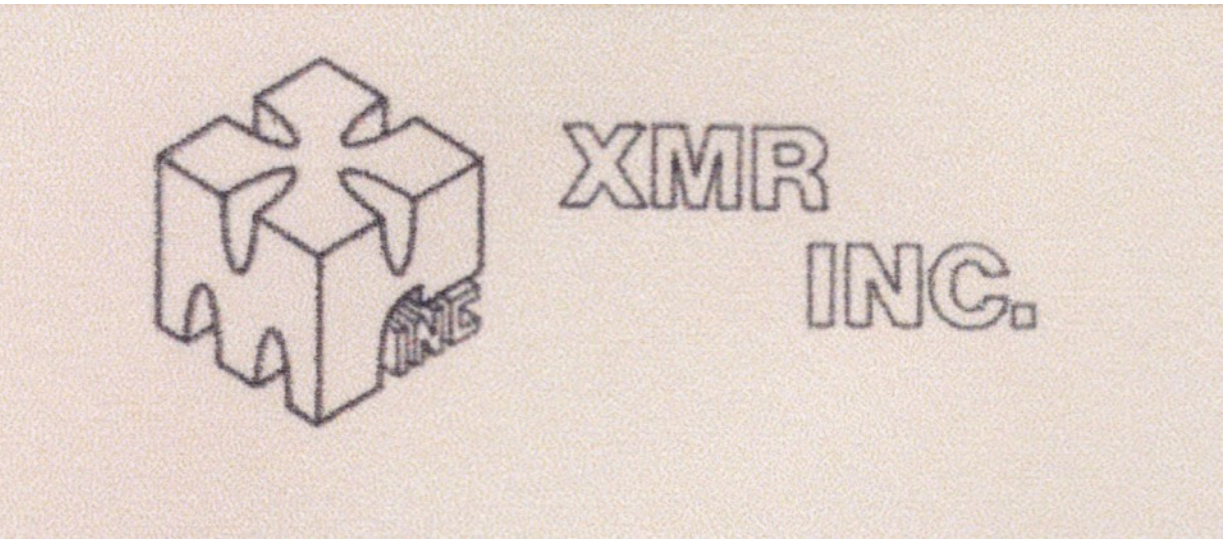


Chapter 13

XMR

Wwwa23/3.....'My plan for my new company was to focus on Excimer lasers hence the three letter name XMR was a natural. The $10,000 income that we received from our kids putting spade lugs on capacitor bank wires for ILC was plainly not a continuing source of business. I certainly did not want Anne to have to continue her sales job at Macy's that she took at this time to show support.

I had been contemplating starting a company when I realized that ILC was not interested in the Excimer Laser area. I had worked at RCA, a huge dominant technology monopoly. I had worked at Holobeam, funded by a financial fraud. I had

worked in GTE a military contractor driven by government procurement rules. And I had worked briefly at ILC technology, a small company with two competent technology founders. I had come to believe that I could do a good job of running a company, and if I failed, I thought I could find a job to support the family.

I did not think I needed advice in the technical area, or even the business area. But I certainly felt that I needed legal advice organizing a company. Somehow I was directed towards Joel Kelman, who was a founding partner in a small new legal firm. He agreed to talk with me and we had several really good conversations. He pointed out that you cannot start a company while you are working for another. Doing so would leave you with a long-term legal problem.

I followed his advice and resigned from ILC after my discussions with Joel and also clarifying with ILC that they had no interest or rights in any technology relating to Excimer lasers.

After having worked in this wide disparity of companies that I mentioned, I had to figure out how I wanted to structure and run XMR. I decided that the best way to reward people for taking the risk of joining a new company was to have every employee be a part owner in the company. This meant stock options for everyone. Joel helped us incorporate and helped me set up the stock plan. We installed a modest two week combination sick and vacation policy. We obtained workers liability insurance, as that was not too expensive. Medical insurance turned out to be a larger problem; few companies wanted to insure a group with only a few members. We finally

did obtain limited small group medical insurance until we were large enough to qualify for a major player such as Kaiser. Luckily we had no major claims during these times.

I established the philosophy that every employee was a part owner and had responsibilities beyond being an employee. We established a corporate charitable donation plan and elected a group of employees to decide what charity got the money. We initially staffed the company with people I already knew. I gave no real consideration to hiring men or women as every technical person I knew was a male. Our first female technical employee was an acquaintance of someone who already worked for us. We wrote down our corporate policies in a brochure for new employees.

I was looking for someone with business experience and I contacted Tom Knowlton, who had worked in management at Holobeam on the east coast and was now in the bay area. Tom was from a wealthy New Jersey family and his father had been very involved in politics. The family also owned one of the large classic Lionel passenger trains. As I mentioned before, Lionel trains were my major hobby and their Standard Gauge, Blue Comet locomotive and train that they showed us was a treasure.

Tom agreed to join me at XMR for a modest salary and a percentage ownership in the company. We had no company location except our Presidio house and Tom did his work in our kitchen; Anne remembers him spending the majority of his time on personal telephone calls. Tom assisted me in scouting around the area for a location. We looked at high-

rise office buildings which were a bad idea for us and we finally found an industrial development complex which had a large number of small buildings.

