

Chapter 9

Holobeam & Commuting



Commuting from our house in Hopewell to RCA Labs was a short drive and often consisted of a carpool with other RCA employees. Holobeam, the company I had just joined was located in Paramus, New Jersey. This was well over an hours difficult drive, even when there was good traffic. We however, lived only one block away from a train station where a two-car shuttle train ran twice a day to northern New Jersey and back. More about this later. I was now working in a manufacturing company building in Paramus which looked exactly like an industrial warehouse. This seemed normal to me as we were actually manufacturing industrial lasers. As I

said in the previous chapter, there was very little commercial laser industry activity going on at this time.

There was a West Coast company called Korad which was doing some work on Ruby lasers and various gas laser systems. Holobeam had acquired some scientists from Korad as their startup technical group. Dr. Jim Boyden was the leader of their technical group. Besides Boyden, the group consisted of an experimentalist named Bud Erickson, and two other laser researchers named Aclé Hicks and Dennis Mulvaney. I'm sure there were others, but these are the ones I remember that moved east to join Holobeam.

Holobeam had been founded by a New York investor named Melvin Cook. He had parlayed a totally impossible and non physical patent relating to holography that he had acquired the rights to, into a few million dollars investment from New York City venture capitalists.

Cook did this mainly by inducing Dr. Gordon Gould, one of the inventors of lasers, to become involved with Holobeam. Gould felt he should have become rich from inventing the laser, but nothing worked out for him. So when Melvin Cook came along sprinkling fairy dust about converting pictures into holographic images, Gould ignored reality and threw his credibility behind Holobeam, and the venture investments followed.

I knew none of this background, did not do any research and only saw a company manufacturing lasers. It looked real and had some exciting West Coast scientists. So I joined them.

As I said before, the Holobeam facility was in Paramus, in northern New Jersey and we lived in Hopewell in central New Jersey.

My commute was wild. It started at the little train station that was two blocks from our house in Hopewell. There was a little two car trolley train that ran twice a day from the station to Newark, New Jersey. I bought a cheap car and left it in the long term parking lot near the station in Newark. I took the train in the morning, picked up my car in Newark, and drove about fifteen minutes to Paramus. In the evening I reversed the procedure.

While at RCA, I had agreed to edit a laser handbook for the Chemical Rubber Publishing Company which put out handbooks on various topics. This involved proof reading the typeset versions of my own chapter about the florescent spectra of trivalent rare-earth ions in transparent crystals as well as editing other scientific contributions on other topics. The train turned out to be an ideal place for checking the text of the articles. This book was published as "The Industrial Laser Handbook" with me as the editor. The little train was only two cars long, the car in the back had a bar. That car was pretty much claimed by the regulars and I did my work in the front car.

If I missed the last train at night, I would have to drive the two hours that it took to travel home during rush hour by car and drive back in in the morning. This was not a nice thought, so I had to be sure to bail out of work in time to get to the train. I remember times when I was running late and I drove the car into the nearest parking lot to the station, tossed the keys to

an attendant, ran for the train, and called over my shoulder that “I will pick up the car in the morning.” It was a little stressful. I continued this commute for almost a year. But it became more and more difficult and was wearing me out.

I discussed moving to the Paramus area with some of the West Coast transfers and one of them, Dennis Mulvaney, convinced me that it made sense to live in north Jersey in the Lakes region near the Wanaque Reservoir. He lived in a town called Ringwood in this area and convinced me to start looking. Anne was not at all anxious to move as the kids were settled in Hopewell with friends as were both of us. She agreed however that the crazy commute was not a long-term



solution and joined in our search for a home nearer to Holobeam.

153 Buena Vista Drive, Ringwood, New Jersey

This home in a woody suburb was our new address and I will talk about our 4+ years here a good bit later after I finish discussing my Holobeam workplace.

Holobeam When I Arrived

When I started, Holobeam was already an operating organization with several government contracts. There was a high average power YAG laser that Bud Erickson was operating at the 1000 watt level. There was a project to incorporate a lower power YAG laser with a mechanical table system to enable the system to adjust the value of resistors on printed circuit boards. Jim Boyden had presumably obtained these contracts from the government prior to my arrival.

