A Legacy of Caring – the History of Picker International

by A. PALERMO, BSEE
Picker International Inc.

A. Palermo graduated from the Case Institute of Technology in 1949 with the BSEE degree and joined Picker that same year. He has worked as a design engineer and has held numerous engineering manager positions within Picker. He holds ten USA patents and has served on the ANSI Standard Committee. He has authored two local history books, numerous local history articles, and is a contributing author to the Encyclopedia of Cleveland. He founded the Picker archives and, at the time of writing this paper, he was CT Engineering Safety Officer. Mr Palermo retired from the Company at the end of 1994.

Headquartered in Cleveland, Ohio, in the United States, Picker International is a leading manufacturer of advanced medical diagnostic imaging systems (fig. 1). With more than 4600 employees world-wide, Picker International serves the global medical imaging market through its operations in Cleveland, Frankfurt, Paris, Toronto, Hong Kong, London, and Miami, as well as distributor partnerships in South America, Africa, Europe, the Middle East, and the Pacific Rim. A significant and growing portion of Picker International's revenues are earned outside the United States.

In 1957, Picker formed a manufacturing operation in Espelkamp, Germany to provide medical equipment for the European market. Today, that division, Picker International GmbH, has a strong and growing presence in the European Community.

Picker International, a subsidiary of the General Electric Company (GEC), has the largest GEC presence in North America. On April 1, 1981, GEC purchased Picker Corporation from Radio Corporation of America (RCA) and formed Picker International, consisting of GEC Medical (Wembley), Cambridge Instruments, and Picker. Subsequently, two of the sub-companies were spun off and Picker now stands alone.

In 1990, Picker reorganized the major divisions of the Company into Strategic Business Units (SBUs) which essentially means that each division stands alone as a profit centre.

1 ***The World Headquarters of Picker International, Highland Heights, Ohio – constructed in 1967***

Interestingly, 1995 marks both the centenary of Röntgen's discovery of X-rays, and the 80th anniversary of Picker International.

Some Recent Business Highlights

Record Sales and Earnings

Picker International continued its eighth year of improved sales and earnings, posting $1 billion in world-wide sales during 1993/94.

Picker Financial Group

Picker's financing arm, Picker Financial Group, entered 1995 – its third year of operation – with record financing of equipment orders.

ISO Certifications

To date, all the Company's production facilities, including X-ray, computed tomography, magnetic resonance, nuclear, and X-ray tube divisions earned ISO 9000 certification, the *de facto* world standard for quality. Certification in one of the ISO 9000 series of standards is rapidly becoming a requirement in the European business community, the largest market for diagnostic imaging systems outside the United States.

Quality-Driven Leadership

This process, formalized and launched in 1990, represents a cultural change at Picker International[(1)]. Led by management, the quality-driven leadership concepts are conveyed to every Picker employee through quality instruction, training, and problem solving. The result is an internal environment that simplifies the objectives of fully satisfying customers by meeting their requirements, by empowering employees to drive positive change, and by continually training people/staff and improving processes and products.

The Beginning – the Golden Age of Radiology

James Picker (fig. 2) was more than an entrepreneur – he was a man of moral conscience who firmly believed in the principles of fellowship and took great pride in his work to help others. The X-ray business he founded was involved in improving life and therefore was an honorable and worthwhile endeavour.

1903 was a time when the 'rags to riches' stories of people like Carnegie, Mellon and Vanderbilt painted a picture of unlimited opportunity to all who would come to America. That picture, combined with the freedoms and liberties, generally in sharp contrast to life in their homelands, drew hundreds-of-thousands of people to the young industrial nation, including a young Russian immigrant, James Picker, born in 1882.

Soon after arriving, he worked in a small pharmacy located in New York near Mt. Sinai Hospital. At night he slept on the pharmacy floor, and during the day swept the floor and made deliveries. A young man of deep resolve, Picker soon was studying at night to become a pharmacist, finished his studies, and shortly after, bought the pharmacy from his previous employer.

2 ***James Picker, 1882 – 1963, the original founder and namesake of Picker International***

Nurses from Mt. Sinai Hospital, on their off-hours, came to the soda fountain to discuss work and daily activities. Through these conversations, Picker first heard of the Röntgen unit at Mt. Sinai; this was a mysterious machine that took pictures of patients developed on glass photographic plates manufactured by Kodak.

Soon after hearing of the new medical marvel, Picker, who wanted to be part of this exciting technology, met with Mt. Sinai's head roentgenologist, expressed an interest in selling the photographic plates to the hospital, and was amazed to find that both the doctor and Kodak were readily agreeable to the proposition.

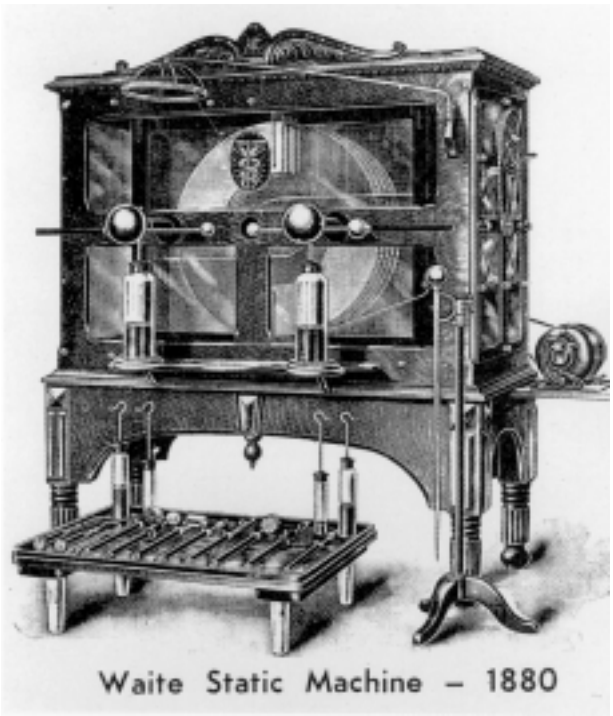
To James Picker, the solution was simple: work hard – serve your customers well – stick to doing it well – and success will follow. Before long he controlled almost the entire market in New York, Philadelphia and Boston for the distribution of the glass plates, and then further expanded the business by selling Kodak X-ray apparatus.

1915 was an important year for James Picker, for not only was his son Harvey born, but it was the year he decided to devote his interest solely to the X-ray business and he sold the pharmacy. Thus the James Picker Company, for the sale and distribution of X-ray supplies, was also born.

