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Sigma

**Getting
to**

One man's journey to a small town in northern California

Getting to Grass Valley

Dr. Donald Hare was the founder of the Grass Valley Company. He started his life on the West Coast. From there, he traveled a long and arduous path to the East Coast and returned to California to launch the company. This is his pre-Grass Valley story.

From the Trenches

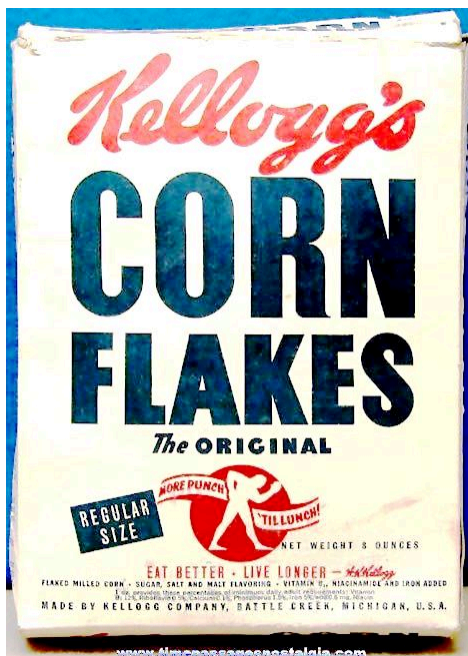
Advertisement in 1898 Fresno City Directory



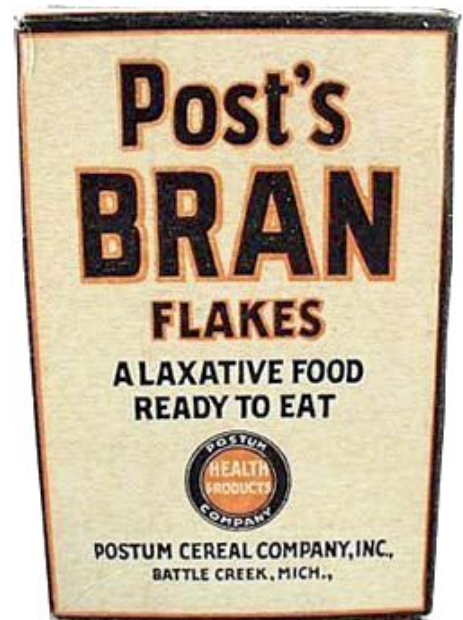
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Hare's Childhood

The Parents



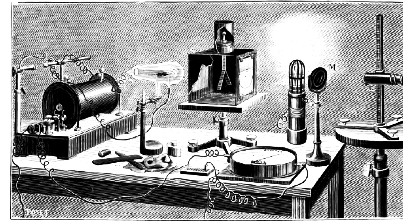
Hare's father went to work for Dr. John Kellogg after medical school. While George's mother assisted Charles Post.



Not too far from Fresno was the largest body of water in the west. It was still large enough that the navy used it as a **From the Trenches**

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Hare was a west coast pioneer in the use of x-rays



Donald George

Corkhill Hare

Hare family compound; the house that Hare grew up in Behind the house you can see the building that Hare's parents practiced medicine



Donald Hare was the youngest child. Donald, did not have a typical childhood as he had no friends his own age. The two brothers and two sisters he had were much older and had their own lives. Donald was not generally included in their activities.

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himself or around adults. After school he had to fend for himself. He often wandered in and out of the small medical complex his parents had and saw people with problems and in pain waiting to see his father or mother. Donald had no stomach in becoming a medical doctor, although the medical books in his father's office fascinated him. One day he discovered Gray's Anatomy. At every opportunity he retired into his room, where he would spend hours reading and study the illustrations. From that book he learned Latin, and about sex.

Because both parents were usually involved with patients, and his older siblings had their own lives, and interests that did not intersect with his, Donald never experienced solid family relationships. Occasionally an older brother would play cards or chess with him, but there were few activities that involved the whole family.

Donald and his father were not close. His father liked to be the center of attention and the organizations he belonged to facilitated that, and he devoted much of his time to them at the neglect of his practice and his family. Having a strong interest in scientific training of medical students, The American Academy of Medicine elected George president for 1916-1917. Twice he was elected as Vice President of California State Medical Society, and as a member of the House of Delegates of the American Medical Association from 1912-1915. He was also a prominent member of several social and philanthropic organizations in Fresno. He was a dapper dresser and fast and loose with his money, some of which had been borrowed from relatives.

