Al Nagler poses with his wife, Judi, in front of Tele Vue Optics' booth at the 2005 Photo Marketing Association Show in Orlando, Florida. ALL IMAGES COURTESY OF AL NAGLER

The life and times of Al Nagler

For 36 years, the man behind Tele Vue Optics has been a force in amateur astronomy. But there's a lot more to him than that.

by Michael E. Bakich

Many readers know Al Nagler as a giant in the field of telescopes — the developer of the revolutionary Nagler eyepieces, which offered amateur astronomers a much wider and sharper field of view of celestial scenes. As founder of Tele Vue Optics, he crafted many high-quality optical products that are well-known to observers: the Renaissance, Genesis, and Tele Vue Petzval lines of telescopes; accessories like the Starbeam, Paracorr, and Powermate; and the Nagler, Radian, and Panoptic eyepieces. He also supervised recent product lines such as Ethos and Delos.

But few people know the story of the man behind the products — the tale of a City College night-school-educated inventor who had many jobs, detours, and learning experiences on his path to success, and who today is an active 77-year-old who still describes himself as "a big kid."

"I just kind of never grew up," Nagler explains, "and I try to maintain that youthful enthusiasm as much as I can. I try to look at the positive side of things, if at all possible, and hope to engage with people, see where they're coming from, and see what I can add to their experiences."

Other pursuits

While known as an icon in our hobby, Nagler has interests that range far and wide, including art, classical music, and sound equipment. "I'm an audiophile," he says. "In fact, I've almost been as crazy over that through the years as I have about astronomy.

"When I was growing up, I thought I might become an artist," he continues. "I used to do oil painting. Now the only artwork I do is sketching out new designs and imagining the way products might look. But I actually applied to two high schools: One was the High School of Industrial Arts in New York City, and the other was the Bronx High School of Science. I was accepted to both, so I had to make a decision, and I chose Science. But I never got too far away from the art side."

Indeed, Nagler's art leanings find their way into some of Tele Vue's products. "For example, if you look at the detail of our Starbeam red-dot finder [a telescope attachment that lets you center on an object]," he says, "you'll see the back end has an odd curve in the tube. I often ask people what they think the purpose of that shape is, which puzzles them until I tell them it's because I like it.

"Personal appeal is also why some of our products have slight bevels and tapers. I just think it adds to the aesthetic," he laughs. "That's the way I vent my latent artistic desires nowadays."

Al Nagler's parents, Isidore and Mildred (Cohen) Nagler, provided a stable home and a happy childhood for Al.

Childhood skygazing

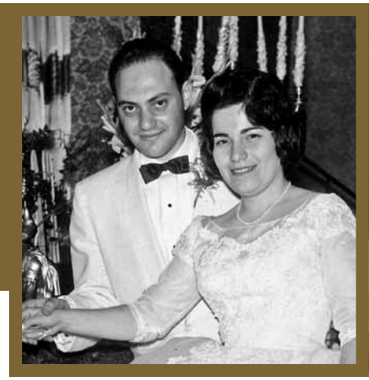
Nagler's interest in observing the heavens began, not surprisingly, in his youth. "My first real telescope," he remembers, "was a 3.5-inch Skyscope reflector that I got as a kid. Before that, I had a spyglass, Roy Rogers binoculars, and a few other things to play with. I knew that by getting into the Bronx High School of Science, I could probably get to build my dream scope, and I devoted my junior and senior years to making an 8-inch reflector. The Scientific Techniques Laboratory (shop class) was a unique opportunity. I made the 8-inch mirror at home on my mother's sewing machine top — my mom was very tolerant."

The school displayed Nagler's telescope on stage during his class's graduation ceremony, and the principal presented him with the "Shop" award for the project. The prize was a micrometer he used for years.

