
Edward Weston: The Man and the Meters

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Abstract

Isaac Newton said “If I have seen further it is by standing on the shoulders of giants”. Edward Weston was the giant upon whose shoulders the electrical engineers and inventors of the 19th and 20th century would stand. His many inventions in electrical measurement allowed him to build the accurate, reliable instruments that made their research possible. The familiar Weston meters are only a part of Edward Weston’s long legacy of invention.

Edward Weston ended his career with 334 US patents. He is mostly recognized for the surviving Weston Electrical Measurement products that bear his name. However, today he is rarely recognized for his earlier accomplishments. Electrical measurement was his fourth and final venture into the electrical field in the second half of his life.

Weston (Fig. 1) was born on May 9, 1850 in Oswestry, Shropshire, England to a middle class farming family. His father was known for his mechanical ability in the farming community and Edward followed in those footsteps with added interest in chemistry and electricity. He was encouraged to pursue these interests in his education. Upon completion of his studies in the sciences, as was common at the time, he apprenticed to become a medical doctor. He soon found that the rigidity he had to follow in the treatment of patients at the time stifled his desire to experiment in his areas of interest. He

soon left rural England for London with the hope of a position at the Royal Institution, where his hero Michael Faraday had once done his work.



Fig. 1. Edward Weston.

Weston, himself, would tell the story of his train trip to London. Along the way he met a very vocal American who was telling all of the passengers about “America, the land of opportunity”.¹ When London didn’t provide suitable opportunities, Weston made the decision to leave home for New York. He arrived in 1870 and like many immigrants he had little money, but was willing to work hard. He would soon make America his land of opportunity. In a short time Weston would become an inventor, engineer and industry leader in four businesses. He would get his start with electroplating.

Weston and Electroplating

Electroplating, the process of using electric current to coat common metals with a thin layer of gold, silver or nickel to produce a fine finish, had become commonplace by 1870. However the ability to do quality, durable work, was not as commonplace. As the little money he had was running out, Weston was able to get employment in the electroplating field. He was able to show his abilities by solving his employer’s problems and greatly improving his work. He also learned his first lesson in American business. The company that hired Weston was the American Nickel Plating Co. and he quickly improved their operation, making it one of the largest electroplating firms in New York. The owner of the company was primarily a stock and commodities trader. In 1872 speculators had caused a shortage in the nickel needed for plating and the owner was one of

the speculators. While the quality of work had made American Nickel Plating Company one of the best, Weston soon found that the company could not get the nickel they needed to fill their orders. He learned that although the owner had control of enough nickel, he would make more money trading nickel on the commodities market. All of Weston’s efforts could not stop his employer from closing the business Weston had made successful.²

Since he had no funds, Weston earned some money with a small photographic studio in his home. Barely getting by, Weston soon found a partner willing and able to finance a plating company. The company of Harris and Weston Electroplating was formed and opened for business in 1872. Edward Weston, at the age of 22, now had started his first business. Although the company was doing quality work, the timing for starting a new business was unfortunate as the Financial Panic of 1873 took hold of the country. The company weathered this period thanks to Weston’s hard work, enabling the company to do the best plating on the most varied objects. His work in this period led to his first patents, the first one for a new nickel anode and the next for an improvement in the plating solution. He also developed a process to plate with malleable nickel which improved the durability of the plating.

Soon another hard lesson in American business be learned by Weston. The original patents for electroplating were held by Dr. Isaac Adams. The company to whom he had assigned the patents

brought legal action against other plating companies. The US Patent Office had granted very broad claims in the original patent for electroplating. The original work of Weston and others had greatly improved the initial process of electroplating. This held little value in court as the legal fight was lost. Weston's partner, who only saw the business as an investment, left Weston to stand and fight alone. Weston would leave the electroplating field that he had mastered and closed the first business he had started.³

Weston and Dynamos

During his time as an expert in electroplating, Weston discovered and solved many problems he found in the plating process. He confronted every fault resulting from contaminated chemicals, poorly prepared materials and insufficient current from the batteries in use. At the time, the preferred source of current was a battery of Smee Cells. Invented by Alfred Smee in 1840, it was an improvement on the original Voltaic Cell. Weston saw the battery of Smee Cells as insufficient and unreliable for the plating business and he started using a dynamo of his own construction. The dynamo converts mechanical power into a steady direct current, often driven by a steam engine. Knowing that the available dynamos at that time were too inefficient to be cost effective, he set about designing his own. The Weston Dynamo Electric Machine Co. was started in Newark in 1877. When Weston started his second business venture, he was 27 years old.