Donald was originally enrolled in a school run by the church his father was devoted to. Donald was often suspended and sent home by the school to be disciplined by his father. After a scolding from his parents and an additional contribution to the church by his father, Donald would be reinstated. Neither his parents or his teachers realized the problem was b

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challenge presented by his schoolwork, and that Donald was doing

and put it back together. He built a shortwave radio and was interested in guns and explosives. He once put a bullet on a stone and struck it with a hammer. Fortunately, the lead bullet and the brass casing went different ways and did not hit him. The downside? The bullet did put a dent in the side of his mother's Buick.

Donald's interest in electricity was sparked by watching his father wind transformers and experiment with electricity in constructing his x-ray machines. Donald took to his own experimenting with electricity and blew so many fuses in his father's shop that he ran down to the hardware store and bought his own secret supply of replacements.

Donald wanted to go to public school and his antics were primarily aimed at being taken out of the parochial school and be allowed to attend the public school. His parents were not interested in his desires until he came home one day and told his parents about two teachers in a compromising situation in the backseat of a car. They decided to enroll him in public schools.

In the 20s California was hit by a sudden fall in the price of produce and experienced a severe drought. Donald's parents had expected to retire from the medical practice to live comfortably on their investments in the orange groves and vineyards. They were not novices when it came to growing grapes, even oranges. But they had bought into the business at high prices and with little equity. At the time it was said that the Bank of America was the largest landowner in the state from so many foreclosures and as a result it was in financial difficulty. This economic situation meant that both his parents had to continue practicing medicine to pay their bills.

The father had neglected his practice and the mother never had a lucrative medical practice as women doctors at the time were not widely accepted even by women. In desperation his mother, took a job as a company doctor at a logging camp. This was the best she could do to earn money for the family. The lumber

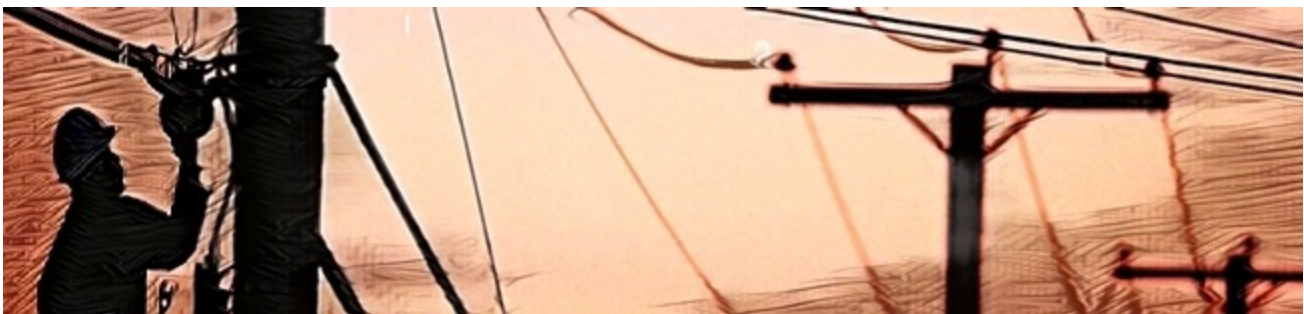
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short supply right after World War I. Donald spent some time with his mom up in the camp.

Donald graduated from Fresno High School in 1924 and he knew that he could not expect his parents to pay for his college. He had grown tall, over 6 feet with a slender, athletic build. Tennis was his favorite sport in school. But now he found himself having to take a job with the Pacific Telephone and Telegraph company as a helper lineman.

Card Shark

On payday several his workers would get together and play poker. They thought the new kid would be an easy mark, but they soon found out that was not the case. One of his older brothers played cards with him and taught him both poker and bridge. Donald, who had total recall was able to count cards, which he used to his advantage. This was a skill he would use in the future. Soon he learned how to play pool and snooker. It was said he could hold his own in a friendly game.



After two years he quit the telephone company and enrolled in Fresno State College. He worked in a sandwich shop and took a summer job in the kitchen of a hospital. The breakfast shift started at four in the morning and his first assignment that first day was to shell several cases of eggs and place them in trays for baking in the oven. That first day he did some quick math and realized the breakfast for the patients would not be ready until 11

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two eggs at a time in each hand. Years later when questioned about this he would proceed to demonstrate that he could still do it.