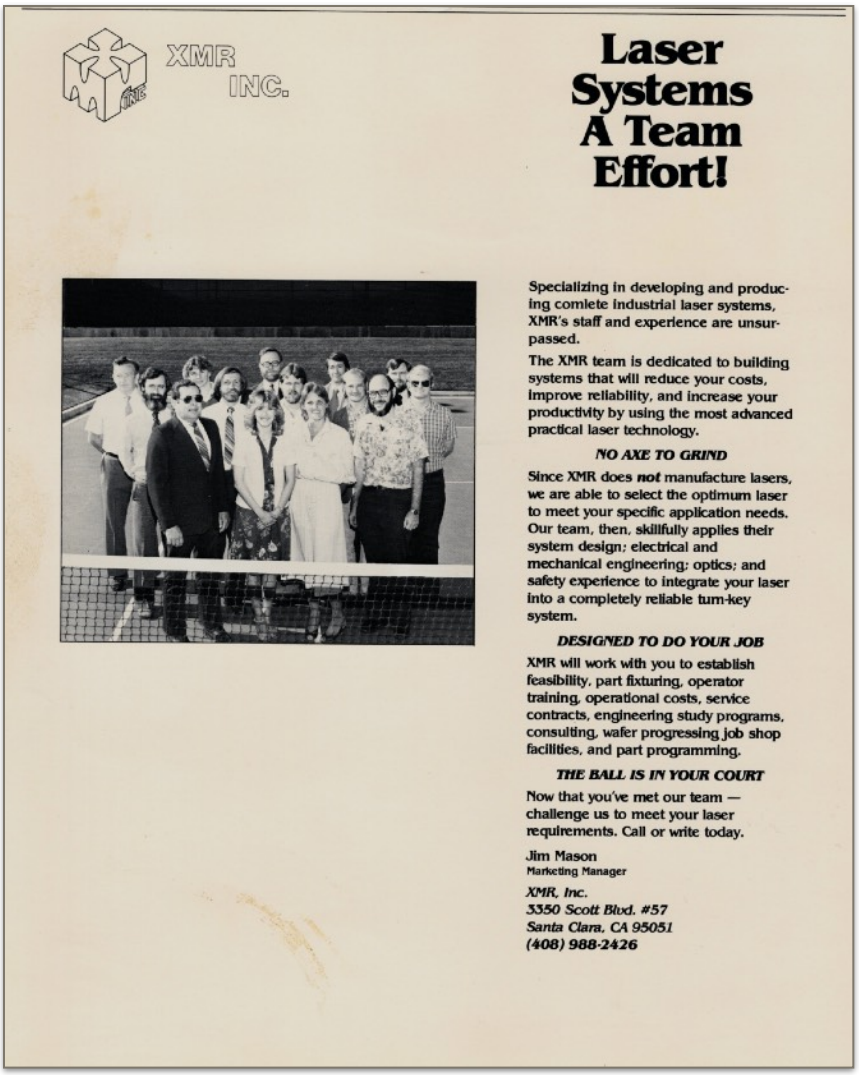
We had no credit rating and no real bank references so it was a financial risk for a landlord to give us a lease. One of the owners of a building in this complex at 3350 Scott Blvd., named Drew Gibson, took a chance, negotiated a lease with us, and also became a member of our board for a small stock option. This is the complex at Scott Blvd. which was our first location.

We started with one building, which we named World Headquarters, we expanded to the building next door, and named it Next Door, the next building was called the Outback and then came two more. I again put our family to work by giving the kids a contract to clean each building. And for a short time Monica was our receptionist.

Initially Building 1 was larger than we needed and I arranged to share the space with an engineering friend, George Shukov. His expertise was in motion technology, which

worked well with our expertise in lasers. We jointly designed and sold a fair number of systems, usually with George subcontracting the mechanical portion to XMR to build. One of the advantages of having George as a partner in the building was that he was also a collector of exotic cars. We used the back portion of our building, which we did not need, to store his three exotic cars. There was a large English Singer convertible and two early Ferrari race cars. These turned out to be very useful as a way to distract potential customers while George and I were trying to figure out a solution to their technical problem and propose solutions.

George was a fascinating man. His great uncle, general Zhukov was a famous Russian general who led the Russian army on the final drive to Berlin. George and I worked together for many years. XMR established an applications lab where we demonstrated the uses of various lasers to cut materials. George perfected and patented the use of Excimer



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Laser Systems A Team Effort!

Specializing in developing and producing comlete industrial laser systems, XMR's staff and experience are unsurpassed.

The XMR team is dedicated to building systems that will reduce your costs, improve reliability, and increase your productivity by using the most advanced practical laser technology.

NO AXE TO GRIND

Since XMR does ***not*** manufacture lasers, we are able to select the optimum laser to meet your specific application needs. Our team, then, skillfully applies their system design; electrical and mechanical engineering; optics; and safety experience to integrate your laser into a completely reliable turn-key system.

DESIGNED TO DO YOUR JOB

XMR will work with you to establish feasibility, part fixturing, operator training, operational costs, service contracts, engineering study programs, consulting, wafer progressing job shop facilities, and part programming.

THE BALL IS IN YOUR COURT

Now that you've met our team — challenge us to meet your laser requirements. Call or write today.

Jim Mason
Marketing Manager

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Lasers to convert a tiny stainless steel tube into a tiny stainless steel mesh cylinder with very smooth edges. These “stents” proved to be extremely valuable for correcting bloodstream blockages. The patent was acquired by the medical industry and George both licensed and manufactured them and became a multi-millionaire.