It was the first company to exclusively produce dynamos.

Weston began a complete analysis of the problems with the dynamos of the time and soon was granted a patent for the "Rational Construction of a Dynamo". He also patented use of the laminated construction of pole pieces to reduce eddy currents. His design incorporated other innovations including methods of producing more efficient windings and methods of cooling the dynamo. Weston would control every aspect of this business including making the sales presentations to companies he knew would benefit from his dynamo. He entered his dynamo at electrical exhibitions winning prizes and gaining recognition in the electrical industry. His entry at the Paris Mechanical Exhibition in 1878 would be awarded the Bronze Medal.⁴ Soon Weston saw that increasing interest in arc lighting would not only create the potential of a large market for his dynamos, but also a new field in which to focus his inventive talents. After giving one of the first public demonstrations of the arc light and installing lights in his dynamo factory, it was clear that Weston would soon be starting his third business at the age of 30.

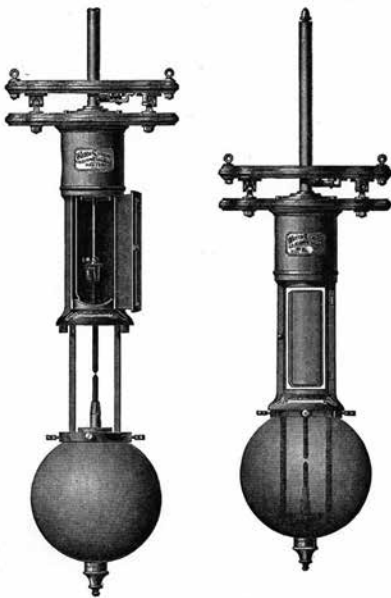
Weston and Arc/Incandescent Lighting

Since Weston had become a recognized leader in dynamo design and manufacturing, it was only natural that he would want to experiment with arc lighting. Although the principle of the arc light had been known for some time, the

early demonstrations were done with batteries. Scientist Humphrey Davy's experiment in 1820 required a battery of two thousand voltaic cells. It would take decades before improvements in dynamo efficiency would make the arc light a practical device. Weston built his first arc light in 1872, and made one of the first public arc light demonstrations. He also used an arc light in his shop. (Fig. 2) He confronted the problems with arc lighting and received a number of patents over the next few years. The Weston Electric Lighting Company was formed in 1880 and Weston's arc lamp soon became a leader in the field. There were no standards for lighting systems in the beginning and buyers did not discriminate between systems. Weston's arc lights were mechanically

well made and included regulators and cut outs that would allow other lights wired in series to continue running when one failed. Another important factor in an arc lighting system was the use of carbon rods to produce the arc. At the time, the rods were imported from Europe and considered too expensive. Weston used his past experience in chemistry to produce an improved carbon rod. The improvements included copper plating the ends of the rods for better electrical contact and mixing other components with the carbon to improve the color of the arc. The final product was a carbon rod with a soft metal core which he produced economically in a high pressure press. For 79 cents per 12 inch rod, a pair would burn for 8 hours, half the cost of the imported rods. Weston carbon rods were the best value and were used not only in Weston arc lights but also in arc lights produced by his competitors.⁵

The combination of the most efficient dynamos, a superior arc light and the best carbon rods, made the Weston System a leader. Soon performance and efficiency became important factors to buyers and poorly designed systems fell out of favor. Weston constructed a central station in Newark that served 300 arc lights for his customers (Fig. 3). This complete system made people take notice. The Weston System was chosen for the premier lighting project of the day. In 1883 the new Brooklyn Bridge would be lit by a Weston system. (Fig. 4) The Weston Electric Lighting Company soon became a takeover target. The United States Electric Lighting



The Weston arc lamp, opened and closed.

Fig. 2. Weston Arc Lights.

Company was formed to bring investment capital to the lighting business. This company hired inventors including the famous Hiram Maxim. It also purchased patents and companies. In 1884 the United States Electric Lighting Company was able to acquire a majority of shares in the Weston Electric Lighting Company and Weston was hired as chief electrician and director of manufacturing.



Fig. 3. Weston Central Station.



Fig. 4. Weston Lights Brooklyn Bridge.