The Röntgen Era

In today's modern era, we have become accustomed to seeing scientific research and developments move along at a high rate of speed, such as in the electronic and communications industries, great marvels that moved from a dream to reality in a comparatively short time period. However, this was not always true. At the turn of the century, when relatively few scientifically-minded men were in research and development, and when so many of today's tools, materials, and knowledge were missing, it is easy to understand why the great X-ray discovery made, by Wilhelm Konrad von Röntgen (1845–1923) in Germany in 1895, moved along at such a slow pace.

X-ray – more-or-less an accidental discovery rather than the culmination of a research project aimed at finding an invisible light – sometimes was referred to as 'X-light', a penetrating ray with unusual properties. Even before its discovery, there was evidence, both in the USA and abroad, that electricity would play an important role in medicine. Various small companies had been organized to develop and produce a variety of items commercially known as electro-medical equipment. Static machines then were the most universally made devices and the most commonly



3 ***Static generator produced by Waite & Bartlett Co., Long Island, New York in 1880***

used source of high voltage (fig. 3). The power requirement even on a large static machine, was so small that it could be transmitted through a sewing machine belt.

Strange Treatments

Some doctors strongly believed in the curing potential of electrical treatment[2]. A few others, regarded as not too ethical, were quick to grasp anything that could be sold to the imagination of a sick person. An example of this can be realized in the following description†.

A complex looking oak chair, resembling an electric chair, was arranged so that the two sides of the chair contained eight or more tubular lamps, somewhat similar to fluorescent lamps of today. Each lamp was filled with a different gas that would produce a soft fluctuating coloured glow when excited with high voltage. Usually each lamp produced a different colour. The patient, sitting in the chair, received a treatment of the so-called beneficial light.

That was it, no more, no less. It should be understood, however, that most of the rather ridiculous types of electro-medical devices developed were used with complete sincerity and belief that the apparatus could prove an aid to human ills.

Finally, the great day came when the static machine could also be used to energize a gas-type X-ray tube. Because of the unpredictable operation of static machines, other more reliable technologies pushed them aside.

† From '25 Years of Progress' by Edwin R. Goldfield, Internal Picker Publication, 1955.

Look Out – Hazards Ahead!

Early X-ray users knew little of the great exposure hazards each time they used this unshielded source of X-ray (fig. 4). Most of the pioneers eventually received severe X-ray burns which generally required progressive amputation of fingers, hands, and arms, and, in most cases, eventually caused death.

As X-ray tubes increased in power, only a few provided any protection for the operator. Some years later, lead-lined shields and lead glass bowls came into use, as did the lead lining of room walls and the use of lead rubber aprons and gloves. An interesting note is that the lead rubber protective material, still in use today, was first developed circa 1898 by Dr W. A. Price, a dentist in Cleveland, Ohio – the future home headquarters for Picker International.

Waite & Bartlett Company, Long Island, NY, USA

One of the early American companies dedicated to the manufacture of electro-medical X-ray

4 ***An early gas-type X-ray tube, manufactured by CHF Müller, Germany, c. 1898***

equipment was the Waite & Bartlett Company of Long Island City, New York, who played a major role in the early evolution of Picker International (fig. 5). As early as 1879, sixteen years before Röntgen's discovery, they produced electro-medical equipment. An interesting note about the Waite & Bartlett Company is that, even though they had done some amazing and outstanding work in the field and probably had more patents than any other company in the industry, they never developed a national sales organization to take advantage of commercial opportunities. Later, in 1929, Picker purchased the company.

Engeln Electric Company Cleveland, Ohio, USA

1911 was the founding year of the Engeln Electric Company in Cleveland, Ohio, USA. By 1920 they had developed the first American-made bucky diaphragm‡, which helped to produce clearer X-ray films, and had much to do with the growth of the company. Many pieces of equipment developed by the X-ray industry years later had their foundations laid in the principles of design of some of the early Engeln models.

In the early summer of 1929, when the great depression was beginning to rage world-wide, Engeln's board of directors were considering a merger with the Acme International Company of Chicago. The 15th of November, 1929, was set as the deadline for the closing, and on that date, 200 men met at noon in the plant to discuss the loss of their jobs. It seemed like the end of the world!

Previously, in 1928, Mr Picker had for the first time visited the Engeln Electric Company. Had it not been for that chance meeting, the Picker plant as we know it here in Cleveland, certainly could not exist today. During the dark hours of closing Engeln in 1929, Mr Edwin Goldfield, General Manager and brilliant inventor at Engeln, was hoping to persuade Mr Picker to produce his own line of equipment in Cleveland. Strangely, Mr Picker was the eastern representative of the Acme Company with whom Engeln was merging.

On October 15, 1929, thirty days before the closing of the Engeln plant, Mr Goldfield was in Mr James Picker's office in New York City to entice him to start a Cleveland plant. Mr Picker told him that ten days prior he had just purchased the Waite & Bartlett Company from Dr Harry Waite, son of the founder, Dr Henry Waite. What a blow!

5 ***Harry Fuller Waite MD, 1874 – 1946, acclaimed as the greatest American inventor of X-ray equipment during the golden age of radiology circa 1900 – 1940***

Goldfield returned to Cleveland determined to start an X-ray business. In the spring of 1930, he had a surprise visit from Mr Picker who showed signs of reconsidering the earlier suggestion. By June they agreed as far as starting a plant. Even the location was settled, and it was to be back at the very spot that the Engeln Company had closed. Mr. Picker purchased assets of Engeln, but not the company.

The amazing part of this story is one that younger people may not appreciate. One needs a recollection of the stock market crash and subsequent depression to realize the chance taken by Mr Picker and his foresight and confidence during those dark days. At the very time countless business organizations were going bankrupt or simply closing their doors, Mr Picker, against the advice of his business associates, was willing to take the risk in spite of the fact that he already owned the Waite & Bartlett Company at Long Island City.

General Electric (USA) had entered the X-ray business circa 1921 by purchasing the old Victor Electric Company. They reportedly had done this primarily to increase the sale of hot cathode, or

‡ A device invented by Gustav Bucky at about the turn of the century. It consists of lead strips (spaced by a non-metallic material) and is placed behind the patient in order to absorb scattered radiation, thereby producing clearer X-ray images. These diaphragms are still in use today.

so-called 'Coolidge' X-ray tubes, developed by Dr W. D. Coolidge at their Schenectady, NY, USA plant in the early days of the first World War. Oddly enough, the first commercial quantity use of this tube was on a military field unit designed and manufactured by the Waite & Bartlett Company and was the only X-ray machine used by the American expeditionary forces during World War I (fig. 6). This hot cathode tube was so superior to the gas tubes then in use that it is difficult to understand why the radiological profession did not immediately accept it.

The 'Coolidge' tube made possible close duplication of day-to-day film results as well as being able to conduct larger currents through the X-ray tube which, in reality, obsoleted most of the previously-built X-ray generating equipment.