I encouraged my marketing manager, Jim Mason, to use any justification for taking the entire company over to the nearby Decathlon Tennis Club for lunch. The above brochure was from such an opportunity; this was early in 1981. The club was adjacent to our building complex but across the Central Expressway. We were lucky not to lose any employees on their way back after a mildly alcoholic lunch at the club.

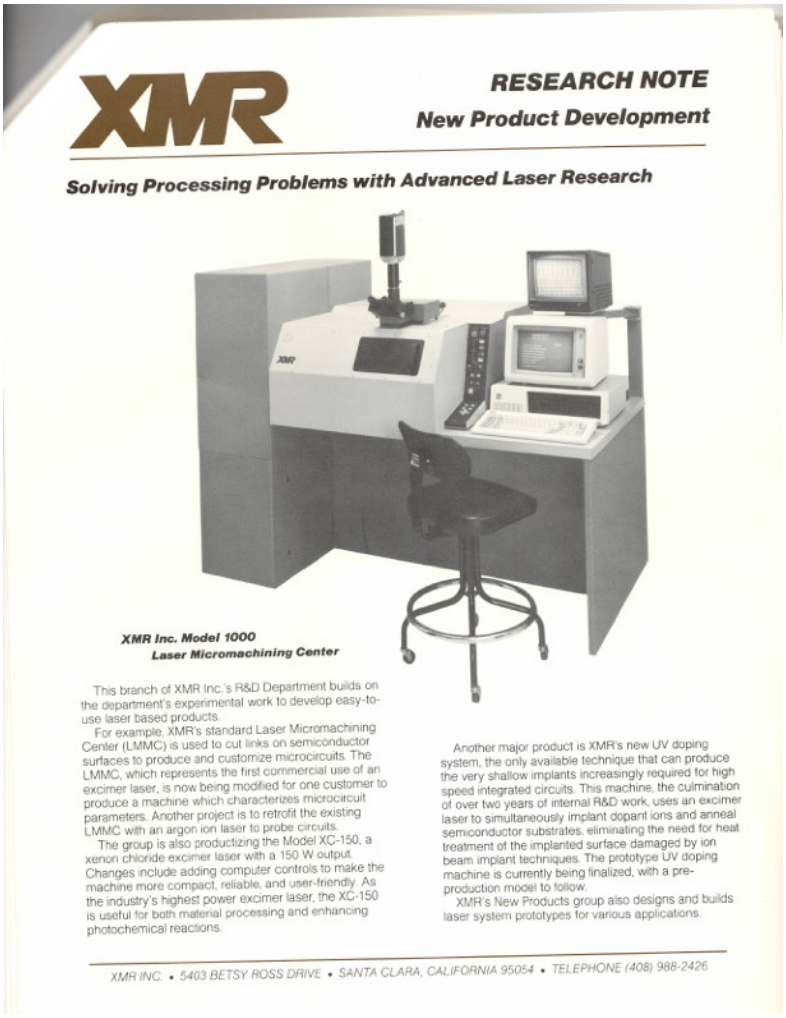
When starting a small company, you do not go through employment agencies; you hire friends and family. George Gerner left Holobeam and moved to the Bay Area and I convinced him to join us. Ted Fahlen moved over from the Electro Optics division of GTE after he secured his pension at GTE. As with most small companies, we hired friends of friends. Eileen Palmer moved from the East Coast and joined us in human resources as our 14th employee

Our first real product was the design of an Alexandrite laser for my ex-boss at Allied chemical, Dr. Jack Gilman. The fifty thousand dollar advance provided our first real income. We were paid to investigate several variations on this laser over the next 18 months.

During this time we developed some Excimer laser machine tools which consisted of motion technology and a small pulsed Excimer Laser system. Our first system is shown here. I no longer remember what we charged for it, or who purchased it, but we made a profit. During this development time, we procured a contract to develop some small CO2 laser systems. We manufactured the laser tube and a partner company made the power supply. This was okay temporarily, but not very profitable. We continued the development of the Excimer laser systems and published some research notes on their capability. The alexandrite contract was from Jack Gilman, who was now at AMOCO Corporation Jack believed in laser driven chemical processes.

I convinced Jack Gilman that the only way we could develop larger lasers was if Amoco invested in XMR. We had been struggling along to generate enough profits to cover our

expansion. To my delight, Amoco agreed to invest and we moved to a much larger single building on Betsy Ross Drive. This was in 1984 (I was now 52).



XMR

RESEARCH NOTE

New Product Development

Solving Processing Problems with Advanced Laser Research

XMR Inc. Model 1000
Laser Micromachining Center

This branch of XMR Inc.'s R&D Department builds on the department's experimental work to develop easy-to-use laser based products.

For example, XMR's standard Laser Micromachining Center (LMMC) is used to cut links on semiconductor surfaces to produce and customize microcircuits. The LMMC, which represents the first commercial use of an excimer laser, is now being modified for one customer to produce a machine which characterizes microcircuit parameters. Another project is to retrofit the existing LMMC with an argon ion laser to probe circuits.

The group is also productizing the Model XC-150, a xenon chloride excimer laser with a 150 W output. Changes include adding computer controls to make the machine more compact, reliable, and user-friendly. As the industry's highest power excimer laser, the XC-150 is useful for both material processing and enhancing photochemical reactions.

Another major product is XMR's new UV doping system, the only available technique that can produce the very shallow implants increasingly required for high speed integrated circuits. This machine, the culmination of over two years of internal R&D work, uses an excimer laser to simultaneously implant dopant ions and anneal semiconductor substrates, eliminating the need for heat treatment of the implanted surface damaged by ion beam implant techniques. The prototype UV doping machine is currently being finalized, with a pre-production model to follow.