He enrolled in a machine shop class to learn about machining. Having learned Morse code when he was 12, he spent one summer with a job on a tramp steamer as the radio operator for a trip out to Hawaii and back. After two years at Fresno State he went back to the telephone company for a year and that convinced him he had to have a college education. He quit the telephone job for a second time right as the great depression was taking hold in 1930. It was the second one in the past 10 years for the state of California.

Stanford



At 23 Donald decided to go enroll at Stanford and did so not know from one school quarter to the next if he would earn enough to stay in school. He arrived at Stanford with \$50 in his pocket and took a job,

again making sandwiches. He bought a Model A with some poker winnings and decided another way to make money would be to continue to play poker. He decided which fraternity to join by the ones that had the most expensive cars.

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wealth parked in front. The fact that his father, mother, and older brother were medical doctors seemed like insurance of his acceptance by the fraternity. Thankfully, none in the fraternity knew of his precarious financial condition. To them he was just another rich kid from a family of doctors.

He found he could make money playing poker with his fraternal brothers. He also had a Saturday night job playing the ukulele in a band. But he was still not making enough to cover tuition.

The poker games continued, and Donald thought that he was not winning too much and that he would stay under the radar, so to speak, with his fellow players. But eventually it got to the dean from parents of his fellow players that he was winning a good part of their kid's monthly allowances. The Dean told him to stop, or he would be expelled from school. No more poker playing put a big dent in his finances.

He went looking for a job as a waiter at a local resort, but saw upper-class ladies playing bridge, and decided to go to the activities director and make a pitch to teach women how to improve their bridge game. He had a tryout with the ladies, they liked him, and he had a job that he could work around his classes. He made more money than playing poker. That summer he went back home to Fresno with \$500 and a used Buick.

Graduate School

He finished his degree in science in 1931 but since the country was in the mist of the great depression, he could not find any work as a freshly minted science major graduate. To make things worse a lot of workers and dust bowl farmers had migrated to California looking for nonexistent jobs. What compelled him to stay in school as he discovered he could make more money by staying in school and thus decided he was going to graduate school.

During graduate school he found himself on an elevator with a

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later lead the atomic bomb project. Hare listened to the two's conversation and later said that "they were so far above my head I felt like a blithering idiot."

Hare received his doctoral degree in physics during the heart of the depression. From then on for the rest of his life he was known by most as Dr. Hare. While he wanted to stay on at Stanford and teach, his recalcitrant attitude at times had not endeared him to some of the higher tenured faculty, and there was no offer to stay on.

Also, during college, he was briefly married for the first time after a woman he was dating became pregnant. They split up not long after a son was born. Hare only saw this son once, in the late 60s, for a very brief and awkward meeting when the son came to see him.

Getting to DGC Hare Company

The Thirties



From college until World War II Hare worked for Texaco The Geophysical Laboratory of the Texas Company, 1939

After leaving the university he got a secretary, who had a crush on him, to type

300 resumes for him. Xerography was still a dream of Chester Carlson's. Of those he was only offered three interviews. His first job out of school was a lab in California doing geophysical work. The next year he went to work for what is now known as Texaco as head of a small Geophysical Labora

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While in graduate school he had the opportunity to hone his machining skills under the tutelage of a couple machinists. He now was able to apply that knowledge with the help of a couple machinists that worked for him. This was paramount, because to keep what they were working on confidential they needed to work on their designs in house. They were developing tools and instruments that harnessed the power of x-ray polarization and scattering, photon counting, and the detection of gamma rays. All areas that Dr. Hare had studied and researched at Stanford and had been exposed to in his childhood by his father. This technology was applied in Texaco's search for oil and gas.

What he did not realize at the time was that this development would later find its way into medical instruments, cancer radiation therapy, and the defense effort of the Second World War. His four years spent at Texaco resulted in 29 patents, 11 of which helped improve the Geiger counter, which detects gamma rays. Drillers for oil study the detected gamma ray patterns for rock anomalies that might indicate the presence of oil or gas.