By this time, inventors realized that arc lighting would never be suitable for residential use. In his new position, Weston had the opportunity to join the ranks of many inventors researching incandescent lights. The elements that were needed to produce the lamp were becoming well known and Weston was well suited to address them. The earliest builders of incandescent lamps searched for the best fibers nature could offer for their lamp filaments. The perfect filament they sought would produce the best light for the longest time and at the lowest cost. Edison sent assistants around the world to send back samples of bamboo and anything else they thought worth testing. All natural fibers had the same problem. None were homogeneous enough to be the perfect filament. Weston took a different approach. Just as he had done with cellulose, he fabricated sheets of his own material. These sheets were then cut down to produce filaments. Weston named this material Tamadine and patented it in September 1882. From 1883 to 1893, Tamadine became the material of choice for many of the lamps that competed against Edison's bamboo filament.

Even the best filaments still had weak spots. Weston again used an earlier experience to solve the problem. He invented a system of flashing to repair weak spots in Tamadine filaments. He found that when he heated the filament in a hydrocarbon atmosphere the weak spots would overheat. This heat would attract the carbon from the gas and the carbon would collect to repair and

strengthen the weak spots. This was a second major invention that would be used by the entire lighting industry. (Fig. 5) Although Weston was granted a patent by a patent office tribunal, it would be denied by an appeals court. William E. Sawyer of the Sawyer-Mann company independently developed the same process. Weston was unable to produce sufficient proof of his date of invention but the legal process delayed a final decision until the patent had little value because Edison's patents were enforced.

In addition to other innovations in evacuating lamps, Weston also developed a chemical getter using Thorium Oxide. This process consisted of placing the Thorium Oxide inside the glass globe of the lamp. It would be kept heated as the lamp was evacuated. After

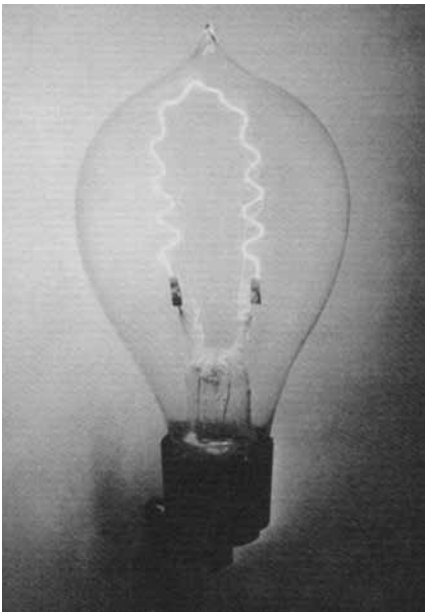


Fig. 5. Weston Tamidine Lamp.

the globe was sealed the getter would cool and then react with any remaining oxygen. The oxygen, now combined with the getter was thus removed from the atmosphere of the lamp. Although there were several other getter processes in use, Weston received two patents for his process. Many years later, this method also became common practice in the manufacture of radio vacuum tubes and can often be seen as the shiny black coating inside the glass.

Many histories of the incandescent light have been written. Many authors promote their favorite inventors. However, there is reason to believe that Weston's inventions and innovations enabled the United States Electric Lighting Company to produce the best lamps in the business. The company would claim that its lamps burned more efficiently and for over 2000 hours, twice as long as competitor's lamps would last.⁶ In the late 1880s, there were many patent battles over the lighting business. Weston spent a great deal of his time testifying in court. He soon became recognized for his clear understanding of the issues and presentation of the technology. After Edison had his incandescent systems up and running, the Edison Company took steps to enforce its patents. This soon made it impossible for other companies to compete. Weston had done battle with Edison both in court and in public. Weston had the reputation as a fighter and in a letter to the *Scientific American* of November 1, 1879, he would call Edison's claims regarding Edison's dynamo, "*manifestly absurd*".⁷ But the

Edison patent victory weakened the position of the United States Electric Lighting Company, and it soon was taken over by Westinghouse. The Westinghouse Company needed to build up a stronger position to do battle with Edison and General Electric. When Westinghouse took over the lighting business, Weston left the company. During his time in business, Weston had become an experienced witness in patent hearings. He had built a reputation with law firms for making clear presentations. He was asked to act as an expert witness for law firms. Weston continued to freelance as an expert witness in the many patent hearings of the day. He created a small laboratory of his own to produce courtroom models and to prepare demonstrations. (Fig. 6)

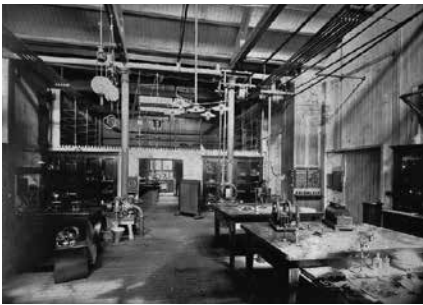


Fig. 6. Weston Lab.