After the introduction of the hot cathode tube, Dr Waite patented (1920) the idea of placing an X-ray tube together with a high tension transformer in a tank of insulating oil (fig. 7) – a simple idea, but one of tremendous importance. Unknowingly, Dr Waite laid the foundation for many of the much acclaimed 'firsts' of the Cleveland Picker factory. Thus the first piece of shockproof X-ray equipment ever to have been developed anywhere was born (fig. 8a)). This patent perhaps was one of the most valuable issued in the X-ray industry. Prior to that, it was not uncommon for patients and servicemen to receive fatal shocks (fig. 8b)).

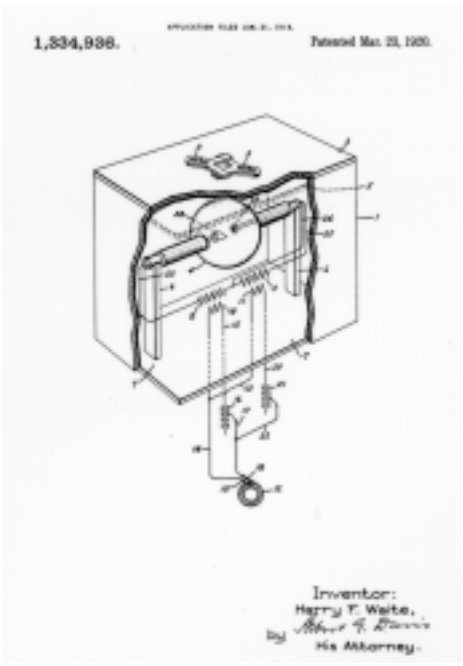
6 ***Mobile X-ray unit, designed by Dr Harry Waite and used by expeditionary forces in Europe during World War I circa 1916 – 1918. Notice exposed high voltage wires.***

Cleveland, Ohio, USA

In 1930, after the new Picker Company was formed (but still using the Waite & Bartlett name), the first item developed was an enclosed shockproof vertical fluoroscope (fig. 9). Because the Cleveland factory did not want to compete with the sister company, Waite & Bartlett, the first few years were spent in the development and production of equipment not produced by Waite, such as patient supports and X-ray tubestands. After two years, it was decided that the Cleveland plant should develop new equipment to replace that produced by the Long Island Waite & Bartlett Company, thus opening a whole new world of opportunities for the small new company.

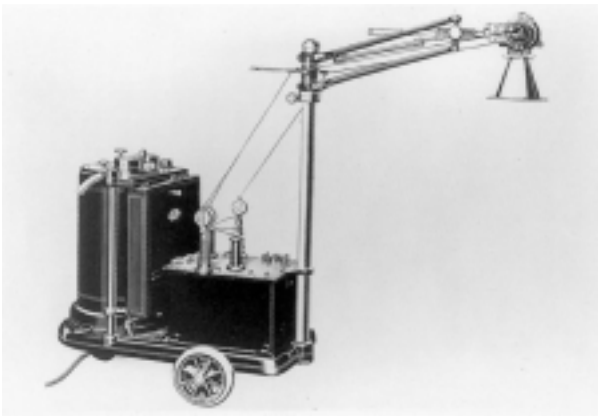
To succeed in this program, the Picker line would have a 'new look', the first to make use of colours, the first to look simple and streamlined, the first to use chromium plating, and above all, the first to be completely shockproof, as proven by Dr Waite ten years earlier.

An approach entirely different from Dr Waite's was taken to achieve shockproof designs (shielded and insulated high voltage cable equipment) which eventually became an accomplished



7 ***Patent issued to Harry Waite in 1920 – perhaps one of the most important ever issued in the X-ray industry***

a)



b)

8 a) ***Dental unit designed by Harry Waite using his 1920 patent. This product, circa 1930, is not too dissimilar from those manufactured in 1994; and*** b) ***a 1920 non-shockproof mobile X-ray unit which at times could electrocute personnel. Exposed voltage values could be 150000 volts.***

9 ***Vertical fluoroscope 1931. First product manufactured by the Cleveland Division of the Picker X-Ray Corporation. This product was classed as shockproof because the sheet metal shroud encased the internal exposed high voltage.***

reality and obsoleted equipment manufactured by every competitor (fig. 10).

By the time the Cleveland factory started, the parent James Picker Company had grown to be the largest, most successful company in the industry insofar as the sale of accessories and supplies were concerned. But, parochial they were, and distributed X-ray equipment only in and around New York. The Company's name was well identified in the supply and accessory field, but in most places was unknown insofar as equipment was concerned.

Mr Picker's goal was carefully to build a national sales and service organization that was second to none, always attempting to provide better men, training, and better equipment than competitors.

As a result of James Picker's business ability and leadership, success came rapidly. A nationwide network of sales agents and distributors was organized, and the Picker name rapidly became a by-word in the radiological field.

By 1936 the Cleveland operation had grown to such an extent, both from the standpoint of personnel and broadness of product line, that larger quarters were required. In 1937, Picker moved into a larger facility on Cleveland's far east side and remained there until 1967 (fig. 11).

10 ***Convention, American Hospital Association, St. Louis, Missouri, 1947. The Deep Therapy shockproof unit (220kV) at the extreme left side of the picture was a Picker 'first' in 1933. The design used insulated high voltage cables and insulated tube housings***

Rumblings of War – 1937

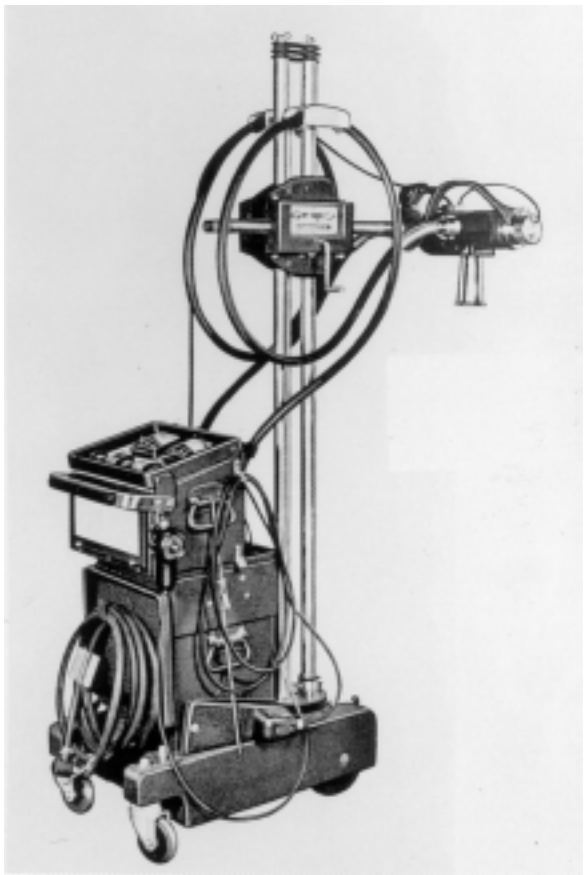
In 1937, the Belgian army, small as it was, was interested in obtaining equipment suitable for military purposes. Picker accepted the challenge of developing such a piece of equipment, and set a goal to operate the X-ray tube reliably at a continuous fluoroscopic (low-power) setting. Units were successfully delivered, a fact that secured the interest and co-operation of the American military authority late in 1939.