Hare also found a way to use x-rays to detect the amounts of liquid in a tank where it would be dangerous to have an electrical device in the tank due to the liquid's volatility. He used similar techniques in determining a liquids specific gravity. All-important parameters when extracting oil. By spring 1940 his staff had increased to 33.



In 1938 he married his second wife, Betty Bloom, a graduate of Scripps College.

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first child, a son, Stephen George Corkhill Hare.

Geophysical Laboratory of the Texas Company, 1941

WWII

Hare played a large role in developing sub detection equipment during the war.

*The system he worked on
was installed in B-18s.
While the B-18 was no
longer a viable bomber it*



was good as a platform for Hare's system

During World War II he was loaned to the National Defense Research Committee, which was under the direction of Columbia University. Specifically, he was assigned to the U.S. Navy Underwater Sound Laboratory in New London, Connecticut. After a few months he was made director of the newly formed Airborne Instrument Laboratory which was tasked with a way to detect submerged submarines from the air. Early in the war, Germans subs were wreaking havoc along the east coast of the U.S. In the first eight months of 1942 the Germans sunk 22 percent of the oil tanker fleet, and 233 other ships in the Atlantic and killed 5,000 seamen and passengers.

German U-boat

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The solution Hare's team came up with involved detecting magnetic anomalies created by the hull of the sub, while filtering out any distortion caused by the aircraft carrying the detector. By the beginning of 1942 when the Germans were starting to terrorize the east coast, a detector

mounted on a blimp detected its first sub. While a summoned destroyer was unsuccessful in sinking it, it was proof that they were on the right track. A couple weeks later it was believed that the detector did lead to the first successful "kill" of a sub. On May 30, the first B-18 bomber, as mentioned, obsolete in their role as a medium bomber were equipped with the Magnetic Anomaly Detection (MAD) gear as it was called. Eventually 122 of these planes were equipped. After the war, the technology was employed to find mineral deposits from the air. While it did not find the presence of oil directly, it identified areas likely to contain oil. Other gamma ray detection refinements led to methods to find non-metallic land mines, and ways to measure the thickness of propeller blades and artillery shells to find weak points that could cause failures.

In 1942 the Hares had a daughter, Susan.

Audio and data recording

After the war he went to work for Deering-Milliken in South Carolina, a textile manufacturer that wanted its own research facility. Dr. Hare was hired to head that up. Soon he convinced the company that to tap the scientific talent to achieve worthwhile results would require the research to be conducted in the northeast. The research facility for Deering-Milliken moved to Greenwich, Connecticut.

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German Recorder

One day a friend just home from the occupation forces in Europe stopped by and handed him a small audio tape recorder, which he got in Germany. Up until then sound recording was done via wire, not tape. Ampex, financed mainly by Bing Crosby, also

discovered the German model, and they were using German made tape. Hare learned that 3M had developed a new audio tape which he used. In his spare time Hare redesigned the machines transport but kept the record heads from the German machine. With 3M tape Hare's result was better than the Ampex knock-off of the same machine. He reported he got twice as good frequency response at 15 inches per second (ips) as Ampex got at 30ips. 15ips soon became the industry standard.

Hare showed the prototype to Sherman Fairchild, who immediately wanted 10 of them. Fairchild had started Fairchild Recording Company in 1931. He was a prolific entrepreneur, having started Fairchild Aerial Camera in 1921. From there he developed some flight instruments and changed the name to Fairchild Camera and Instrument Co. in 1927.



In 1924 he developed a high-wing m **From the Trenches**
forerunner to the Fairchild 24. Fairchild was the first to add flaps

and wing slats.

Fairchild F-24



His company made the primary trainer for WW2, the PT-19.

Fairchild PT-19



He started two airlines that were later merged into Pan Am. In 1957 he was the founder of Fairchild Semiconductor Corp., financing a splinter group from Shockley Labs, known as the traitorous eight. This is the group we will look at in an article entitled the "Fairchild Effect." That group included Noyce and Moore of Intel fame. Over his lifetime Fairchild started, mostly through spin-offs from his original startup, over 70 companies.

At the time Hare had no way of knowing how to start a company that would have a similar, but smaller effect on an

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area, Grass Valley, as Fairchild Semiconductor had on Silicon Valley.

Hare decided he could not continue moonlighting in electronics while on the payroll of Deering-Milliken Research. In addition, Milliken was having second thoughts about having his research so far away from their mills in South Carolina. He quit the Deering-Milliken job to start his own firm, the D. G. C. Hare company.