Electrical Measurement Prior to Weston

To appreciate the value of Weston's work, we need to understand the methods used to make electrical measurements before his inventions. Francis Jehl, an assistant to Thomas Edison from the earliest days in Menlo Park, was given the task of determining the

voltages and currents required by the first incandescent lamps. The first crude measurements were accomplished by measuring the horsepower needed from the steam engines turning the electrical dynamos, and ultimately, from the amount of fuel used. Jehl concluded that getting more precise measurement of individual lamps would prove much more difficult.

The instruments available at that time included a Thompson high resistance galvanometer to measure electrical current and a quadrant electrometer to measure electrical potential. Using fixed resistances, Clark cells and Wheatstone bridges, taking measurements was tedious and painstaking. Edison also used an electrodynamicometer, which sent current through large fixed coils which would then deflect a smaller movable coil. This required hours of setup time and additional hours to take measurements and perform calculations. Several measurements would be taken and since no two readings were the same, an average of all of the measurements would have to be calculated. Edison said of the electrodynamicometer "It's a mighty fine scientific looking instrument, but it doesn't work".⁸ The Deposition Cell was another simple but time consuming device to measure current. Current was sent through a Deposition Cell for several hours and the average current was calculated by measuring the change in weight of the metal plate element in the cell. The final result reported to Edison was a judgment call based on a comparison of all results and confidence in

Edward Weston: The Man and the Meters

the instruments. Many of the instruments were so sensitive to vibration that for stability a calibration table was built on brick piers set 10 feet deep.

To measure the energy consumed by a lamp, the method used was a water calorimeter. The lamp was placed in a container with a fixed amount of water and a thermometer. The energy used was determined by the time needed to raise the water temperature a fixed amount. Francis Jehl called this an “instrument of congeniality” since workers stayed for hours just to maintain a constant voltage and current from the dynamo. This gave them plenty of time to swap stories among friends as the water temperature slowly rose.⁹

Weston and Electrical Measurement

The difficulties in taking measurements also affected Weston. Weston had a

display at the Franklin Institute Electrical Exhibition in Philadelphia in 1884. (Fig. 7) In order to set up the display, he had to measure the performance of the dynamos and lighting products. Using the instruments available, it took Weston one week to take and confirm the measurements. Weston’s own experiences identified the need for easy and accurate electrical measurement.¹⁰ He already had set up his own laboratory during the period of his consulting activities as an expert witness. He began to use his lab to investigate the requirements needed to improve electrical measurement. With a small group of investors, Weston, at the age of 38, (Fig.8) formed his fourth and final company. The Weston Electrical Instrument Company was started on March 31, 1888 in Weston’s home laboratory. His associates soon convinced

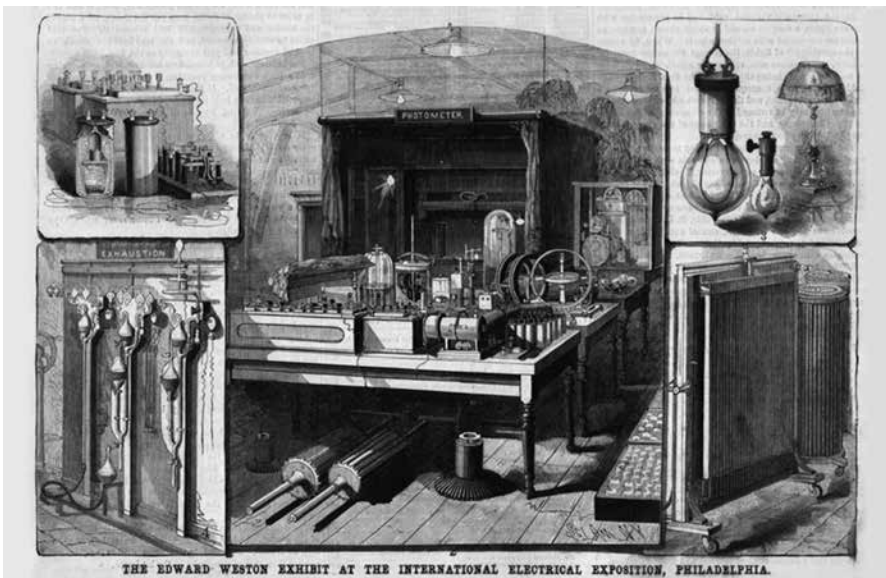


Fig. 7. Weston Exhibit.