World War II – 1939

Picker's contribution to the war effort was the outgrowth of a letter that Harvey Picker (later to become President of Picker) wrote to the US Surgeon General soon after hostilities in Europe erupted and before entry of the United States into the war. He offered, without cost, the services of the Picker Engineering Department to develop X-ray units believed to be needed if the US entered the conflict.

The offer was accepted. Picker's stipulation was that they not only be permitted to bid on contracts for the yet-to-be-designed field unit, but also that the award should still go to the lowest bidder. Picker carried out the engineering work and built a prototype at its own expense (fig. 12). When final production bids were opened, Picker was the lowest bidder, received the contract, and for several years was the government's sole supplier. When the military felt they should have a second supply source, Picker trained a second supplier whose unit price was higher than Picker's.

11 ***Picker X-Ray Corporation, Waite Manufacturing Division, Cleveland, Ohio, USA. Picker occupied three floors at various times between 1937 – 1967***



12 ***The US Army X-Ray Field Unit, used extensively during World War II. Picker produced about 13000 units during the war. The unit could be removed from three shipping chests and assembled in five minutes.***

The demand for these rugged units was enormous. Economies of scale, made possible by rapidly increasing production (fig. 13), caused profits to flow to the Picker X-Ray Corporation at a rate that distressed James Picker. He acted with characteristic altruism and simplicity.

13 *Factory production of X-ray tubes used on the US Army X-Ray Field Unit, 1942 – 1943*

American industry and the public were amazed when national newspapers headlined the fact that, on three occasions during the period 1942–1951, Picker returned to the United States Government sums totalling $4.0 million dollars. He said:

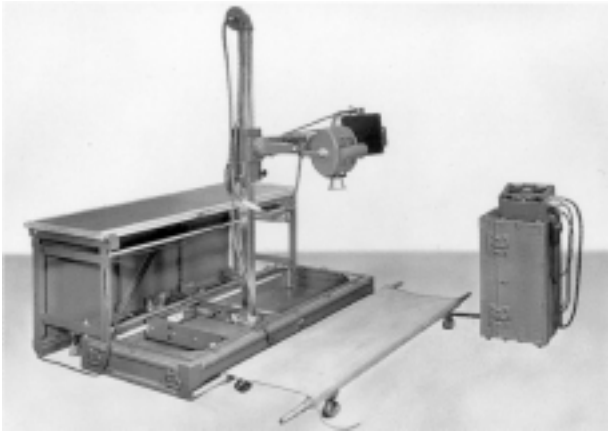
> 'I did not want to make a profit on men dying. With our fellow Americans and allies being killed in the war, the least we could do was to see that we (Picker's) did not profit from it'.

It has been said that more X-ray machines were turned out by the Picker plant during World War II than produced in the same period around the world. The outcome was the distribution by the United States Government to our allies of one of the most rugged products ever produced by Picker. As a result of the good name earned in this manner, Picker sales expanded.

Changes in Military Equipment: the Polaroid Joint Venture and the Korean/Vietnam Wars

The success of the World War II unit did not keep Picker from moving ahead. In 1950 the Company completely redesigned the mobile military X-ray unit to include technological advances and in anticipation of a new type of warfare (fig. 14). Some of those advances involved the X-ray tube unit itself and the quality of images. One, however, involved film processing, and led to Picker's joint venture with the Polaroid Corporation in 1950.

Polaroid had introduced the Polaroid 'instant pictures' camera in 1947 by having the developing



14 *Korean War Unit, 1950. This unit provided improved technology over its predecessor.*

chemical part of the film itself. Seeing possibilities of an X-ray-type Polaroid film for army field use, Picker signed an agreement with Polaroid to develop what came to be known as the Picker Polaroid Processing Unit (fig. 15). Polaroid engineered the film, and Picker, with guidance from Polaroid, engineered the hardware to process the film.

Both the new transportable Army X-ray field unit and the Picker Polaroid portable processor units were completed in 1951 and used by US troops during the Korean War. The X-ray system could be dropped into a combat zone, carried by two men, set up, and be ready to work in fifteen minutes.

The 1960s saw further developments by Picker for near-front-line combat medical diagnostic X-ray equipment with the evolution of the Mobile Unit Self-Contained Transportable (MUST) unit, produced by Picker and successfully used in the Vietnam War.

15 *Picker Polaroid Processing Unit, 1950. This unit, designed as a joint venture between Picker and Polaroid, was an outgrowth of the world famous Polaroid 'instant picture' camera developed in 1947.*

1940s – 50s: Technology Advances – so Does Picker X-Ray Corporation

The 1940s ushered in the fantastic technical achievements of the nuclear age and the jet airplane. The 1950s saw the introduction of the transistor. A quantum leap in medical technology that occurred in the late 1940s was the development and production of the image intensifier tube. In the early 1950s, a large semi-tractor-trailer equipped with an intensifier tube demonstration unit owned by the X-ray division of Westinghouse pulled into the Picker X-Ray Corporation parking lot in Cleveland, Ohio. The entire management and engineering staff of Picker, including the author, witnessed this mind-boggling event.

Prior to the intensifier, the only available fluoroscopic real-time X-ray device was the conventional fluoroscopic flat screen whose crystals, when excited with X-rays, gave off directly visible light. When the intensifier made its debut, its amplified light output, or brilliance, was compared with that of the fluoro screen for equal X-ray inputs. The first tubes had amplification figures of about 100. These quickly grew to 1000. Figures of 20000 are commonplace today. Westinghouse was very interested in selling that product to Picker and others.

Now for the first time, physicians would no longer require dark glasses to view images, nor would they need fifteen minutes to dark-adapt their eyes, nor would they have to look at greenish-yellow images through 1/4-inch (6.35mm) thick yellowish leaded glass. Imagine being able to see a fluoroscopic image in almost broad daylight. The future was paved with golden opportunities for Picker. Numerous image tube manufacturers jumped on the bandwagon including Machlett, Rauland (Zenith), Varian, Thomson-Houston, and others. A most interesting and bizarre fact is that Westinghouse, who drove into the Picker parking lot on that warm summer day, with its technical platter filled to capacity, eventually succumbed to the aggressiveness of Picker and other competitors. Westinghouse sold its X-ray business to CGR in the early 1970s.

