documents in my possession and I had heard many descriptions of earlier events from my father.

In preparing this article, I have two of my former associates, Mr. Gustav Heberlein, Vice President of engineering, and Mr. Frank Judson, the Corporate Secretary, collect details. Mr. Heberlein on items of Engineering and Mr. Judson of Corporate matters. Mr. Heberlein is a Fellow Life member of the I.E.E.E. as I am. Mr. Judson made a most significant contribution by submitting an article on I-T-E's history. This article, quoted at length herein, is on company history to that date. This article had been widely distributed to I-T-E shareholders as part of the 1962 I T E Annual Report (Issued 1963).

Now as to the details, I am just short of certain that my father, W. M. Scott, Sr. contrived the words "...inverse time element. . ." from which the trademark I T E was derived. This letter-form trademark was registered in the United States Patent Office in Washington, DC. in 1896. The subsequent circular-enclosed trademark was registered also in Washington, DC in 1904.

Having mentioned the principal owners and officers, I would like to conclude this introduction by saying that the loyalty and hard work of the Supervisors and workers alike contributed to the success of the company in a major way. In his time, I have heard my father express strongly the same thoughts.

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Prologue

ITE—In their original meaning the letters stood for Inverse Time Element, the principle that made the circuit breaker practical, the principle that was the basis for almost all air circuit breaker development to follow.

Simply stated, the greater the overload or short circuit current, the greater the necessity for opening the circuit. . . the greater the necessity for opening the circuit, the quicker it is accomplished. This is the I-T-E principle.

For the historians, it is noted that the Inverse Time Element principle seems to have been clearly recognized and included in the first 1890 circuit breaker. It was described in these words within a few years. I.T.E. was used descriptively as an abbreviation in 1896 and was adopted in block letter form I-T-E in 1897. The circular monogram form of I-T-E, as used today, was introduced in 1904.

In 1905, the principle was further extended to the "Dalite" or Direct Acting Limit Inverse Time Element—the overload time delay of the suction disc type. Today, nearly all low voltage circuit breakers use time delay overloads of one sort or another.

Narrative

As of the 75th Anniversary

The years from 1888 to 1963

From ITE 75th Anniversary Annual Report

The I-T-E story goes back to 1888. Henry B. Cutter, electrical contractor and small manufacturer, informally organized the Cutter Electrical and Manufacturing Company, which was incorporated in 1891. His first product, a "double-push" wall switch for household use, was made in a one-time private residence at 27 South 11th Street in Philadelphia.

Working part-time with Cutter was an inventor and patentee named Walter E. Harrington, who was also chief engineer for the Camden Horse Railway, then in the first throes of electrification. It was Harrington who first became interested in the circuit breaker for his railway. It was he who induced Cutter to start its manufacture in the small factory the latter had by now leased at 1112 Sansom Street, also in Philadelphia. In his tenure with the Cutter company, Harrington made many contributions to the circuit breaker art. When he left, Cutter had an extensive line of circuit breakers for moderate voltages and had begun development of a line for switchboard use.

Also outstanding in the company's early years was William M. Scott. A young mechanical engineering graduate of the University of Pennsylvania, he became draftsman under Cutter and Harrington in 1894. He was followed shortly by "Ned" Newton, earlier described, who bought into the company in an effort to recoup his fortunes after the Cleveland Panic.

Together, it developed, these two were to guide the growing company for many years. By 1900, when operations had been moved to their present Philadelphia location, they headed the company as full partners and officers. They had pooled their resources and borrowed to the limit to buy it.

Newton served as president from 1900 to 1927, then as chairman of the Board until his retirement in 1931. Having served as chief engineer after Harrington's departure Scott became treasurer and general manager in 1900. In 1927, he became the company's third president and served in this post until his death in 1942, when he was succeeded by William M. Scott, Jr., the company's present president.

During the Newton-Scott years, the Inverse Time Element circuit breaker was continually refined. With succeeding models, its applications were broadened and improved. Like other improved electrical devices, which appeared with great rapidity during this period, it facilitated the rapid growth of the electrical industry.

For in many ways, the I-T-E story parallels the growth of the electrical industry. Certainly, electrical manufacturers and those who generated and used electric power in rapidly-increasing quantities were, and are, highly inter-dependent.

After Edison energized the first practical electrical transmission system in New York City in 1882, the use of electric power began a growth cycle which has not yet abated. Electrical manufacturers had to press to keep products ahead of the need for them. About I-T-E in this connection, Newton was often heard to remark: "I well remember how invariably there appeared to be an urgent demand for a circuit breaker just a trifle larger. . ."

Starting with small loads and low voltages, circuits went quickly beyond the point where the primitive fuse protection originally available was adequate. Improvements in fuses and switches were sought by many, but, like his forbears, young Scott was intrigued with the idea of automatic circuit protection. The early circuit breakers were understandably crude, but Scott and his growing group of engineers soon devised many ingenious improvements for them.