Hare & Company

After the war Hare was working for Milliken Company, a textile manufacturer, but in 1949 decided to start his own company, The DGC Hare Company, "short" for Donald George Corkhill Hare



In 1949 he moved to New Canaan, Connecticut and started his company. Ruth Kuntz, his bookkeeper, and girl Friday during his years at Deering-Milliken, agreed to follow him. Since he could not afford to pay her a salary, she lived with him and his family until the company could afford to pay her. She found a location for the new company in back of a local machine shop. A concrete block addition was added for some office space. Besides being a secretary, and bookkeeper, she was also the Hare's babysitter.

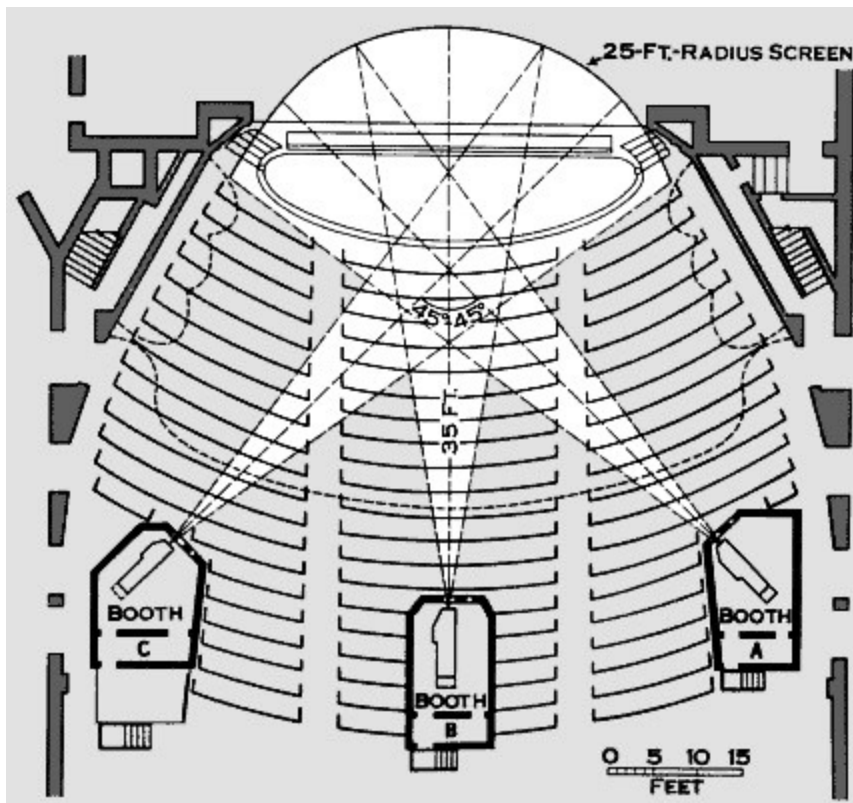
Soon Hare and company were in business. CBS ordered six of his new audio recorders. He borrowed \$10K from Fairchild to fill the order, procuring parts and hiring a staff of 5: three electrical engineers, a mechanical engineer, and

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placed an order to use one of his recorders as part of the first meteor tracking system.

While the business was off and running, his personal life was not so fortunate. His marriage hit the rocks over his long hours and a major difference in opinion in the handling of the discipline of the two children. He moved out in 1952 but had no thoughts of divorce at that time.

Cinerama & First Sale



Hare's company found a new opportunity to expand its fledgling audio product offerings. A company named Cinerama had developed a concept to project three separate films across multiple screens, or one very wide one. Each film contained a third of the horizon span of the composite wide screen content. It was the first super wide screen system designed to bring the viewers peripheral vision into play. Hare's company got

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Speakers were not only installed behind the screens, but on the sides and in the rear, seven channels in all. Maybe the first instance of surround sound. Then Hazard Reeves, the President of Cinerama, with director Merian Cooper, of the original King Kong movie fame, and starring Lowell Thomas, produced five movies specifically for the new system that grossed over \$100 million.

To secure his source of equipment Reeves offered to acquire D.G.C. Hare Company for 125,000 shares of Cinerama stock for all 500 shares of Hare Company stock. This was the first time Hare sold his company.