XMR's New Products group also designs and builds laser system prototypes for various applications.

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But there was more before Amoco.

We also started frequency doubled YAG work for Laserscope, a medical laser company developing a frequency doubled YAG laser for Dr Rodney Perkins (see the next chapter). We continued on with the development of high-average-power Excimer lasers using the transverse gas flow technology similar to that from GTE Sylvania's other CO2 lasers. We developed a magnetic switching technology, a high-flow gas system, and the power conditioning necessary for a high-average-power xenon chloride laser. We also increased the staff in the research work over the next couple of years.

The Acme Cleveland Buyout

Back at Holobeam, we had developed a variety of laser machine tools using Nd:YAG lasers and we followed this work at XMR with a successful series of larger laser machine tools. This was a good business but not where I wanted XMR to spend its resources. About this time we attracted the interest of Acme Cleveland a Midwestern company which wanted to expand its machine-tool business using laser technology. They made us an offer, which I accepted, after some negotiation, to purchase the laser products division of XMR for $2 million.

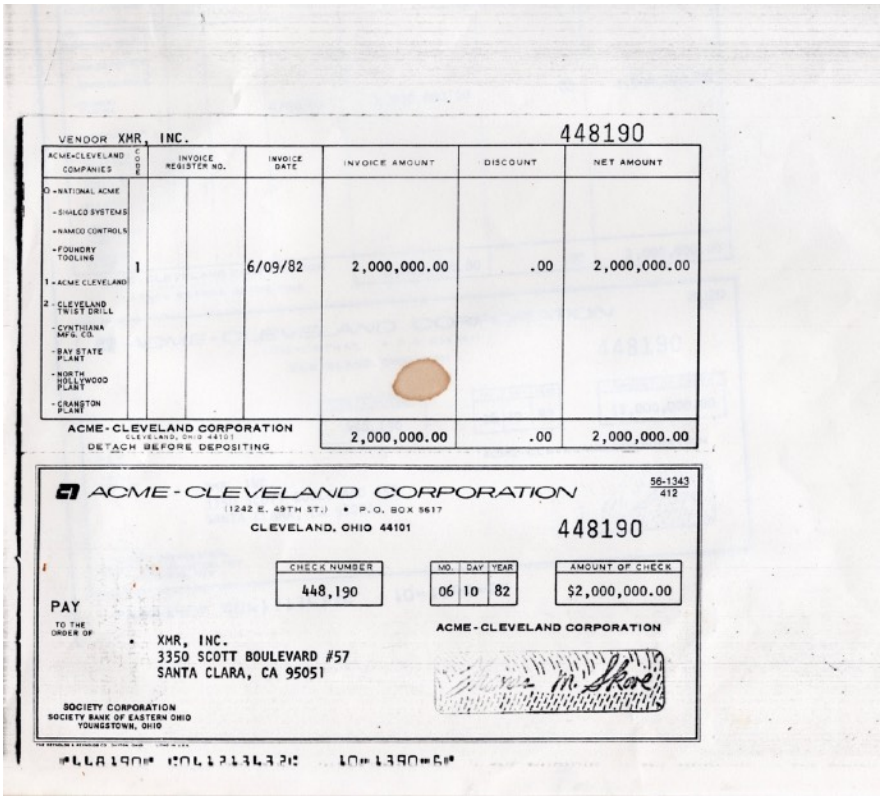
This money gave us the resources to continue Excimer laser development. We transferred the systems program equipment to a separate building and continued our work on Excimer Lasers. The group of employees working on systems were now employees of Acme Cleveland.

I have no memory of celebrating the receipt of such a windfall, nor do I remember receiving the additional 10% that was in the contract. We had been fairly successful in building specialized laser systems and were advertising our general ability in this area. I have lost track of how they succeeded as part of Acme Cleveland.

The sale of this division brought our legal work back in contact with the lawyer I mentioned earlier, Joel Kelman who had been invaluable in starting the company. His law firm negotiated the sale of the division. Jackie Daunt was the principal lawyer involved in the sale and she became our

corporate attorney who handled our work including the later sale to Amoco. She and Eileen Palmer are still friends.

Jackie helped to set up our stock ownership and option awards that officially gave increasing equity to each employee and ultimately real money if and when the company was sold.



VENDOR XMR, INC. 448190

ACME-CLEVELAND COMPANIES	CODE	INVOICE REGISTER NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNT	NET AMOUNT
0 = NATIONAL ACME - SHALCO SYSTEMS - NAMCO CONTROLS - FOUNDRY TOOLING 1 = ACME CLEVELAND 2 - CLEVELAND TWIST DRILL - CYNTHIANA MFG. CO. - BAY STATE PLANT - NORTH HOLLYWOOD PLANT - GRANTON PLANT	1		6/09/82	2,000,000.00	.00	2,000,000.00
ACME-CLEVELAND CORPORATION CLEVELAND, OHIO 44101				2,000,000.00	.00	2,000,000.00

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(1242 E. 49TH ST.) • P.O. BOX 5617

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SANTA CLARA, CA 95051

ACME-CLEVELAND CORPORATION

SOCIETY CORPORATION
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YOUNGSTOWN, OHIO

About this time we set up the Pressley Family Trust. This was a revocable trust and placed all of our assets in joint ownership with Anne and myself. It covered the joint inheritance to our kids and placed my sister Mary as a guardian if we passed away.