Fig. 8. Edward Weston.

him to end his consulting service to give this work his full effort. Weston identified six areas of improvement needed to reach his goal.¹¹

1. The moving coil

The tangent galvanometer was the accepted method of measuring current. It consisted of passing the current to be measured through a coil thus producing a magnetic field. A compass would be placed in the center of the coil and the magnetic field would deflect the compass needle to a degree proportional to the amount of current in the coil.

An improved galvanometer design would use a permanent magnet to produce a strong and steady magnetic field. A coil to carry the current to be measured would be hung from a thread placed in the magnetic field. This coil would turn, proportional to the current, against the force of the twisting thread. Although Weston and others were working on this approach, it

was first patented by Jacques-Arsène d'Arsonval.

He produced the d'Arsonval galvanometer and this type of moving coil is still referred to as a d'Arsonval movement. The moving coil design still required Weston's five additional innovations to produce the meter he considered acceptable.

2. Permanent magnets

For a meter to be stable, the magnet must be permanent. Weston found nothing available that met his requirement. He made many improvements to the magnet including developing his own alloy, heat treatments and reducing the gap as much as possible. He also allowed some aging time and then tested and matched the results to finally produce a truly permanent magnet.

3. The wire carrying current to the coil

Weston recognized that the wire carrying the current to the coil was changing its resistance as the current heated the wire. His answer was to produce two new alloys that many thought were impossible to create. Manganin was very stable with temperature change and Constantan actually had less resistance with increased current. This assured a linear supply of current to the coil throughout the range of the meter.

4. The coiled spring carrying the moving coil

The coil spring is important in that it offers the resistance to the permanent magnet to keep the moving coil carrying no current steady at zero deflection.

It also resists the deflection caused by the magnetic field generated in proportion to the current to be measured. Weston found that the steel springs available to be insufficient. He created a low resistance copper alloy that had fine elastic qualities and was non-magnetic. He also used a jeweled sapphire movement to support the top and bottom of the coil.

5. Improving the coil

Weston improved the performance of moving coils by producing a light aluminum frame for the coil. This not only maintained the shape of the coil but also had the added benefit of inducing eddy currents in the frame itself that caused a drag through the field of the permanent magnet. This reduced the oscillation before it came to a stop, thereby allowing the indicator to give a stable result quickly.

6. Electrical shunts to measure high currents

Fine coils in a meter cannot measure large amounts of current. Weston's answer was to divert a fixed percentage of current around the delicate moving coil through a shunt. The coil actually measures only the minute amount of current that was not shunted. By knowing the percentage of current going through the shunt, the meter scale could be calibrated to represent the full current through coil and shunt. After much experimentation, Weston used Manganin, the alloy he created that maintains a constant resistance independent of the amount of current

and the temperature. The shunt circuit was patented in 1893 and was used in Weston products. (Fig. 9)



Fig. 9. Moving coil.

The Meters

Weston always wanted to improve his products. By 1888 he had made progress on all of the requirements for his meters except the shunt. Convinced that the meter he could produce would be the best meter on the market, he began production of the Weston Standard Portable Meter. His solution to making his meter as accurate as possible is seen on the early version of the Standard Portable Meter. (Fig. 10) A built-in thermometer indicated where to set the temperature compensation dial. This temperature adjustment satisfied Weston that his meter was as accurate as possible. He was persistent, continually working on improving the instrument. When Weston was able to introduce his temperature stable alloys



Fig. 10. Early Standard Meter last calibrated in 1895.

he was able to eliminate the need for the temperature compensation control. The thermometer and dial were later removed on the same model meter. (Fig.11)

Weston would incorporate all of these improvements into the Model 1. He considered this to be the first accurate, reliable, compact and truly portable meter. (Fig. 12) These features were of great importance to the labs and schools of the day. All electrical meters

were costly at the time. The ability to have one meter that could be passed around to different technicians or students, who could then obtain quick and accurate readings without checking for temperature changes or needing calibration was a great benefit.