Hazard Reeves's Cinerama Company was headquartered in New York City, with production and technical operations based primarily in Hollywood, California. But Hazard Reeves's Reeves Soundcraft Corporation, which provided sound technology for Cinerama, was located in Midtown Manhattan, New York.

Eventually he setup Reeves Teletape Studios which went on to acquire a group of television studios located in Manhattan in New York City, mainly from CBS. One was the Ed Sullivan Theater (CBS Studio 50, 53rd Street and Broadway). A CBS soundstage that had been home to The Ed Sullivan Show, Teletape used the building during the 1980s for productions such as episodes of Kate & Allie. CBS regained control of the facility in 1993, and has since used it for The Late Show. Unitel Video bought the Teletape and its assets in late 1986, and operated them into the 90s. Unitel Video Studio 55, became the second home of Sesame Street and The Dick Cavett Show.

On the personal front, Ruth Kuntz's roommate introduced Hare to Hazel Shaw, a recent college graduate in chemistry who worked for American Cyanamid Corp. On weekends Ruth often went target shooting with Dr. Hare. Hazel was a member of her company's rifle shooting group. Ruth introduced Hazel to Dr. Hare and encouraged her to try pistol shooting. Hare was a marksman. He and Ruth would prepare the weapons and

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ammunition late Friday afternoon for the weekend. He had a shooting range in his basement.

The first competition that Hazel and Hare were in, Hazel did not load her weapon correctly and when the time came it would not fire. She asked for a restart which Hare refused. A few weeks later she and Ruth went to his house where in the excitement Hare's dog vomited on the rug. Hazel said a man who likes dogs could not be all bad. Soon after they began dating. Their romance was at times rocky, with the generational difference in the ages lingering in the background. Although Hare had been separated for several years from his second wife, he had not considered a divorce. After a year of courtship, he came to realize that Hazel was ready to end her relationship with him unless he was serious about marriage.

Hazel Hare, late in life



Hare offered to let her replace Ruth, who was going into the hospital for surgery, to see if she liked working for a small company. Hare liked to cook and was good at it, while Hazel did not know how to cook. Ruth got involved and arranged for Hazel to take a cooking class. Twice a week she took a train into New York City for her class. Hare let her off early to go but made her pay for the lessons.

When Hare finally filed for divorce from Betty, he simply wanted it over and agreed to a settlement that strapped him for many years. In 1957 Hazel and Hare got married, his third and final marriage.

The Hare Company continued to develop their audio tape recorders and made multi-track recorders for the Navy, among others. The company built a synchronous-film recorder for CBS. They also worked on some signal processing equipment.

The work for M.I.T. led to the navy giving him a contract that

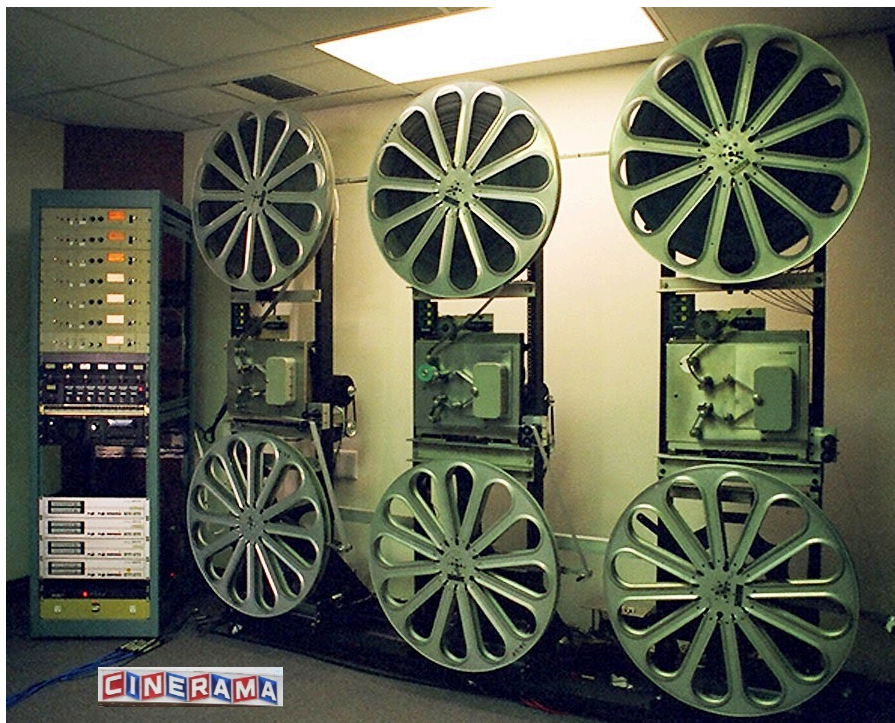
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would loom large in a few years for Hare, to develop method testing and applications of transistors.