We also set up a trust for each one of the children with $20,000 for each of them. This was to cover their college expenses etc., but they had total control over the money. They could spend it as they wished, but they knew our intent was for it to get them through college and started in life. It worked out amazingly well.

I recently thought to mention to my sister Mary that she had been guardian to these grown-up people all these years.

Back to the Beginning of XMR

The first real business for XMR had been to build a laser utilizing a new crystalline material developed at Allied Chemical. I talked with Jack Gilman and convinced them that the only way I could do this was if Allied advanced me $50,000 to start the program. He agreed. I think this may have been because the last job I did for him at Allied was to obtain a contract from the Electric Power Research Institute for improving the amorphous metal they were making for themselves and to develop a manufacturing process which would be paid for by the Electric Power Research Institute in California.

It ended up being a $4.8 million contract for Allied Chemical.

As I said earlier, I left Allied as an employee when they chose not to pay for my moving to Morristown since my commute was only 49 miles and the rule for relocation was 50. Maybe Jack felt he owed me something. This work for Allied had long been completed before we sold the laser systems division. Jack Gilman was also the first person I tried to convince that you can grow diamonds using a laser.

A few comments about the overall Amoco XMR relationship:

Dr. Jack Gilman had been recruited from Allied Chemical Corporation to a larger position as head of research and

development at Amoco, a huge oil company based in Chicago. He continued to be convinced that lasers could be very valuable in driving chemical processes. He did not believe that such systems could be developed within Amoco. He wanted XMR to develop some larger lasers for possible applications in the oil industry. We continued the small Excimer Laser job shop, but mostly worked on applications utilizing the advantages of the short wavelength output of an Excimer Laser.

Amoco corporate was initially very positive about these high tech possibilities. I was invited to go to Chicago and meet their executives at their corporate headquarters, a major high-rise in the center of the city. As an archival note, in those days we did not arrange our own flights. We used a travel agency we had under contract, and they sent us the tickets. These were the multiple sheet tickets where a gate agent tore off one sheet to keep track of the passengers (such was history).

My hotel was also booked by the travel agency, and it was only a couple blocks from the corporate tower. Being a Californian, I assumed that I could make it to their offices from the hotel even in the winter. I met my first Chicago wind of Lake Michigan and almost froze. In any event I was ushered up to the 30th floor, which was totally occupied by four executive suites, one for each of the Executive Vice Presidents.

At the hotel, I had read in the newspaper that Amoco had just been fined by the French government a few hundred million dollars for damage to the fishing industry in France caused

one of their tankers running aground. I expected that there would be concern. I was wrong. Over a friendly cup of coffee, Richard Leet, the executive VP mentioned how happy they were that that the fine was small and the cost was relatively negligible.

He then conducted me to the next floor and introduced me to the Chief Executive Officer of Amoco. We said a few polite things, such as lasers are really important etc. I received a few more encouraging words about how great lasers were and then I was sent down one floor to meet Len Triggiani, who was supervising the four or five high-tech small companies that Amoco was investigating with the idea of investing in. We discussed the general level of investment, but I was concerned about each of the companies they discussed. Interestingly, none of them became cash positive. I remember wondering how they picked these companies. It was a strange trip.

Jack Gilman, now at Amoco, convinced the Amoco management that an oil and chemical company should continue investing in laser technology for driving chemical processes. Amoco invested in XMR with a mutual agreement that if XMR sales reached a certain level, Amoco would purchase the company. We were now operating with overseers.

The sale to IBM of these big Excimer Lasers generated sufficient sales for XMR to achieve the volume in sales to where Amoco became obligated to complete the purchase of XMR.

We had painted a large thermometer on the wall of the cafeteria showing the current sales and at the top of the thermometer was marked with the number at which Amoco was required to purchase XMR. We had been adding to the level bit by bit until the IBM purchase was finalized and I was able to take a paint roller and run the amount completely to the top of the thermometer and up the wall. This was a good time generating financial liquidity for all parties.

Someone at Amoco noticed that the IBM laser had not been actually shipped to IBM and should not be counted, even though IBM had fully paid for it. We strongly argued that this was a true sale and eventually Amoco gave in.

It Was Time to Celebrate

Eileen Palmer rented the Monterey Aquarium for our private party.

The Party

We had sold the company and everyone in the company had received a check. If someone joined the company a week before the sale, they still got part of the purchase price.

I realize that this is why I structured the company the way I did. As you can see from the pictures below, I was both very happy and probably inebriated. The party actually only cost $15,000 which I paid. I knew I would get in big trouble if I used Amoco money for the party after they had just

purchased us. I figured I might get fired. Of course I did get fired a little bit later.

We had a band, we had food stations, we had seafood right near the aquarium tanks. The top Amoco man did not want to spend his time talking to drunk celebrants and took over the meat carving table. The party was made even more spectacular when the thunder and lightning storm came through and the electric power went off for the whole neighborhood, except for the aquarium which had standby emergency power.

This was a good party.

Eileen Palmer &
Gary Bakerville

Ted & Linda Fahlen

Bob & Len Triggiani

Life With Amoco

XMR continued building systems, but they utilized Excimer lasers.