The technology race was on and Picker responded in kind with an avalanche of new ideas and products using the intensifier.

During the old fluoro-screen days, daylight reflections of any kind within eyeball view of the doctors eyes were taboo. For optimum visualization of patient studies, room lights were turned off, black shades were put on windows, electrical instruments were back-lighted with non-white bulbs (usually red) and the equipment itself painted a non-reflective colour. Most competitive equipment was painted black. Picker's colour was known around the world as Picker green, of which some equipment occasionally surfaces as a reminder of the past. With the advent of the image intensifier, the equipment colour window was opened to let in a breath of fresh air.

By this time, hospital architects were keenly aware of the psychological aspects of colour within the hospital walls. Greens, yellows and blues were kind of 'out' and neutral beiges and tans were 'in'. The Picker green colours just didn't match. The obvious solution was to change.

In 1977, when Picker first introduced the CT scanner, the colour of choice was a neutral off-white earth-tone colour that has stood the test of time, still is the colour of choice, and has spread across all product lines.

1960s–70s–80s: X-Ray Strategic Business Unit

Picker's presence in the standard X-ray diagnostic and fluoroscopic marketplace eroded during the 60s and 70s for both administrative and technical reasons. New management in the 80s recognized the shortcomings and took immediate steps to turn the business around.

Investing in research and development were the key words for both national and global opportunities. In 1989, the X-ray strategic business unit (SBU) introduced eleven new products.

After investing significantly in vascular, radiographic, and radiographic/fluoroscopic technologies as well as imaging accessories, Picker International broadened its X-ray technology in 1990 with the introduction of the Cardicon-L system, which was developed and engineered for cardiovascular diagnostic and interventional imaging (fig. 16). In 1993, Picker's vascular imaging

16 ***The Elite 5000, a modern, general radiographic and fluoroscopic table/filmer system – designed and manufactured by the X-Ray SBU Division in Highland Heights, Ohio – is in current production.***

capability took a major leap forward as clinical trials began for digital vascular and cardiac imaging systems whose features dramatically expanded visualization, diagnostic capability, and clinical effectiveness for users during interventional procedures.

A new application of existing technology, pulsed fluoroscopy, provides high-quality images while reducing radiation dosage by as much as 80 per cent during fluoroscopy exams. In 1993, the Company applied the technology to its radiographic/fluoroscopic systems which enabled medical institutions to reduce radiation doses for paediatric patients dramatically. With the most extensive range of X-ray and vascular imaging systems in its history, Picker International positioned itself to increase market share of its X-ray business significantly.

Picker/Dunlee

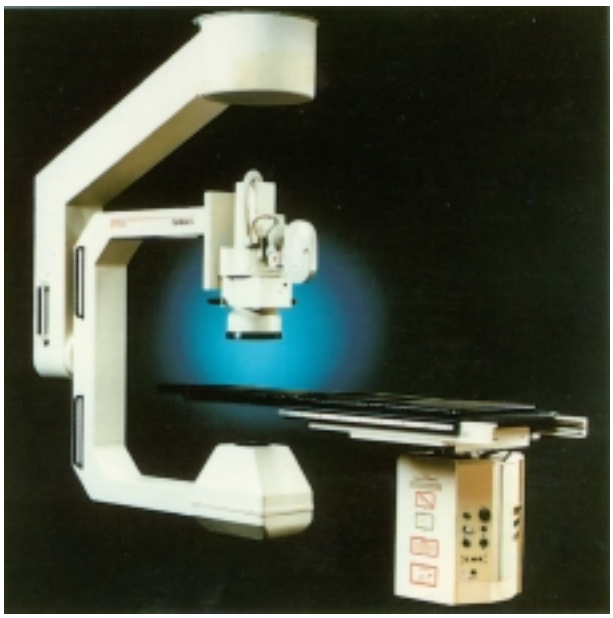
The Dunlee Corporation was formed in Chicago by Zed J. Atlee and Dunmore Dunk in 1946 in response to increased market demand for high quality X-ray tubes. They quickly earned a reputation for providing quality standard and custom tubes for new medical and industrial applications.

The Picker X-Ray Corporation, a customer and supporter of Dunlee from its inception, encouraged their entry into the X-ray tube market. Dunlee tubes were part of the new line of diagnostic and therapy products that launched Picker's post-war growth to a position of prominence in the industry as a major supplier of civilian and military diagnostic X-ray apparatus. Picker acquired Dunlee as a wholly-owned subsidiary in 1967.

Dunlee continues to keep pace with advances in X-ray and CT, produces tubes to accommodate higher patient throughput, operates as part of the X-ray Strategic Business Unit, and supplies X-ray tubes for Picker International radiographic and fluoroscopic systems.

Committed to doubling its investment in research and development over the next five years, Dunlee in 1994, moved into a new 133000 square foot (12000m^2) facility in Aurora, Illinois (fig. 17).

17 ***Dunlee Corporation, Aurora, Illinois (architectural rendition). This new 133000 square foot (12000m^2) facility opened for business in 1994***



18 ***Cardicon™ – L Angiographic system provides a full range of cardiovascular and interventional imaging procedures. The image intensifier, filming and TV viewing systems are manufactured by Sierra Scientific. The unit is in current production.***

Sierra Scientific, Mountain View, CA

Picker International's Sierra Scientific Division in Mountain View, California, provides the development and manufacture of Picker International's medical television systems utilized in fluoroscopic, vascular, and military systems (fig. 18).

Operating as part of the X-ray SBU, Sierra was founded in 1966 to build video equipment for Picker X-Ray Corporation's medical applications. In 1971, Picker purchased Sierra as a wholly-owned subsidiary and, in 1974, Sierra expanded operations to build industrial TV systems. In 1985, Sierra acquired rights to manufacture both Digital Angiographic Subtraction (DAS) systems and the rugged PET Scope (Panel Electron Tube) for the military.

Sierra also develops products for the non-diagnostic imaging marketplace, such as night detection systems, machine vision systems, military surveillance and security systems.

Computed Tomography

In 1967 Godfrey Hounsfield of EMI in England produced the first Computed Tomography (CT) image. This remarkable achievement, which revolutionized the field of medical diagnostic imaging, earned for Hounsfield and A. M. Cormack (American) a well-deserved Nobel prize[3].