The first day I arrived, I was told by Jim that I had a new employee, a recent University of Michigan graduate with a doctorate from Stanford University, named Jim Murray. This was in 1971 and amazingly, I am still playing bridge with Jim and his wife Lindsey 46 years later.

In those days, all high-power lasers consisted of NdYAG laser rods being optically pumped by krypton arc lamps. The most power anyone could obtain from a single laser rod unit was about 125 watts. Bud Erickson set up eight of these lasers between two mirrors and aligned them so that the active beam was going through all of them. The average life

of a krypton lamp in those days was only a few hours. This meant that Bud had a very short time to align and test the eight head system before something broke. He managed to make it work well enough to meet the contract requirements.

The structure of the laser heads was such that the active parts such as the reflectors, the lamp, and the laser rod were oriented within a transparent Lucite sandwich structure. Bud had designed the structure so that it was held together with multiple small screws threaded into the Lucite. It was a pain to take one apart and change the rod or the lamp. But he did manage to operate the thousand watt system and take enough measurements with it to get some data.

The Nd:YAG laser emits radiation in the infrared and there was considerable interest in obtaining laser output in the green. There was a new material available which could, in principle, be placed inside the laser in the beam path where it would convert some of the infrared radiation into the green spectrum. This material was called "banana." (actually Barium Sodium Niobate). I worked with Jim Murray a good bit on this project and we met the government specifications, but the quality of obtainable "banana" was so poor that we could not obtain reliable continuous separation.

A laser beam is not always as pure as theory predicts unless care is taken to prevent higher divergent beam components of the output light. Jim Murray did pioneering work on ways to structure the laser cavity to obtain near perfect output. He also developed a way of describing the beam divergence as an M number with the perfect beam having an M value of

one. This became an industry-standard way of describing laser output quality.

Holobeam Products

There were three potential products in development at Holobeam at this time. They each used a single laser head in conjunction with an optical system. They were diamond drilling, resistance trimming, and laser printing. We had a marketing and sales group directed by Martin Phillips. John Palmer and Jim Mason were independent sales managers.

Diamond Drilling Machine

Diamonds, as found in nature often contain microscopic impurities. These reduce the brightness of a diamond gemstone and reduce its value. The gem cutters work to obtain stones that have a minimum number of these impurities, but a large fraction of the finished gemstones still contain impurities.

Holobeam developed a laser machine capable of locating the impurity and drilling a very tiny hole in the front surface of a gemstone reaching down to the impurity. With the impurity removed, the gemstone was much more valuable. Holobeam sold a number of these machines to jewelers in the New York City area. It was important that the hole have such a small diameter that it could not be seen with a standard jewelers magnifying loop. The drilling part of the system always went fine, but some of the impurities were difficult to remove. One of our marketing managers, John Palmer, made many visits to work with different jewelers to develop a chemical process

for removing the impurities. Holobeam sold a fair number of machines. I believe this process is still in use today.

Printed Circuit Board Resistor Trimming

In the early days of computer-driven electronics, the transistors needed to be connected by evaporated metallic resistors. The resistor had to be of a certain value for the system to operate properly. It was less expensive to evaporate a resistive film where the circuit required a resistor and then trim away a portion of the film to make it have the correct value. This process used the same laser system that was being sold for diamond drilling.

We were initially very happy to have these resistance trimming systems used in industrial production lines. I discovered the downside a few weeks later. when I received a phone call late on a Friday afternoon from a manufacturer reporting that the optical pump lamp had broken and they needed help repairing their system. I said I can have somebody there Monday afternoon. They responded that if I didn't get somebody there in a few hours, they would be shutting down their manufacturing line and probably returning our laser. Luckily one of our field service engineers was still in the plant and I could bribe him to go fix the machine.

These lasers still had Bud Erickson's original design for the plastic housing. My first technical input at Holobeam was to work with George Gerner and design a much simpler system that was essentially a sandwich with a metal extrusion on top connected to the base with four bolts. This simple change in

design basically allowed a technician at the customer's location to change the lamp and become a respected local laser expert. This significantly reduced our field service expenses as these laser systems were all over the country. Sometimes small design changes toward simplicity can be incredibly cost-effective.