Early transistor. Transistors would become important to Hare's future company. Like another ancillary player in this story, Sony was an early adopter of the device. They became interested around the same time.



The transistor had been born through the efforts of William Shockley, John Bardeen, and Walter Brattain at Bell Labs in 1947. Shockley went on to found Shockley Labs, mentioned a short while ago. Hare had worked closely with Bell Labs during the war and because of that was as familiar as anyone outside Bell Labs with these new devices.



The Cinerama projectors

As 1957 ended the future direction of the company was not clearly defined. As we will see the endeavors the company pursued tended to revolve around what

opportunities organizations would bring to Hare and company to try and solve. He had a small, but continually looking for ways to keep

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Sangamo, Sale number two

The Sangamo Electric Company, a company originally started at the end of the 19th century was an offshoot of a clock company. Early products were electric watt-hour meters. By WWII it had advanced into anti-submarine sonar, along with capacitors, a common electronic part. By the end of the war the company employed



over 3000. In 1958 the company was run by Charles "Chick" Lanphier, who was personally involved in the development of Sonar for the Navy in WW2. Lanphier was often referred to as "Mr. Sonar." Sangamo needed help supplementing their design efforts for a new sonar recorder, and they had heard of Hare's abilities in producing recorders and so approached him to help them complete the design.

This kept Hare's company busy for a while. Early in December Chick offered to buy Hare's company. The Hare Company had been going nowhere under Cinerama's ownership and Hare was sure they would be happy to spin it off and measure the stock price giving ownership back to him. Cine

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were acquired by Cinerama where bought back by Hare. The day the deal closed Cinerama's stock had closed at \$33, meaning that Hare bought his company back for \$162,294.

Hare immediately sold his 500 shares for a second time to Sangamo in exchange for 4,918 shares of Sangamo electric standard stock. Hare and Chick had many oral agreements about the operation of the Hare Co going forward. Part of the deal was that Hare would stay in charge of his company, as Chick stated that they were just after his experience in designing and manufacturing recorders.

For the next year Hare and his engineers worked with the Sangamo engineers. Hare would get extremely agitated when the design engineers covered ground he had explored before. At one point during an engineering meeting he said "Damn it, I told you I tried that before and it didn't work. Why in hell do you insist on spending months and money when all you are going to do is prove me right?"

Late in 58 Chick asked Hare to come to Springfield for a conference. Chick wanted to have Hare move his operation to Springfield to save money. But Hare pointed out that under their agreement if his lab were ever to be moved it would be to a location that Hare choose. Chick gave in as Hare made it clear that he would not move to Springfield as he did not like the climate. This discussion led Hare to seriously look at where he wanted to relocate.

As we also saw in previous article, a fellow Stanford alumnus, Charlie Litton, offered to rent him space in his plant in Grass Valley. Litton's building had room to spare.

Litton and Hare

Moving to Grass Valley & a falling out

From the Trenches

The Inscrutable Dr. Hare



A Legend Of
Grass Valley

Bob Robertson

Yes, the Hare story was incredible enough that a book has been written just on his life. The story in the book ends when Hare retired from the company (many would say forced out), after it was purchased, as we will see in another article.

Growing up, Hare had spent many days in the foothills of the Sierra east of his home in Fresno, and thus he was excited about going back. He and Hazel flew out and were taken by the area and went back to New Canaan and called his employees together to see how many would relocate. Ruth Kuntz, Ken Bauer, Roy Hamme, and Paul Faynor all agreed to move. These were his key people. Hazel flew out to find

the transferring employees, and themselves, suitable places to rent. It was not an easy task.

At the time Grass Valley was a sleepy little town with no industry to speak of, except for Litton's small operation. The last big mines, the Empire, and Idaho-Maryland, had closed during WW2, and sputtered back to fitful operation for a few years afterward before finally closing. The local economic climate was dismal, and the unemployment rate was among the highest in the nation.