In 1973, Picker put together an engineering team to evolve preliminary design concepts and, in 1977, shipped Picker's first production scanner.

Because CT technology and competition were rapidly advancing, Picker responded by delivering, in March 1978, a newer technology scanner and, in the process, won several honours for excellence in industrial design.

But the winds of change were blowing and Picker successfully completed yet another new model in 1981 with the first patient scans having been made at the prestigious Cleveland Clinic. This unit proved to be the work-horse of the industry and the world's gold standard. In 1983, these scanners were installed into mobile trailers.

But time and tide wait for no man. At RSNA '88 (Radiological Society of North America – see fig. 19)), Picker's new cost-effective IQ scanner (fig. 20) made its debut as the latest state-of-the-art in CT technology to fit the low-cost market niche, and was the first commercial CT scanner to use slip-ring technology with an on-board, rotating, high frequency X-ray generator. Also in 1988, Picker signed a 5-year joint venture agreement with Imatron Corporation to sell and service their rotating electron beam CT Scanner.

One year later, at RSNA '89, Picker again rocked the CT world with the introduction of the PQ-2000 scanner, the new gold standard. Sales of the IQ and PQ scanners skyrocketed.

Picker's complete line of CT products and services, including continuous whole-body scanners, visualization systems and remote-access viewing stations, are built on a modular technology platform that can respond effectively to changes.

In 1992, Picker acquired Dynamic Digital Display Corp. to provide the Voxel Q™ visualization system which offered advanced capabilities for 2-D analysis, multiplanar reformatting and fast 3-D reconstruction.

The latest Picker CT advanced technology is TELEVIEW™, a teleradiology system that allows physicians to review medical images in their homes or other remote locations.

With the goal of redefining the onco-diagnostic process, the partnership of Varian Oncology Systems and Picker in 1992 resulted in AcQSim™, a CT therapy simulation system designed to improve the efficiency and accuracy of radiation delivery in cancer treatment.

19 ***Convention, Radiological Society of North America (RSNA), Chicago, Illinois 1992. Picker presents a strong presence at this world-class event.***

20 ***IQ Premier Computed Tomography (CT) Scanner, show-cased at RSNA 1988***

Picker's global CT presence expanded significantly including a most recent joint venture in India, known as NETWORK that provides CT scanners for their local markets.

Picker again made history in 1988 when Picker 1200SX CTs were installed on board two US Naval hospital ships, the USNS 'Comfort', and USNS 'Mercy'. These were the world's first seagoing CTs with diagnostic capabilities, never before possible on a ship (fig. 21).

In 1991, Picker deployed the first military MEDCAT CT Scanner (housed in an International Standards Organization (ISO) shelter) to an evacuation hospital during operation 'Desert Storm' in Saudi Arabia, about 200 miles from Kuwait. Later, in 1992, a MEDCAT was sent to Somalia to help in the relief effort (fig. 22).

21 ***Picker CAT 1200 SX CT Scanner, the world's first sea going CT, being installed on the USNS 'Comfort' in San Diego, California in 1988***

22 ***Picker IQ Premier CT Scanner, installed in a military ISO shelter. The unit shown saw service in Saudi Arabia in 1991 (Operation 'Desert Storm') and Somalia.***

Health Care Products

From its very inception in 1915, Picker was, and still is, heavily involved in the accessories and supply business. In 1968, Picker Corporation purchased a small chemical manufacturer located in Cherry Hill, New Jersey, thus marking the beginning of Picker Chemicals. Today, the building has been expanded to 40000 square feet (3700m^2) and houses a state-of-the-art automated production facility that includes research and development, quality control programs, and a customer service program.

In 1981 when GEC acquired Picker, the supplies, accessories and chemicals businesses were brought under one umbrella, which two years later became the Health Care Products (HCP) Division.

In 1989, HCP took a quantum leap into the future when it initiated its first Electronic Data Interface (EDI), a total electronic ordering system that provides a computer-to-computer exchange of intercompany documents, such as purchase orders, acknowledgements, invoices, freight details, price schedules and more. Products include film illuminators, disposable patient apparel, the CADI chemical mixer, a line of plastic film-filing products, remanufactured Kodak film processors and dark-room accessories.

Today, Picker Health Care Products Division is the largest distributor of radiology products in North America, bringing a complete line of supplies, accessories, and services to the hospital and non-hospital imaging marketplace (fig. 23). HCP's portfolio of over 5000 products is derived from a dual supply strategy that includes self-manufactured products from its Cherry Hill, NJ and Charlotte, NC facilities and branded products from key suppliers.

23 ***Some of the products distributed by the Health Care Products Division***

HCP has sixteen warehouses strategically located near epicentres of population in the US. A private trucking fleet services selected distribution points to ensure lowest customer cost, timely delivery and product integrity through all phases of handling. HCP links each warehouse electronically through an on-line ordering system. Its vast distribution system and a huge national inventory of stock items provide a strength unmatched by any single competitor.

HCP's Order Express system provides customers instant access to pricing, availability, and order entry from any one of four centres, twenty-four hours a day.

EnviroCare, a new, environmentally-friendly film processor management system from Picker Health Care Products, helps hospitals comply with OSHA (Occupational Safety and Health Act) and EPA (Environmental Protection Agency) standards while reducing chemistry usage and increasing silver recovery.

Offering the same products and services as the U.S. Division, HCP has sister organizations in Puerto Rico and Canada. Although independent of the US operation, they work closely together to provide overall strength in the North American marketplace.

Magnetic Resonance Imaging

GEC's Magnetic Resonance Imaging (MRI) technology dates back to 1974. In April of 1981 Picker acquired MRI technology from GEC and pursued a dual program to develop both resistive and cryogenic imaging systems. The strength of the Picker Scientific team and the significant number of clinical patients gave Picker a clear lead in the clinical acceptance of MRI technology.

Picker has since remained a leader in the development of Magnetic Resonance Imaging systems for hospital use as well as for mobile MRI systems contained and operated within 45 or 48 foot (13.8m or 14.6m) trailers.

In 1989, the Magnetic Resonance business unit challenged the industry with systems that delivered unprecedented clinical utility and image quality.

Vista ® HPQ magnetic resonance systems offered insights into critical health issues (fig. 24). For instance, MR spectroscopy broke ground in the diagnosis of AIDS and Alzheimer's disease; and Vista HPQ's non-invasive angiographic techniques positioned Picker as a front runner in the industry for this procedure.

Offering varying magnetic field strengths, Picker provided options for a wide range of applications and high image resolution, and in

24 ***A Vista™ Magnetic Resonance Unit undergoing final assembly***

1990 introduced the 1.0 Tesla mobile HPQ system. Additionally, Picker International's pioneering active shield technology simplified the spatial demands of MR siting, saving both time and money in system installation.