User identity between the product and the company ultimately became so strong that, in 1928, the company's name was changed officially to I-T-E Circuit Breaker Company. The original New Jersey corporation was changed to a Pennsylvania corporation in 1939.

As might be expected, many facets of the I-T-E story developed simultaneously. Research and "development with direction" have been basic in the company's philosophy and a strong factor in its ability to serve the electrical world continuously for some 75 years.

In a recent book, Dr Jules Backman of Columbia University links the growth of American productivity to the dynamic growth of the electrical industry. It was, he states, one of the earliest to become research-conscious.

I-T-E archives substantiate this. Take as an example the words of J. N. Kelman, in Los Angeles, CA, who built an early model oil switch in 1901.

"We took two ordinary barrels to use as (oil) tanks, and attached long, vertical blades to a movable cross bar for the moving contacts. We had 40,000 volts from the Colgate power house to apply to it. We stood at a respectful distance as we prepared to open the circuit. This was something we had not tried before. The question was, 'Would this crude mechanism work?'"

This was almost at the same time as the Inverse Time Element air circuit breaker was introduced on the East Coast.

I-T-E met the changing needs of the electrical industry with an expanding array of products.

The breadth of the Company's line was expanded also through the acquisition from time to time of well established manufacturers of other quality products. In the power equipment field, these include complete lines of power switching equipment, outdoor substations, insulators and power circuit breakers. In the indoor distribution field, these include safety switches, load centers, various forms of bus duct, and fuses. Also included were several switchboard assemblers.

This pattern began to take shape early in the century also when it soon became evident that the young company would need its own switchboard outlet. Messrs. Scott and Newton therefore bought out a local switchboard builder who already used I-T-E circuit breakers. This firm later formed the nucleus of the Switchboard section of the Switch-gear division.

In similar fashion, d-c breakers for mine and street railway use were added to the line some years later by the purchase of that portion of the business from a Columbus, Ohio, manufacturer.

Little did the original proprietor realize that by the mid-1950's the company would be one of Philadelphia's largest manufacturing firms and well up in the list of 500 leading U.S. corporations.

Ownership of the company proceeded from that single proprietorship to joint ownership by two families and, subsequently, by three families.

Just before World War II, some of its stock was purchased by a number of employees. After the war, public ownership broadened somewhat when trading over the counter was begun. Some preferred shares were offered to the public in the early fifties. Listing of the company's common shares and convertible debentures on the New York Stock Exchange occurred in 1957.

Epilogue

- 1888— Henry B. Cutter—Sansom Street, Philadelphia. Business was in house wiring and wall switch manufacturing.
- 1891— New Jersey Corporation—Cutter Electric & Manufacturing Co.
- 1896— Trademark granted I-T-E block letters.
- 1898— The Cutter Company purchased English patent #N1826-VICTORIA, ETC. Subject: improvements in electric switches and cut-outs.
- 1901— Newton and Scott, Sr. purchased Cutter Electrical & Manufacturing Co., Inc. and moved business to 19th & Hamilton Sts., Philadelphia. Mr. Newton was new President. H. B. Cutter resigned as President of Cutter Electric & Manufacturing Co. and retired from the company.
- 1902— Purchased in England, a patent on oil disk overload time limit. This was an important event and resulted in the adoption of the trade name DELAYED ACTION (TIME) LIMIT, or DALITE.
- 1904— New trademark I-T-E in circle issued.
- 1905
- 1908— Newton and Scott, Sr. acquired first 50% of Walker Electric Company. Newton made Presi-