Michael E. Bakich *is an* Astronomy *senior editor and author of* 1,001 Celestial Wonders to See Before You Die *(Springer, 2010).*

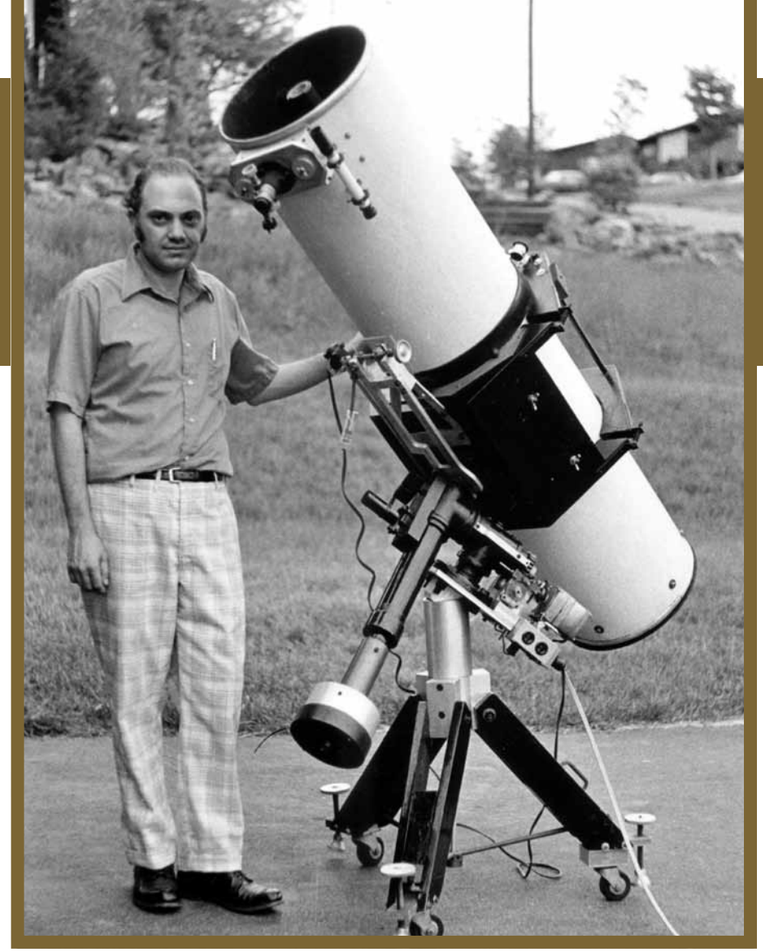
This 8-inch Newtonian reflector was Al Nagler's senior project in high school. Here it is at the 1958 Stellafane Convention, where it earned him third prize.

Charley Cafferella (left), Al Nagler's high school shop teacher, poses with his wife. Years later, Cafferella saw an ad (showing Nagler in the top of a lens) stating "A little Nagler goes into every Tele Vue Barlow." Cafferella thought, "I know that kid," and called Nagler, who gave him the telescope shown.



Albert Nagler married Judith Pearlman on June 25, 1961. His wife co-founded Tele Vue Optics and was the company's first full-time employee.

► This 12-inch scope Al Nagler built was the first-prize winner at the Stellafane Convention in 1972.



Even in youth, Al Nagler loved art. This oil painting is his re-imagining of Russian composer Modest Petrovich Mussorgsky's famous suite *Pictures at an Exhibition*. The music was itself the composer's tribute to a series of paintings by his friend the Russian architect and artist Viktor Hartmann.

Upon graduating from high school, Nagler had to work to support his mother and sister, since his father had died four years earlier. Nagler's first inclination was to be a machinist, so he took a job running a lathe in a lead factory. This, of course, was before the dangers of lead were widely known.

"I didn't really like the job, and after two weeks I was fired. But not for any reason you'd think," he says. "I got the job through an employment agency, but it turned out that the company hired me only as a two-week fill-in for a guy who was on vacation. And I still had to pay the agency!"

Nagler's next job also met an unusual end. Following his interest in machines, Nagler answered an ad for the Scientific Machine Corp. in Brooklyn. "What can get better than that for a guy who built a telescope in high school, right? And I got the job," he says. "What I did, however, was assemble a variety of mechanical arcade games we now call Skee-Ball machines and the giant toy cars that you used to see kids ride outside supermarkets."

But even this job was short-lived. "One day the owner, Jack Firestone, came up to me and said, 'You know, Al, you can do better than this. You're fired,'" Nagler says. "And he meant it. And he knew. And he was right. It was a great lesson and a great favor, although I recall being unhappy at the time."

What's that smell?

Nagler's checkered job history continued with lab work at several chemical companies. The first, at National Starch Co., ended when he couldn't afford to move himself, his mom, and his sister to the company's new location in New Jersey. "My worst job," he says, "was at a plating plant in the Bronx where I tested chemicals, including acids and solvents. I had my own little laboratory on the second floor, but it didn't have any windows or ventilation.