Integrated into the family of Vista HPQ systems is the ViStar ™ medical imaging supercomputer, which can review multiple patient studies, reformat 2-D multiplanar images, compute angiographic projections, render surfaces and display cines, all of which can be done in real time and independent of the MR scanner.

An even more dramatic feature of the ViStar supercomputer is its capability to project instantly any angle of a scanned image. It affords physicians and radiologists tremendous flexibility in diagnosing illness and avoids costly delays associated with repeat patient visits. By turning 2-D MR images into 3-D anatomy, the ViStar supercomputer allows the radiologists to see through, segment and shade objects for optimal clinical analysis.

In 1993, Picker added three systems to its product portfolio to comprise the industry's most complete MRI product family. Two actively-shielded systems, the 0.5T Asset™ and the 1.5T Edge™, and the

innovative 0.1T Merit™ join Vista Q™, Picker's 1.0T system introduced in 1991. Both Asset and Edge use the new Alpha AXP 64-bit RISC computer from Digital Equipment Corporation. This open platform delivers the fastest real-time image display and manipulation available.

The 0.1T Merit is the result of a new joint venture, named Picker Nordstar, between Picker and Instrumentarium of Finland. Picker Nordstar will also continue a project started in 1989 by Instrumentarium and Nycomed Imaging AS, a leading manufacturer of imaging contrast agents. The Overhauser MRI Project is developing imaging techniques using enhancement agents coupled with a special, low-field scanner to provide clinical analysis better than that currently available with high-field systems.

Picker's MRI coil program made significant strategic advances both in phased array and conventional coil technology which provided complete anatomical coverage, and incorporated the latest RF technology to keep pace with rapidly expanding clinical needs.

Nuclear Medicine

In 1958 Picker entered the nuclear diagnostic field as one of the early developers and manufacturers by producing the Magnascanner (fig. 25).

25 ***Picker Magnascanner (1958) vacuum tube model, later replaced with a transistorized model***

Nuclear medicine provides the means to pinpoint the existence and location of pathologic tissue, perform blood flow studies and show heart motion. Picker Nuclear cameras provide hospitals the means to do so. Auxiliary equipment helps the nuclear medicine practitioner in all phases of this important examination technique.

Prior to 1958, nuclear medicine was confined to measuring thyroid uptake of radioactive iodine. The medical profession credited the Magnascanner with much of the success that the field of nuclear medicine later met. Several thousand units were manufactured and sold.

Continued development and expansion of facilities in Northford, Connecticut allowed Picker to introduce to the marketplace in 1968 the first Dynacamera, a major contribution to the evolving nuclear imaging technology. The Dynacamera, a commercial success, produced images of internal organs such as the brain, liver, lungs, and heart, but later was obsoleted by the introduction of the CT Scanner.

In 1987, because of business conditions, the Northford facilities closed and all design and manufacturing were consolidated and moved to Cleveland.

Since 1985, Picker International has begun to regain its stature in the nuclear medicine marketplace. The Digital Dynacamera and the SX Series Stands provided its customers with high quality results and high patient throughput.

Acceptance of single photon emission computed tomography (SPECT) is the driving force of growth in nuclear medicine. In 1989 SPECT usage doubled in North America, and is the most important nuclear medicine technology for cardiac and brain imaging.

Recognizing the significance of SPECT, Picker International revitalized its Nuclear Medicine business to support its customers better. In 1989, Picker International acquired control of the assets and technology of Ohio Imaging. The result was the introduction of the world-class Prism™ 3000 nuclear imaging system, which featured one of the first three-headed camera SPECT technologies (fig. 26).

Benefits of the Prism 3000 system to radiologists included the capability to collect three times as much SPECT information than prior systems without increasing study time. In short, the Prism 3000 system provided opportunities to increase patient throughput, improve floor space usage, take advantage of low life-cycle costs, and provide more clinical value compared with other technologies.

Since the introduction of Prism 3000, Picker International has become the major player in this segment of the nuclear medicine marketplace.

26 ***Picker Prism 3000 (Spect unit) is a driving force in nuclear medicine.***

With a commanding global presence in multihead SPECT systems, Picker's record of innovation continued with the introduction of the Odyssey™ VP computer, which offers twice the computing speed of its predecessor in a smaller footprint.

Picker enlarged its nuclear medicine facility by 14000 square feet (1300m^2), reflecting substantial year-over-year growth in production, sales and profits.

Research and development investment increased 30 per cent with a significant portion directed towards many clinical and scientific partnerships. Research ranges from Image Fusion techniques, combining CT or MR data with SPECT images, to new methods for correcting attenuation artifacts. With the help of these clinical partners, Picker's leadership in SPECT imaging grows stronger each year.

The Formation of the Federal Group

Recognizing the importance of Picker's military products, the Company formed the Federal Business Group in 1983. This group's mission was to develop the highest quality military-unique products available in the market-place. One early success of the group was a research and development contract with the US military to develop transportable field radiographic/fluoroscopic systems. Later, in 1987, Picker signed a federal contract to develop X-ray mobile systems as well as to further develop other systems to meet the needs of the military.

Most recently, in 1994, The US Department of Defense awarded Picker a contract to produce X-ray systems for field-deployable military hospitals, special radiographic units with military-unique components for the Defense Personnel Support Centre.

Picker Service: 1915 – 1994

The Picker story is not merely one of pioneering technology, of equipment 'firsts' or scientific achievements, but rather one of eighty years of dedicated men and women committed to the ideals of customer service first established by James Picker. Early in our history, Picker advertized that:

> 'every state in the union has its patrons of Picker Service who would gladly testify to the efficiency of its methods. Studying the doctor's needs and preparing to meet them at a moment's notice at a saving in cost, has been the main cause for the success of this house, whose name has become a password among roentgenologists all over the country'.

Success and growth in today's challenging marketplace is as much a factor of our dedicated employees as it was back in the early part of the twentieth century.

Through gradual expansion of service offices starting in 1915, Picker essentially covered the world in strategic areas. Servicemen were trained in-house with actual equipment representing real service issues. In 1976, the James Picker Center for Continuing Education was founded in Cleveland to further enhance training.

In 1990, the Service organization made strides in reducing life cycle costs of imaging technologies, enhanced image quality and system reliability, reduced overall customer response time, and streamlined the business management organization – to be more responsive to requirements of customers (fig. 27).

At business headquarters, the Company improved communication among the more than 1400 field service engineers, electrical engineering or biomedical graduates, to interpret trends of system performance on a customer-by-customer basis.