- dent. This was always operated *entirely separately* from the I-T-E Company until about 1928. Walker was finally taken over by the I-T-E Co. in the mid Nineteen-thirties.
- 1922—** (About) I T E introduced "*URELITE*" air circuit breakers which were totally enclosed in an insulated steel box with outside close and trip handles. This was among the first totally enclosed breakers in the trade. "*URELITE*" was the trade name.
- 1926—** A. E. Newton wrote a book entitled "Experience is Master." This book gave photographs of the officers, supervisors, workmen and the field salesmen. Over the next two years, 10,000 or more copies of this book were distributed to the customers (companies) and employees.
- 1928—** (Or a year or so later) Cutter Electric & Manufacturing Co., Inc., changed their name to I-T-E Circuit Breaker Co., Inc. W. M. Scott, Sr. became the President and continued on until his death in 1942. Mr. Newton retired.
- 1928—** Walker Company of Philadelphia started supplying metal clad covers for dead-front I-T-E switchboards.
- 1930—** (About) High Power Short Circuit Laboratory at I-T-E Co. Philadelphia, PA. plant placed in operation. After about two years, a second generator of many times more power was added. Prior to this, interruption tests were done outside, in U.S. or European laboratories.
- 1933—** I-T-E Company commenced production of molded case circuit breakers (at first low amperage). As years progressed, larger and larger sizes were added to the line. All this was done under license.
- 1934—** I-T-E entered segregated metal-clad medium voltage, high current metal clad buss. These were later changed to an isolated phase round housing construction.
- 1936—** I-T-E acquired Automic Recloser Company, Columbus, OH. Single pole automatic reclosing circuit breakers were manufactured here. Operation eventually moved to Philadelphia.
- 1939—** I-T-E Circuit Breaker Company changed from a New Jersey corporation to a Pennsylvania corporation.
- 1941—** On two occasions, during WWII, the United States Navy awarded an "E" for excellence in production and delivery of our work for them.
- 1944**
- 1943—** Started manufacturing of airplane jet engine hot parts, made of Stainless Steel.
- (?)**
- 1946—** Started I-T-E Special Products Division to continue manufacturing of above mentioned jet parts (1943). Also (?) date started manufacture of AC to DC mechanical rectifiers. Capacity up to high amperage in figures 1,000 Volt DC or less.
- (?)**
- 1947—** Acquired Railway and Industrial Engineering to Greensburg, PA. Manufacturers of disconnect switches and sub-stations, along with other miscellaneous small items. Also acquired Eastern Power Devices LTD of Toronto, Canada—later Port Credit (near Toronto). Manufacturers of disconnect switches and sub-stations and later manufactured some I-T-E circuit breakers and importers of some from USA.
- 1950—** (About) I-T-E Circuit Breaker Company began manufacturing at its Philadelphia, PA. plant liquid and air insulated step-down transformers. This was done in order to work with switchgear unit sub-stations, also to feed AC DC rectifiers.
- (?)**
- 1951—** About this time, the Special Products Division made the first Black & White round television tube bodies, conical in shape and of Stainless Steel.
- (?)**
- 1953—** Acquired Chase Shawmut Co., Newburyport, MA. Manufacturer of cartridge fuses and particularly "AMP-TRAP" high speed fuses, ranging in sizes up to 4,000 amperes.
- 1953—** Acquired Victor Insulator Company of Victor, NY. Manufacturer of principally large porcelain insulators and some smaller ones. Porcelain insulators are a very substantial part of R & IE disconnect switches and other power devices.
- 1954—** Acquired BullDog Electric Products Co., of Detroit, MI. A manufacturer of safety switches, panel boards, switchboards, and bus duct. Also started the production of metal bodies for the first color television tubes. However changed the metal construction to rectangular form as used up to today.
- 1954—** Acquired BullDog Electric Products Co., of Weston, Ont., Canada. Part manufacturer, part importer and sales rep. for BullDog, USA Products.
- 1956—** Acquired Walker Electric Co. of Atlanta, GA. S.E. area sales representative for and supplementary manufacturer for Detroit BullDog (not connected with Walker of Phila.).
- 1956—** Acquired Kelman Electric Manufacturing Co. of Los Angeles, CA. Manufacturer of oil circuit breakers and switchgear.
- 1957—** I-T-E Circuit Breaker Co. stock listed on the NYSE.
- 1957—** Acquired Canadian Porcelain Co. of Windsor, Ont., Canada. Manufacturer of large and small porcelain insulators (no connection with Victor Insulators of USA).
- (?)**
- 1958—** Acquired Wilson Electrical Company of Huston-BullDog of Detroit area representative. Also, acquired other area BullDog *agents*. One in San Francisco and possibly one or two others. Also Standard Electrical & Manufacturing of Dallas, TX was a substantial manufacturer of switch boards and panel boards.
- 1960—** Started manufacture of industrial control apparatus "motor starters."
- (?)**
- 1962—** Our customer for television tube metal bodies (and the trade in general having changed to all glass tubes), the Special Products Division of I-T-E was discontinued. However, the space was utilized for other electrical operations.
- 1963—** I-T-E Circuit Breaker Co. Annual Report and information bulletin with extensive remarks about company quoted in foregoing. I-T-E Company celebrates its 75th Anniversary.
- 1965—** (Or later in this decade) I-T-E began manufacturing of metal clad isolated phase 15KV and 345KV buss' filled with sulfa-hexafluoride gas at 3 atmospheres under license from a European company.
- 1966—** (Or later in the decade) Started manufacture of high voltage circuit breakers with 3 atmosphere