Laser-Based Printing

Since a focused laser beam has sufficient power to drill holes in diamond, it should have enough power to evaporate ink. Holobeam decided to fabricate a laser printer. A sheet of glass was coated with a layer of ink and the modulated laser beam scanned the outer surface of the glass. A sheet of paper was placed directly below the ink covered plate and the irradiated ink, containing the pattern, was transferred to the paper. We demonstrated this by scanning a page of a Time magazine and re-producing the page. The scanner produced a modulated signal for the laser beam. This printing information could also be transmitted over a computer. Mel Cook took this concept and a demonstration to one of the existing larger printing manufacturers and tried to sell the idea to them for several million dollars. No one bought!

Pulsed Ruby Lasers

Holobeam also manufactured and sold a pulsed ruby laser. This program was run by Aclé Hicks. The system consisted of a large ruby laser rod inside a helical flash lamp and a large high-voltage pulsed power supply. If these lasers were properly instrumented with a Q switch, they produced an optical pulse with a peak power of about a gigawatt. We

delivered quite a few of these to scientific laboratories around the world. The lasers were shipped to laboratories in the United States, were quite reliable, and had no failures. England, however, was a different matter. Twice we had a failure of a laser on a Monday. We initially, could not figure out the cause until we realized that the English laboratory was unheated over the weekend. The first time they pulsed the laser on Monday morning, the temperature was well below what we consider room temperature. The laser, being at the same low temperature, generated so much unexpected output energy that it destroyed the reflector on the end of the laser rod.

These programs were in existence before I joined the company. Jim Boyden left the company fairly soon after I arrived and I found myself in the position Vice President of Holobeam. Mel Cook had no technical knowledge and we were permitted to bid on almost anything - and we did!

Military Projects

We designed and built a high-repetition-rate laser jammer for the United States Air Force. The Air Force was worried about defending against something called first-pulse-return optical laser radar. This type of system sent out a pulse and measured the distance to the target by the first reflected laser light return timing. The military wanted to confuse this type of radar by having the target generate a high-frequency series of randomly timed pulses. We built and delivered a lightweight, mode-locked laser that met the performance specifications. I always thought this was a rather stupid military project since the supposed defensive laser was

continuously generating a very bright series of laser pulses which would make it an easy target. We met the contract, we were paid. They took the laser. I do not know if it was deployed.

High Power Low Divergence Telescope Illuminator System

We designed and built a 1000 watt average-power laser system for Patrick Air Force Base in Florida. This was a portable oscillator–amplifier unit mounted on a trailer. It was meant to be fired through a large telescope at the Patrick Air Force Base to illuminate Soviet satellites and determine their shape from the return image. This was a classified program so we never found out if it was used in that fashion, but we did get the results of their initial testing. They irradiated a plywood target a fair distance away from the laser to measure the beam to divergence. The target then caught on fire. Rich Popper, our project manager, related that they never mentioned the laser divergence again and just accepted our system.

Israeli Army Interaction

We also modified our neodymium YAG laser to be operated as a portable optical rangefinder. This caught the attention of the Israeli Army and I traveled to Israel to discuss a potential sale. I arrived in Tel Aviv shortly after the Olympics massacre of the Israeli team. Needless to say, the security at the airport was extreme. The men and women were separated into different lines coming off the airplane and there were an amazing number of Israeli teenagers carrying automatic weapons. Once they examined my credentials and

determined that I had been invited by the Israeli army, I was whisked away to a hotel in Tel Aviv. The next day, the Army gave me transport to a base nearby, where we discussed the laser system. I went over the specifications and performance, which matched their need, but when I said it would be at least six months before we could deliver a product, they informed me they needed it now.

As I was headed back from the Army base, it was strange to see a camel caravan passing by. In any event it was a good feeling to get on an airplane and leave Israel even if I had not made a sale.