Although many examples of Weston meters survive, the model, serial numbers, patent numbers and calibration tags are often confusing and difficult to understand. The date of production can



Fig. 11. Weston Standard Meters.



Fig. 12. Early Model 1.

rarely be determined from the patent dates or calibration dates. This is largely due to the methods used in sales and production. The Weston Company saw no need to produce new catalogs or to have new model numbers each year. The Model 1, for example, was in production for decades. When a customer ordered a Model 1, he would choose from the different configurations that were offered. This model could be specified for AC, DC, both AC/DC or resistance, all in wide ranges. This philosophy was used for all of the products. The number of products was continually growing to meet the demands of industry. In 1900 there were 28 products, by 1904 there were 280 and after 1919 over 400 products.¹² In addition to the number of products to choose from, the customer was able to choose from hundreds of

variations.¹³ Later the company would release circulars covering specific product lines such as Radio Circular J of 1928.

When instruments were sent to the factory for calibration they would be upgraded to the latest version of that instrument. At that time the calibration sheet of paper would be exchanged showing the newest data and calibration date. Although this is all confusing when viewed today it was not confusing at the Weston Company. The company maintained an archive of records for every product built and every time it was serviced or upgraded. (Fig. 14)

Power Station Meters

Weston meters were commonly used in schools and laboratories. It was obvious to Weston, however, that the biggest



Fig. 14. Records Archive.

demand would be for power station meters. (Fig. 15) The electrification of the United States was beginning and this produced increasing demand for meters. A casual examination of surviving meters shows serial numbers on laboratory meters in the thousands while power station meter serial numbers reach well into the tens of thousands. Before Weston, the equipment available to central stations at the time was inefficient and inaccurate. To measure large currents, the full current would pass to the device through a copper bar. The associated losses caused the meter to consume considerable power. Since Weston was passing most of the current through the shunt and only a minute fraction was sent through the

meter, he could actually show that his meter would reduce the annual cost of operating the power station meters from hundreds of dollars to a few cents. This made the decision for a station manager to buy new Weston meters an easy one.¹⁴

Other Accomplishments

Another major accomplishment was the development of the Weston Standard Cell. In 1911, the International Conference on Electrical Units and Standards declared it the official standard for measuring the volt. Standard cells had been used in the past as a voltage source and a tool to check the accuracy of meters. Weston's innovative use of cadmium produced a much more reliable output of 1.0183 volts. To aid the electrical industry Weston turned over patent rights to this cell to all parties.¹⁵ Weston was the first to offer the radio industry a meter to directly measure radio frequency current as well as the first radio test set.

Company publications show the production, over the years, of hundreds of models of instruments with thousands of variations, many built for the government and the military. However, in 1935, after Weston's retirement, a patent issued to his son, Edward Farady Weston, would lead to another product that set a standard, pioneering a new field of measurement. The Weston Company, in its second 50 years, would become famous for exposure meters, setting new standards for photographers. The company worked with the photographic industry to set standards



Fig. 15. Power station meters.

Edward Weston: The Man and the Meters

for exposure time, aperture settings and film speeds to enable exposure meters to measure the light and calculate the correct settings. There were 36 variations of exposure meters produced.¹⁶

Weston Electrical Instruments did not forget its roots in electric meters. The company would continue to develop meters into the digital era, incorporating displays using Nixie tubes, LEDs, and LCD read-outs. (Fig. 16)



Fig. 16. Weston Digital Meters.

The Weston Legacy

Edward Weston's personal legacy is an American success story. From his arrival in New York and struggle to find work, to becoming a renowned inventor and creating four businesses, his story is one of living the American dream. Weston would retire from his company at the age of 80, turning over his position to his son, in 1930. (Fig. 17) At this time he was 8th on the list of individuals with the most US patents. He is listed in the New Jersey Inventors Hall of Fame and received many awards in his lifetime. His accomplishments



Fig. 17. Edward Weston, later years.

in chemistry and electricity fill a long list. (Fig. 18) His processes for producing Tamadine are considered the basis for the production of Rayon and Cellophane. He was awarded the Perkin Medal in 1915. The Franklin Institute awarded him the Franklin Medal in 1924 and he was awarded the Lamme Medal in 1932. During his later years, Weston helped found the Newark Technical School. This school would later become Newark College of Engineering and is now the New Jersey Institute of Technology. Weston was also a founding member and past president of the AIEE, which later became the IEEE. After enjoying a retirement that included time spent yachting, Edward Weston passed away in 1936. The results of his work would live on much longer.