- sulphahexafluoride gas in the interior as an interrupt medium and also as an insulator. Under USA license.
- 1967**— W. Maxwell Scott, Jr. notwithstanding pleas to the contrary resigned as President of I-T-E Circuit Breaker Co. for personal reasons, and left the company.
- 1967**— Harry L. Buck, previously Vice President was elected President of I-T-E Circuit Breaker Co.
- 1968**— *Note well*—W. Maxwell Scott, Jr. having left the I-T-E Circuit Breaker Company was much less acquainted with the affairs of successor companies. He was limited largely to Public Press articles, Stockholder reports, attending some stockholder meetings and occasionally talking with an old friend. (Dates given are somewhat questionable. . . Facts are much more accurate).
- 1969**— I-T-E Circuit Breaker Company merged with Imperial Eastman Company of Chicago, IL to form I-T-E Imperial Company. Then W. C. Musham of Imperial Company was elected President of this company and kept the I-T-E/ (Vertical Bar) trademark. Imperial Eastman was a manufacturer of control cylinders and small pipe fittings. Combined headquarters in Chicago subsequently moved to Philadelphia. A substantial amount of new common stock was issued as part of this transaction.
- 1970**— W. Maxwell Scott, Jr. was elected by Imperial Eastman Co. to be a Director of that company and so continued the relationship for several years.
- 1970**— (About) I-T-E Imperial Company acquired Rowan Controler Co. of Westminster, MD. This greatly improved company's business in industrial controls.
- 1972**— After about five years of planning and importing of a large short circuit generator from Switzerland, a laboratory was placed in operation. It was located in Chalfont, outside of Philadelphia. It was well named after its Engineering Planner, Gustav Heberlein "*The Heberlein Research Center.*"
- 1976**— Gould Company of Chicago, IL bought I-T-E Imperial Co. and moved its general headquarters to Chicago.
- 1979**— Gould sold to Brown Boveri Company of Baden, Switzerland or to its US subsidiary thereof, a 50% interest in its high voltage switchgear including rights to the I-T-E trademark thereon. Also, sold to Brown Boveri 50% interest in I-T-E Imperial, LTD and its owned Eastern Power Devices, LTD. Manufacturers in Canada of both high and low voltage switchgear together with Canadian I-T-E trademark.
- 1979**— (About) Gould sold its Canadian Porcelain Company of Windsor, Ontario, Canada to a Canadian entity.
- 1981**— Gould sold Brown Boveri Co. an additional 50% interest in stock in high voltage switchgear, making BBC sole owner of this item together with the rights to use the I-T-E trademark, continued on the high voltage switchgear.
- 1981**— Gould sold to Brown Boveri Company the remaining 50% interest, which it bought as per the foregoing 1979 date.
- 1982**— Gould sold a portion of Victor Insulators to the Victor President.
- 1982**— Having had four years of planning a second Swiss made short circuit generator the same as the first one in 1972, it was made and installed in Chalfont's laboratory, doubling that laboratory's capacity (Mr. Heberlein consulting).
- 1983**— Gould sold low voltage I-T-E Divisions to a 50-50 joint venture of Siemens and Allis Chalmers, known as Siemens-Allis. Right to I-T-E trademark on low voltage equipment was included. Gould kept Chase Shawmut motor control and Navy breakers. The old 50-50 joint venture later became Siemens 85% Allis 15%.
- 1984**— Gould Sold the remaining Victor Insulator Company to the Victor Employees.
- 1985**— Gould sold Telemacanique of France—the industrial control plant including products, of Westminster, MD. (This was the same operation bought from Rowan Control Company many years earlier about 1970).
- 1986**— Gould sold to a group of management employees of S.P.D. Technologies, Philadelphia, PA. its business in Navy circuit breakers (principally low voltage).
- 1986**— Siemans bought out remaining 15% from Allis and changed the name to Siemens Electrical Products, Inc. The rights to use the I-T-E trademark on low voltage equipment continues.
- 1986**— The Gould Company of Rolling Meadows, IL, heretofore referred to, is now Gould Electronics Company. A substantial manufacturer of factory automation, mini computers, and also a large manufacturer of copper foil.
- Gould continues to hold the Gould Shawmut Company, formerly named the Chase Shawmut Company of Newburyport, MA. The Chase Shawmut Company was founded in 1883 by Mr. Wm. Trotman, now more than 100 years ago. Chase Shawmut Company was bought by the I-T-E Co. back in 1953. The Gould Shawmut Company is a prominent manufacturer of electric fuses.
- 1988**— At the end of one century after the inception of Cutter Electrical & Manufacturing Co. the many changes thereof, it can be said that the year dates given are in the majority correct. Questionable dates are marked with a (?) sign, more questionable dates are marked with a ??(double question marks).
- Similarly, facts or thoughts are to be for the most part substantially correct. (This cannot be guaranteed!).
- Reading this epilogue from the time of H. B. Cutter's original circuit breaker in 1888, the 100th Anniversary, together with many intervening changes, one might well exclaim. . ."WHAT NEXT?"