This random selection of Holobeam laser systems for sale was an indication of how unfocused Holobeam was. Mel let us bid on anything. We delivered a complicated articulated laser cutting and welding system for use on nuclear fuel rods to a nuclear plant in Idaho. We designed and fabricated large xenon lamps for a Texas indoor football stadium (I almost had a field service employee quit over having to install the lamps in the interior roof cat-walks). We had excellent engineers such as Bob Webb, Nick Levinos, and Herb Goessor. Herb and two other engineers commuted daily from Long Island in a converted hearse. During all this, the imported West Coast group returned to jobs on the West Coast. Jim Boyden left first and was followed by then Aclé Hicks, Dennis Mulvaney, and Bud Erickson.

The Non-Technical Circus of Holobeam

As I mentioned, Jim Boyden left relatively soon after I arrived and I became the Vice President. Mel had set up the offices

at Holobeam as a three room suite. His secretary was in the center room and there was a door to the right to his corner office. There was also a door to the left to my interior office. There will be more on this later.

Holobeam had a marketing team in place when I arrived. Martin Phillips was the marketing manager, Jim Mason, John Palmer, Bob Pitklac and John Ragazzo completed the group. As I mentioned before John Palmer was mainly involved in diamond equipment sales. Martin Phillips handled government contacts. Jim Mason sold the commercial laser products. John Fitzgerald, seen here, was a senior marketing manager and advisor.



At RCA Laboratories there were no marketing people and this was my first experience with salesman. It was also my first experience in going to laser conferences, setting up booths and enticing potential customers. At RCA Labs, we would go to one conference a year, and just wander around and enjoy ourselves. These laser conferences were working conferences. If I now met someone for a drink after the conference day, it was to sell them something.

Back to a Couple More Diamond Stories

For reasons that I can no longer remember, John Palmer and I took a laser sawing system to a conference in Amsterdam. We set our laser sawing system up as part of an industrial exposition. We certainly did not take our own diamond samples, but counted on the customers, or potential customers, to bring their own samples. We did demonstrate the machine over the few days, but other than a visit to Amsterdam, it was not a very useful trip.

Holobeam was contacted by a company in New York called DDI. Their full name is Diamond Distributors International. Diamonds are usually found as tetrahedrons. A tetrahedron is basically two pyramids back to back. Tetrahedron shape diamonds are normally small sidelights for the central diamonds in rings. The first step in processing these small stones is to cut them into two pyramids by sawing through the tetrahedron. This is laboriously done by young boys in India monitoring diamond embedded string saws. DDI gave Holobeam a contract to demonstrate laser cutting of these stones and calculate what the cost would be per diamond.

We utilized one of our machines, optimized the cutting, and provided an estimate of the cost per diamond. It turned out about six cents per cut as the machines are very fast and the stones are very small. I thought we had a sale as they had told us it was costing them eight cents a stone to have this done in India. It turned out that when they told the Indians that they can have this done for five cents, the Indians reduced their price to four cents. Not only did I not make a sale, but I reduced the standard of living in India.

The best part of this project was that it caused me to visit the diamond district of New York City. Our meetings were in the DDI office. I found out that diamonds are not sorted by any computer operated measurement, but are compared to a series of piles of diagnosis on open tables. There were thousands of diamonds of each each grade. DDI also showed me two large gemstones that they were polishing for a ring for Elizabeth Taylor. These were polished stones about 1/2 inch long. They asked me to hold out my hand and they placed the stones on the back of my hand. It was the first and only time I had a half-million dollars on the back of my hand. Boy was I watched carefully!

DDI obtained most of its raw gemstones from a country in Africa known as the Central African Republic. One day, Anne and I received an invitation to attend a formal dinner in New York City to honor the dictator of the country. Subsequently we were notified that the dinner had been postponed and shortly thereafter we were told that the dictator had been deposed and shot. So much for that dinner.

Back to Non-Technical Holobeam

Japan

Holobeam had an established distribution company in Japan called Marabun. It was not one of the larger trading companies, but was far larger than we were and had many established representative companies in Japan. Our main contact was through a gentleman named Terry Maruyama. He visited Holobeam several times each year and became friendly with several of our families, primarily John Palmer's.

Marabun was participating in a laser conference in Japan and Holobeam sent three of us over. Our team consisted of myself, John Palmer, and Bob Pitaick. Marabun arranged for Terry to drive us to Kyoto and visit the imperial palace. We stayed at a Ryokan (traditional Japanese rural hotel) and slept on the tatami mats.