We displayed them at some of the major laser shows. The sign was much bigger than the laser system

XMR had been maintaining its own bank account and had no line of credit. Once Amoco had invested and was the majority owner, I contacted the appropriate regional Amoco financial person and asked how he wanted this for the duration. He proposed we handle it the same way they would handle any other project, such as a new well. Each Friday I was to see how much money was in the bank and also calculate what our expenses would be for the next week assuming no new money came in from customers. I was to tell him the amount, and it would be deposited in the bank. I was told there was one limitation to this and that it was if I needed more than $1

million, I had to make a second phone call on Monday, as his approval limit was $1 million a day.

Our local manager from Amoco, John Triebe was expected to approve or control any new areas of operation, but never limit the expenses in our technical areas. That was my ballgame.

At some point Amoco decreed that XMR should lay off 20% of employees. This is something we had never done and I was determined not to do it now. In order to comply I came up with a plan to reduce overall salary expense by 20%. We imposed a 10% pay cut for exempt employees, 5% for non-exempt and a 25% cut for me. This lasted about six months until some sales came in to boost our income.

Our business evolved into three main technical areas: the first was a large Excimer Laser for IBM, the second was surface processing for the semiconductor industry, and the third was a medical project to utilize the strong absorption of Excimer's in removing plaque

from blood vessels.

The first, and largest market was working with IBM using the large Excimer Laser. They were doing photo-lithography on one of the main control boards of the mainframe computer projects. The high-energy pulses from our big systems worked very well for them and they ordered one unit, specifically modified to their requirements, early on after Amoco had made its investment.

We were now fully a division of Amoco Corporation. Amoco purchased the company for some $4 million.

But back to work as an employee of a big corporation.

John Triebe was now officially my boss. He and Bob dePaul, became frequent visitors. Bob was a supervisor over another Amoco investment in a small company in the area and he and I became quite good friends. John Triebe was a very straightforward upfront corporate guy, but he ultimately had the job of notifying me that I was no longer needed. It was a breakfast meeting to discuss future plans for XMR and he informed me with an appropriate letter that I was being terminated with a continuation of my salary for one year, and I was not to go back to the company at all. They had my office packed up and had all my files and miscellaneous stuff shipped to my house. It was an interesting emotional time. I really no longer wanted to work for another corporation, and I had been paid a good bit for my interest in XMR, but it felt like I had abandoned my child which had been adopted by someone else.

Ted Fahlen was put in charge of operations. Ted and I had been, and continue to be, great friends, and I was happy that he was given the job. But back to things that happened while I was still running XMR and had a say in what our technology was going to be.

The large Excimer program was being run by Bob Butcher and was being improved year-after-year. Most of the work was on reliability improvements and experimental work. With Amoco's investment, we had set up a small production line for these large lasers and delivered a fair number of them to IBM. IBM in fact ordered two extra lasers to be used as replacement parts somewhere in the Midwest. This provided a fascinating insight into large-company operations when one of their factory lasers needed replacement and they ordered a new one from XMR, telling us that they could buy a new one far faster than they could approve a shipment from the storage depot.

When Amoco wanted to close down XMR, IBM forced them to maintain the large laser operation for an additional year. Even though the process worked well for IBM, they ultimately changed technology away from this type of a mainframe computer to a type that did not require this product. Such is business!

Being still involved with Laserscope, I continued my interest in the potential medical uses of lasers. The short wavelength of the Excimer Laser emission provided a differential absorption between blood and plaque. In principle then, the laser could be used to clear plaque from blood vessels without blowing a hole in the side of the vessel. We identified

a medical laser company Shiley. We negotiated a contract with Shiley where they paid for the development of a small Excimer laser that we would develop and sell them for approximately $170,000 apiece. This was a small version of our large transient-flow Excimer Laser and Ted produced an excellent design for the unit prototype which worked very well.

We tested the performance of the laser blood vessels from pigs. Shiley Corporation somehow fed pigs a diet that produced blood vessels with significant plaque. We found that indeed, we could remove the plaque without punching a hole in the blood vessel wall. While that part of the experiment was successful, we were unable to find quartz fibers that were sufficiently transparent for the doctor to be able to deliver laser output into the desired blood vessel. They wanted to use a 2 meter long fiber. The purest quartz we could find was not adequate. We suggested that they use a composite UV transmitting fiber with a calcium fluoride core. Ultimately they decided to abandon the entire plaque removal project. Oh well, it was a good technology. The project was a good idea, the laser worked well, but the doctors wanted the delivery mechanism to get all the way into the blood vessels.

The other area of on-going work was semiconductor surface processing. The Excimer laser wavelength could melt a very shallow layer of surface material. Semiconductor devices have multiple layers of metal traces that go adjacent to and up and over lower layers. It becomes increasingly difficult to evaporate all high resolution traces on these layers when they are of different heights. XMR developed a laser system

XMR

RESEARCH NOTE

Semiconductor Processing

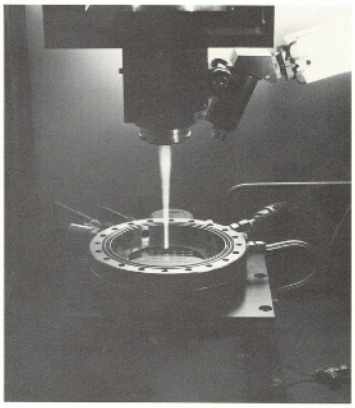
Improving Device Fabrication Technology with UV Lasers

XMR's R&D staff has developed several new UV processing techniques for semiconductor materials.