In 1990, training sites at headquarters were constructed to resemble actual hospital facilities where on-site service was conducted. Additionally, Picker International expanded one of its two product renewal centres. The 17000 square foot (1580m^2) centre in Charlotte, North Carolina, tripled in size to 51000 square feet (4740m^2) to accommodate the growing business of Nuclear Medicine, MR, and CT.

In 1993, Picker Service set the pace in flexible customer training through rapid growth of its popular Co-op Support Plan. Through Co-op, customers with in-house service groups received Picker factory training, service documentation, and diagnostic tools, along with a host of options to

27 *A Picker Field Service Engineer at work on an IQ CT Scanner*

tailor the plan to their needs. This two-year-old program has grown exponentially as more hospitals recognize the value of combining in-house service with Co-op. Flexibility and quality have made Picker's Co-op Support Plan the most comprehensive and widespread in the industry.

Considerable investment in advanced service technologies over the past few years has led to major achievements. The recently implemented Telapath℠ Resource Hub, a group of applications and equipment specialists in Cleveland, is resolving a high percentage of customer queries on the first phone call. Previously, these calls required a field service visit to the equipment site. For those situations that still require on-site service, Picker has implemented Questor℠, a notebook-computer-based expert system that helps field service engineers diagnose problems up to 50 per cent faster.

The renewal operation in Norwalk, California serves the X-ray business. By thoroughly evaluating parts, components and systems at the renewal centres, Picker International is able to improve reliability and uptime through on-going engineering upgrades on developmental and existing diagnostic imaging technologies.

Picker International Parts Operation

Another arm of the organization supporting field service effectiveness is the Picker International Parts Operation (PIPO), Chicago, started in 1981. Coupled with 13 depots nationwide, PIPO maintains an inventory of more than 40000 different parts. Field service engineers are assured of timely response to their requests for parts – which results in quick turnaround for customers.

Adapting to Change: Gone from the Scene

Picker International was, and still is, a company in dynamic motion. Management constantly monitors the 'winds-of-change', be it technological, medical, administrative, or other, and reacts accordingly. The parent company's name has changed with the times, reflecting changes in corporate strategy:

1915 James Picker Company,
1921 Picker X-Ray Corporation,
1967 Picker Corporation, and finally
1981 Picker International.

Some products, divisions and entities, having performed their intent, but no longer active are:

Picker Accessories: See Health Care Products.

Picker Chemicals: See Health Care Products.

C.I.T. Financial: In 1958, the privately-held Picker X-ray Company was sold to C.I.T. Financial. Prior, the Pickers feared an unfriendly takeover from other suitors, and because of possible severe estate and tax liabilities, sold to C.I.T. on friendly terms. C.I.T. recovered its investment in less than 8 years.

Custom Medical Engineering Department (CMED): Formed in 1968 to supply custom-built X-ray (and other) equipment to the medical community. Business conditions forced closure in 1978.

Picker Briggs Corporation: Acquired by Picker in 1968 to supply intercoms and other communication systems to hospitals. Picker, mandated by Federal Law to sell the company, sold Briggs in 1979.

Picker X-Ray Diffraction: Picker produced diffraction equipment for the scientific community as early as 1940. Subsequently, a separate division was formed that produced high quality products. A mild recession

occurred in the late 60s, government funding was drastically reduced, and so were orders for equipment. Picker closed the business in 1970.

Picker Industrial: Formed in 1959 to provide non-destructive test equipment (X-ray equipment and others) to industry. Business conditions forced closure in 1975.

Picker Instruments: See Picker Nuclear.

Picker Schwarzer Division: In 1981, after the merger of Picker Corporation with GEC Medical and Cambridge Instruments, the German Espelkamp operation amalgamated with Schwarzer, a manufacturer of diagnostic and patient monitoring equipment. Picker sold the company in 1992.

Picker Ultrasound: In 1968, Picker, the first USA company to market commercial equipment for this non-invasive diagnostic technique using 'sound waves', dominated the market through the early 70s. Business conditions and technology forced a strategy change and USA manufacturing ceased in 1988. Some off-shore manufactured equipment currently is being marketed and sold by Picker in Europe.

Picker Therapy: Formed in 1955 to provide the therapy medical community with the latest advancements in the nuclear-age radioactive isotopes. After a highly successful 20 years of launching new products, a business decision forced closure in 1979 because of rapid advances in linear accelerator technology which affected sales of radio-isotope equipment.

Picker Wembley: Originally part of the GEC Company prior to GEC's purchase of Picker in 1981, they provided X-ray equipment to the medical community. Business conditions forced closure in 1990.

Picker X-Ray Manufacturing Limited, Canada: Formed in 1963 to provide X-ray equipment for the Canadian market. Business conditions forced closure in 1989.

Radio Corporation of America (RCA): In 1980, RCA purchased C.I.T. as a strong financial base for their operation. Within a short time period, they spun-off the manufacturing arms of C.I.T. of which Picker Corporation was one. On April 1, 1981 the sale was completed and GEC plc became the new owner.

Picker Vertex: Acquired by Picker in 1966 to provide specialized high-speed cameras and related optical equipment for Picker products. In 1972, the company was absorbed into the Picker Manufacturing operation.

Picker/Philips: In 1987, Picker International and the Medical Division of Philips, Eindhoven Netherlands came within an eyelash of merging, but the event never materialized.

Temporary Business Halt in England: In 1989, Picker ceased business in England as a consequence of a joint venture between GEC plc and GE (USA). In 1994, after a legally mandated hiatus, Picker resumed normal operations in England.

Cambridge Instruments: Established as part of Picker International in 1981, they provided EKG heart monitoring equipment to the medical community and were spun off in 1982.

Conclusion

George Santayana, USA Philosopher, said something about the fact that you can't know where you're going unless you know where you've been. Picker International clearly knows and practises that philosophy. Some basic tenets the Company adheres to are as follows.

- know your competition.
- stay abreast of technology and adapt to change.
- research and development for **new products** pays huge dividends.
- hire qualified people and train accordingly.
- watch the market and plan or react accordingly.
- product quality, product quality *ad infinitum* is paramount.

Without exception, Picker management has practised the above guidelines for 75 years and plans to do so in the future so that the Company's 'history-to-be' will equal or exceed the Company's 'history-that-was'.

References

1 PLANTE, D.E., 'A top-down deployed, bottom-up implemented TQM model', *GEC Review*, **8**, 1, p. 28–39, 1992.

2 FISHLOCK, D., 'A history of electricity in medical treatment', *GEC Review*, **9**, 2, p. 113–124, 1994.

3 CORMACK, A.M and HOUNSFIELD, G.N., Nobel Prize in Medicine for developing revolutionary X-ray scan technique, computerized axial tomography (CAT scan), 1980.