The next day we were treated to a formal dinner at the home of the owner of the Japanese company. There were three Americans, five Japanese, as well as eight geisha. At the meal, each one of us had a girl sitting slightly behind us to fill our glass and help us with the meal. It was strange. I found out later from Terry that the owner had to pay extra for geisha who could speak both English and Japanese. We were shown the traditional tea ceremony room. We had an appropriate amount of sake. It was my first introduction to Japanese society.

The next night John, Bob, and I went out into the Japanese entertainment district, the Ginza. The three of us had leather jackets on and were all significantly taller than the Japanese

crowd. We kept wondering what the Japanese were calling to each other. It sounded like “bakatani guigen.” Eventually we learned that that translated as “subhuman lowlife foreigner” or worse. I remember we did manage to find a bar where we could buy a drink or two. This whole interaction was sort of an introduction to Japanese formality.

This was an easy visit to Japan. There were no big decisions, there was sightseeing, and they paid all the bills. The most difficult personal time I had in Japan was when I was invited to a formal dinner with at least eight other Japanese. I was a guest of honor and therefore was the first one to use the chopsticks to take some food from the serving bowls. This being a very formal place, the chopsticks were very slippery ivory. It was not my best performance. I think I was still recovering from the previous course where each one of us were served a live shrimp I do not know whether this is customary, or whether this was just an effort to intimidate a foreigner. In any event one large bite and the shrimp was gone. I still had the struggles of the rest of the meal with the chopsticks.

Another Much Later Japanese Story

Another time, much later, I was in Tokyo on a sales visit. Our international sales manager at this company was a 6’7” guy named Ivan Courtwright. Ivan and I had been enjoying the cherry blossom time and we were scheduled to visit a manufacturing facility around lunchtime. The taxi dropped us off at the entrance to the manufacturing complex and Ivan and I were walking towards the headquarters along one side of the street while a solid stream of Japanese workers were

going the opposite direction on the other side of the street. I did not think they were paying much attention to us, but when Ivan and I ducked under a tree branch, a wave of bows went down the other side of the street for a block or two.

My Office, Or Not My Office

When I became Vice President at Holobeam I had my own office. Towards the end of my career there I went to Europe on a sales trip, visited several companies, and flew back to Paramus. I walked through the door in front of the secretary's desk and started to make my normal turn to the left through the door to my office. To my surprise there was nothing there but a solid wall. I was not sure if I had been fired or what. Mel claimed that he just needed more privacy, and I was free to redecorate however I wanted. I had been fighting with him and the Board of Directors about the direction of the company and I should've known my end was near. I think he wanted me to quit. I had no immediate prospects and continued, entering my office through the telephone switchboard area. I had maintenance paint my office red, white, and blue. My relations with Mell continued to get worse.

Lightning & Flood

Sometime in the second year I was working at Holobeam, we had a major rainstorm, flood, and roof leakage. We had some rain damage to a few products stored near shipping. I was somewhat amazed when Mel ordered some of our unsold systems to be moved into the flooded area. I never found out if the insurance company found out. Another time the

building was hit by lightning. It appears that the building had been previously used for some form of heavy manufacturing because it had a huge transformer outside and a large room with switching equipment to handle high voltages or heavy currents. The electrical connections consisted of copper components about a quarter-inch thick and 4-inches high. There were large insulated handles to open and close the circuits. After the lightning hit, there were foot long sections of these bus-bars that had just disappeared. Presumably the copper was blown all over the room. I do not remember how long it took to get the company running again, but I know Mel made another large insurance claim. Eventually Mel no longer wanted me around and fired me. So much for my three technical years at Holobeam.

After I had been there a couple years we hired another engineer PhD called Dr. Cook. It was only a matter of time before Mel fired him because people kept asking to talk to the real Dr. Cook. When Mel was about to get rid of someone he moved their office from the engineering area to a back corner near shipping. Mel promoted me to the Board of Directors and I thought I could have some input on the company. However the third member of the board was his brother-in-law. I was just naïve.

Mel and I Parted!!

While researching this chapter, I discovered that Mel Cook. In 2018 is still running Holobeam as a real estate investment holding company in Hohokus, New Jersey.

Unemployed!!