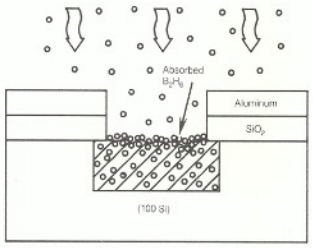
One such method, originated at XMR, is a UV doping process. This technique allows the creation of ultra-shallow, high-concentration boron profiles in silicon using UV laser assisted doping. With this process, a dopant species is adsorbed on the clean silicon surface and subsequently driven in during a melt/regrowth process initiated upon exposure to the short laser pulse.

The main components of the UV doping system are a xenon chloride (XeCl) excimer laser, optics system, gas cell, and computer. The 308 nm laser is used to minimize photolytic reactions with the dopant gas, while still maintaining a shallow absorption depth in Si. Another advantage of using an excimer laser is the spatial uniformity attained using the XMR beam homogenizer. The optics system redefines and homogenizes the beam to a size of 3 x 3 mm, and is mounted on an X-Y stage which tracks the beam across the wafer. A television monitor provides visual feedback.

The UV doping process involves placing the wafer into the gas cell, pumping the cell to a few torr, and back filling with N_2 gas to remove oxygen and residual water vapor before adding the pyrolytic diborane (B_2H_6). The



UV Doping of Silicon Wafer



Molten Silicon

UV Doping Mechanism

Cross-section of a masked (100) wafer showing the adsorption of the dopant, in this case B_2H_6, onto the clean silicon surface. The dopant is incorporated into a very shallow region upon exposure to the excimer laser pulse.

wafer is masked with patterned SiO_2, a reflective layer such as aluminum, or polycrystalline silicon. The laser is then pulsed and the B_2H_6 dissociates, with the boron being incorporated into a shallow molten region. This entire molten region is doped p+ to controllable depths in the 300 to 800 angstrom range during the approximately 200 ns period from initial pulse to total recrystallization.

When the laser diodes fabricated using the UV doping process are evaluated, their electrical characteristics show essentially ideal diode behavior (ideality factor, $n_i = 1.03$) with an absence of damage and shallow defect levels.

In addition to ongoing work with UV doping, the semiconductor processing group is investigating several other areas involving excimer laser/semiconductor material interactions. These include direct deposition of metals for contacts, automated through-via formation for compound semiconductors. UV scribing for damage-free dicing of wafers, and direct deposition/write of oxide structures on silicon.

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that could instantaneously melt these aluminum layers and demonstrated that surface tension would leave a perfectly flat surface. This technique could also be used to fill a small hole required for an electrical connection between the layers. We call this process planarization.

Excimer Laser Processing of Semiconductors

Excimer Lasers Provide New Capabilities for Semiconductor Processors

by Robert J. Pressley

Optical sources have played a key role throughout the evolution of the semiconductor industry, examining, probing, modifying, processing, and labeling semiconductor devices. Excimer laser processing is the latest step in that progression.

Incoherent sources with well-defined spectral ranges have long been invaluable for photolithography and inspection. As coherent sources became available, their advantages — high peak intensity, high average power, controlled spatial properties, and spectral purity — made them obvious candidates for commercial use.

Initial work with a variety of existing lasers confirmed these advantages and indicated that, indeed, high intensity and beam uniformity were bonuses. However, spectral purity produced interference problems in the optics. In fact, some degree of incoherence was advantageous.

Excimer lasers combine partial in-

Bob Pressley is president of XMR Inc., Santa Clara CA.

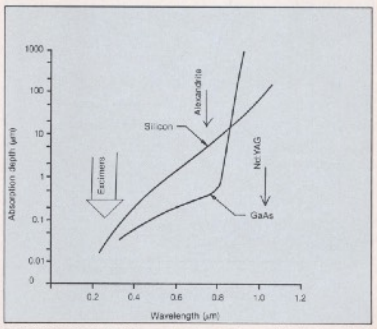
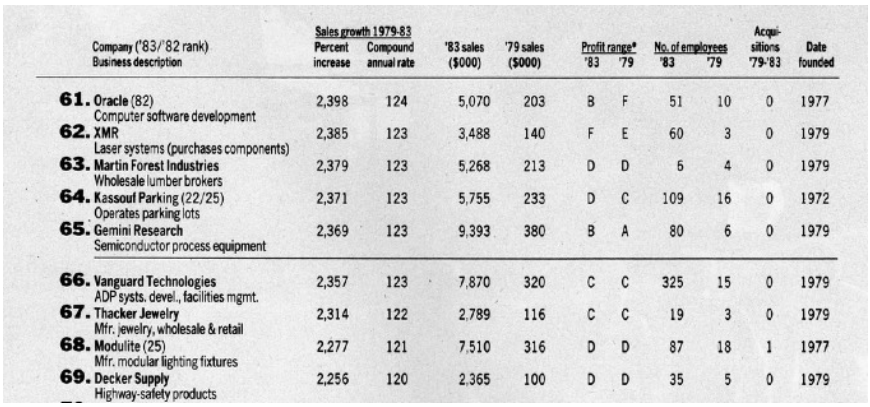


Figure 1. Absorption depth of silicon and gallium arsenide as a function of wavelength, with common laser wavelengths noted.