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This is the Litton Building today. It was intended to be a hospital. The start of World War II suspended construction. It never became a hospital. Charlie Litton bought the unfinished building. He moved in with what was left of Litton Industries. The company, known as one of the first

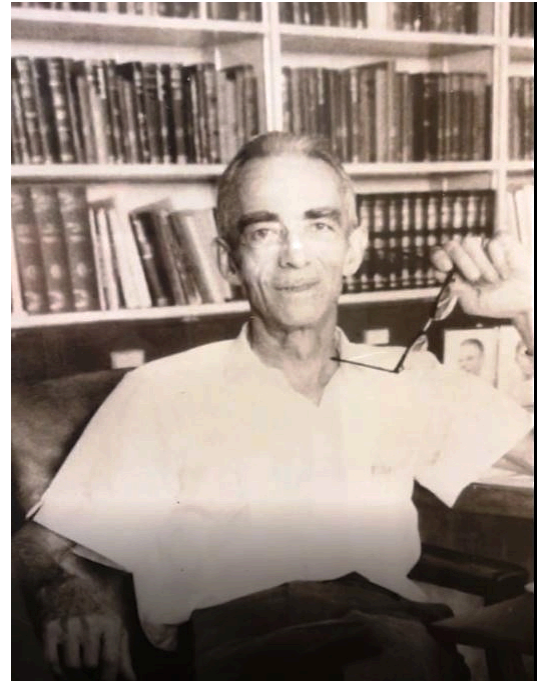
"Silicon Valley" companies, became more than Litton wanted to manage. He was a physicist at heart. He sold everything but a small glass lathe manufacturing operation and moved to the Sierra foothills. "Litton: the Catalyst" article covers the full story.

Hare and Company started out renting 5,000 square feet from Litton. Sangamo moved Hare's plant machinery and office furniture, even bookcases. When Paul Faynor had most of the machinery up and running, Hare was called back to Springfield to talk about recorder development. Hare took Charles Litton with him. They met with the Sangamo top brass. At some point in the meeting Chick and a couple other highly ranked members adjourned to an adjacent office. The

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the fact that Litton's skill was in vacuum tubes (again we will look at that in another article), and the recorders were now being designed with transistors. They decided they would offer to put Litton in charge of the recorder development program as they believed he would be more frugal in holding down costs than Hare would.

Charlie Litton, Sr.



When the meeting reconvened Hare was told about the decision. Needless to say, Hare was quite upset and demonstrative in opposing it. They said Hare would still oversee technical development, but because Hare did not know finances as well as Litton the financial purse strings would be controlled by Litton. Litton had once ran a large company before selling most of it off and moving up to Grass Valley.

Hare countered that they could not teach him anything about finances as he had sold his company twice. Some present feared the meeting would come to blows. Hare suggested that they fire him, which they agreed to, but then added that he would be kept on as a consultant for \$50K a year. When they agreed Hare countered at \$75K. Chick said he thought it was 50. Hare said it just went up. After all that had transpired Litton ultimately told Chick that he did not want the job.

This started the first fissures between Litton and Hare. But immediately, his displeasure with Chick and Sangamo was far worse. So Hare formed a new company, The Grass Valley Group. He kept most of the H.G. Hare employees, including those who had come from Sangamo, and was able to

From the Trenches



Dr. Donald Hare

Hare and company kicked around adopting a new name. They had come to referring to themselves as the "Group." Seeing they were in the town of Grass Valley they became the Grass Valley Group. GVG for short. Employees and customers usually referred to GVG as the "Group," occasionally even to this day.

Early Grass Valley Group logo



After a couple of rounds of trying to patch the relationship up with Hare's newly formed Grass Valley Group, Chick and Hare finally came to an agreement and Sangamo gave the newly formed company a development contract to continue working on the recorders. Eventually Chick was put on the board at GVG. While both came from different backgrounds, they had similar intellectual prowess and eventually became friends again and stayed that way until Chick's death in 1978.

Hare's new company continued to be plagued by scrounging enough work to stay viable. The Sangamo contract helped, but now Hare went back to an earlier source of work. He contacted Wentworth Fling whom he had dealt with at Cinerama. The timing was right as they were looking to build more theaters and gave GVG a contract for \$400K to supply more amplifiers.

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