The Weston Electrical Instrument Corporation followed a creed set by its founder. He did not want a company obsessed with size or sensationalism. The company's purpose was not to produce the most meters at the highest profit but rather to develop new instruments so fine that they would widen and improve the use of electricity. After

Edward Weston was the man who:

1. Applied the dynamo to electroplating (1872).
2. Patented an anode for making malleable plated nickel (1875).
3. Patented the rational construction of dynamos (1876).
4. Patented laminated pole pieces and cores for dynamos, raising their efficiency from about 45 per cent to 85 per cent (1875).
5. Gave a public exhibition of arc lighting in the United States (1877).
6. Used the arclight for general lighting purposes (1877).
7. Opened a commercial arc light factory in the United States (1880).
8. Used a soft metal core for arc light carbons (1878).
9. Copperplated the ends of arc light carbons (1878).
10. Used an electric arc furnace industrially in the United States (1875).
11. Used the dynamo as an electric motor for industrial purposes (1878).
12. Made a successful homogeneous carbon lamp filament (1885).
13. Cured weak spots in carbon lamp filaments with hydrocarbon flashing process (1885).
14. Made nitrocellulose into pure fiberless cellulose (1885).
15. Made a truly permanent magnet (1887).
16. Compounded a German Silver alloy containing 30 per cent nickel (1887).
17. Made a metal having a negative temperature coefficient (1887).
18. Made a metal having an extremely low temperature coefficient (1887).
19. Made an aluminum alloy which could be drawn to very thin tubes (1887).
20. Used a metal frame for damping the motion of moving coils (1887).
21. Made a commercial, direct-reading electrical measuring instrument (1888).
22. Used the shunt circuit (1893).
23. Made a stable cell for use as a secondary standard of the volt (1893).
24. Developed the magnetic drag-type speedometer (1885).
25. Made an ammeter for use with automobile starting batteries (1911).

Fig. 18. Edward Weston was the man who.

the retirement of the founder, the company was headed by his son, Edward Faraday Weston (1878–1971). He would continue running the company following in his father's footsteps. The company creed would be restated in a 50th anniversary company publication, *"This policy of serving, of helping scientists prove new phenomena, engineers perfect new designs, and manufacturers produce new devices, has guided the Weston company from the beginning"*.¹⁷ This policy brought success and a continuous stream of invention for over a century. These inventions include improvements to existing products as well as research into new products to meet new demands unimagined in the early days of the company. From the small lab built behind Weston's home, the company would grow into

the industrial complex shown in this 1906 company photograph. (Fig. 19)

As the result of mergers and acquisitions, the company would become associated with other names such as Sangamo, Schlumberger and Solartron, the name of Weston Aerospace came into use. In 2003 Weston Aerospace became a part of Esterline Advanced

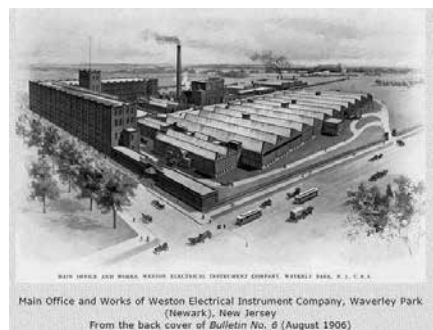


Fig. 19. Weston plant in 1906.

Edward Weston: The Man and the Meters

Sensors and today is part of Esterline Technologies Corporation based in Bellevue, Washington.

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Figures 10, 11, 12, 13, 15, 16. The author's collection www.electronicfossil.com

About the Author

Mike Molnar started Diagnostic Services Inc. in 1983. Mike is still busy running the company, designing and building nuclear medicine equipment for equine and small animal veterinary use. A long time AWA member and collector, his interest in old radio, TV and electronics continues. His large collection is still growing and available for many to see at electronicfossil.com. With the help of his patient wife Pam, Mike serves as caretaker of the fossils.



Snow and ice can't stop author Mike Molnar and loyal helper Lila from uncovering more electronic fossils.