Let me get a little technical here. Skip this section if it becomes boring. When a solution surface is exposed to a vacuum, it will retain an adsorbed layer of whatever gas was present before the vacuum was achieved. We demonstrated that when the laser melted the surface layer, the adsorbed



Company ('83/'82 rank) Business description	Sales growth 1979-83 Percent increase	Compound annual rate	'83 sales ($000)	'79 sales ($000)	Profit range* '83	'79	No. of employees '83	'79	Acquisitions '79-'83	Date founded
61. Oracle (82) Computer software development	2,398	124	5,070	203	B	F	51	10	0	1977
62. XMR Laser systems (purchases components)	2,385	123	3,488	140	F	E	60	3	0	1979
63. Martin Forest Industries Wholesale lumber brokers	2,379	123	5,268	213	D	D	6	4	0	1979
64. Kassouf Parking (22/25) Operates parking lots	2,371	123	5,755	233	D	C	109	16	0	1972
65. Gemini Research Semiconductor process equipment	2,369	123	9,393	380	B	A	80	6	0	1979
66. Vanguard Technologies ADP systs. devel., facilities mgmt.	2,357	123	7,870	320	C	C	325	15	0	1979
67. Thacker Jewelry Mfr. jewelry, wholesale & retail	2,314	122	2,789	116	C	C	19	3	0	1979
68. Modulite (25) Mfr. modular lighting fixtures	2,277	121	7,510	316	D	D	87	18	1	1977
69. Decker Supply Highway-safety products	2,256	120	2,365	100	D	D	35	5	0	1979

material was not blown away, but was mixed in the re-melted silica. This allowed us to manufacture extremely shallow junctions and connections.

We called this process “gilding.” These types of machines had the potential of becoming production equipment in the semiconductor industry and were potentially very profitable for us. We demonstrated the technology, interested some customers and shipped a few units. I published the lead article on Excimer Laser processing.

The article was published in late 1985, one year after Amoco invested, and we continued selling laser systems for the next five years. In order to get a feeling for the size of the company in 1989 and ‘90 before Amoco closed it down, here are few technical items. We were growing quite rapidly at that time; in fact in 1984 we were the 62nd fastest growing privately held company in the United States, according to an Inc. magazine survey.

If you look at the data closely, it will say we had more employees than Oracle Corporation, and were growing just as fast at that time. Obviously though Oracle grew somewhat faster in the following years.

Moving ahead to 1988 and 1989, when Amoco was evaluating where the company was going, below are some numbers.

The company was selling fairly large machines retailing for several hundred thousand dollars. In 1988 we had sold some 33 of these machines and managed to break even financially, as shown in the income statement. We employed about 170 people. It turned out however, that our markets were fairly limited.

In 1988 XMR basically broke even delivering the 33 laser systems; in 1989 XMR delivered only 16 laser systems and Amoco, looking at the loss in future expected orders, decided to gradually close the company. I was let go and Ted was given the job of supervising the transition from a company with new products to a company supporting the existing products. Amoco notified all of the semi conductor companies that had purchased one of our gilding machines that they were no longer going to support them and Amoco actually repurchased all of the machines. Strange are of ways the big companies.

By 1991 XMR was no more and I was convincing Ted to join me at a new company,

I had started XMR from scratch with no outside investors. We had innovated a number of really great large and expensive products. At the end, our real future was in semi conductor surface processing. Amoco was unwilling to continue the research and investment to make this play out.

Amoco Corporate did not even notice such a small event as closing XMR when they were no longer interested.

A Wonderful European Trip in 1991
Bob & Anne, Ted & Lynda

Even though Amoco was trying to decide what to do with XMR, Ted and I were somehow negotiating some kind of a complicated deal with the German company called KWU. We decided to make this a family trip. George Shukov's wife was a travel agent and George worked with her to arrange our trip. It was memorable. I do not believe we made any sales nor concluded any deals, but we had a ball.

I remember the trip was two weeks long. The four of us flew into Frankfurt and rented a car. We toured a couple of German towns and got to the German KWU factory in Sindelfingen. Ted and I met with the German company people and the Germans arranged an excursion trip on the Danube River for our wives. They reported it was very enjoyable.

We then drove through Germany and the Black Forest and visited a small town that seemed to do nothing but make cuckoo clocks. It was beautiful scenery. We then headed towards Paris on a French superhighway. It was here that Ted became curious as to how fast our rented car could go and discovered it was somewhere over a hundred miles an hour. He might well have tried to go faster if Anne, sitting in the

backseat behind Ted had not started beating him around the ears to convince him to slow down.

When we arrived in Paris we circled the Arc de Triumph. This involved merging in and out of some four or five lanes of buses, motorbikes and cars. In the center of this merging traffic area was a raised platform with a French policewoman with a whistle. She was the boss. In any event, Ted made it through, and we finally found the car return location.

We had rooms at a small hotel overlooking the Eiffel Tower. We investigated the Paris subway, a couple of department stores, and the Louvre Museum. We also visited a couple who were friends of Ted and Lynda's. They treated us to a meal in their apartment, which had the smallest elevator I have ever seen. It was a delightful fish meal and when we had finished the hostess said "now I will play." She indeed played a couple pieces on the piano.

Somehow there was a confusion in our reservations at the hotel, and they wanted us to move out. There was somewhat of a language barrier until our previous night's hostess arrived and in quite loud and insistent French settled the matter and we stayed in the hotel room.

A couple of memories from the Louvre Museum. Ted likes to go places early so we were there when it opened one day and went immediately to look at the Mona Lisa. We were the only four people in the room and were able to get amazingly close to a very famous, but quite small painting. My other memory is resting alongside the statue of the winged victory

and watching Ted practically running while recording using his video camera.

We flew home from Paris, completing a delightful two weeks with far more memories than I have related here.

On to our Next Adventure