"The conditions were intolerable, but when I complained, they ignored me," Nagler continues. "So, one day I cooked up a giant vat of hydrogen sulfide — otherwise known as 'rotten egg' gas — and I turned on a fan and blew it down into the main office. Well, I got even with them, but, of course, they fired me."

Right after high school, Nagler started night school at City College of New York. Because of work during the day, he had to decline a daytime-only scholarship. He studied music history, geology, chemistry, drafting (with the possibility of going into mechanical engineering), and, later, physics.

"And here's a story I've only told a few close friends," he says. "My first drafting job was for a company called S&S Industries in the Bronx." Since 1946, S&S has manufactured, among other things, brassiere wires and still controls 90 percent of that market.

"They had to make templates for the many underwire products so they could check the quality control," Nagler recalls. "My job — and I can already hear people laughing — was to make precision line drawings of the brassiere curves. I worked there for about a year."

Another drafting job followed, at Lightolier in New Jersey, where his drafting skills were applied to track lighting. This finally moved Nagler into the field that would transform his life.

High-level optics

"At that point, I had some real-world drafting experience, along with the article I wrote for *Mechanix Illustrated* in December 1955, where I described building my telescope in high school," Nagler says. "I also happened to know that the editor for *Sky & Telescope*'s amateur telescope-making column, Earle Brown, also was the chief project engineer at an R&D company, Farrand Optical, in the Bronx.

"So, in 1957, I just walked in and got a job as a draftsman. And that, of course, worked out well because after a year they asked if I would like to join the optical design department, where I eventually became senior optical systems designer."

Nagler worked at Farrand until 1973. Under Grumman Aerospace Corp.'s contract with NASA, the company developed visual simulators for the astronauts. Nagler himself designed the infinity displays for the Gemini program and the Apollo Lunar Module spacecraft. The simulators used large mirrors to project images of Earth orbit, docking, star fields, and lunar landing.

A complex optical probe created real-time landing images. The probe acted like a television camera mounted on a boom that "flew" down onto a scale model of the lunar surface. He also worked on eyepieces for night-vision goggles and mirror-type "heads-up" displays for aircraft (which later gave him the idea for Tele Vue's Starbeam red-dot pointer).

Nagler got his B.S. in physics in 1969, after 16 years of night school. The degree allowed him to take a position as chief optical engineer at Keystone Camera Co., a division of Berkey Photo, Inc. There, he designed a zoom lens for the firm's pocket camera. That task took him to Japan, where his contacts with the optical industry later proved invaluable: One of the Japanese companies he worked with remains a major supplier to Tele Vue today.

In 1973, Al Nagler, then the chief optical engineer at Keystone Camera, designed the zoom lens for this small pocket camera.

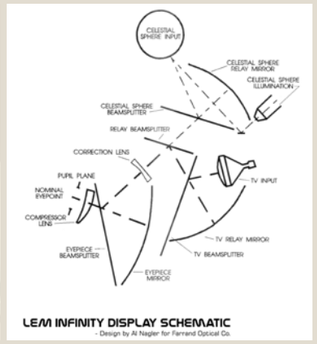
When Nagler left Farrand in 1973 to join Keystone, he also toyed with starting a company with a Farrand friend, Matt Baum, to make stereo reverb units. "Then I realized I'd be competing against companies like Sony that could take an idea and do anything they wanted to with it," he says. "So I went in a different direction."

Baum had invented an electronic motor brake that worked well, so the two men started a company, Ambi-Tech Industries, making products that combined electronics and mechanics.

"I worked part time with Matt until I left Keystone in 1976, joining Ambi-Tech full time," Nagler says. "I did optical consulting in the evenings and started Tele Vue with my wife, Judi, in 1977. Judi managed it in the daytime while I designed optics for it at night.

"Matt and I built Ambi-Tech into a full-time business and had lots of fun developing products, mainly for safety on woodworking machines. My main functions were in product development and marketing. For 20 years, that's how I supported my family as I developed Tele Vue part time," Nagler says.

"Matt and I sold Ambi-Tech in 1996, and after my support work for the new owners ended in 1997, I finally went to Tele Vue full time," he continues. "My having another job was great because it let Judi and me build up Tele Vue slowly, without the need to borrow money or for additional investors. It also allowed my son, David, to join the company in 1988 as my 'eyes and ears' operations manager and become immersed in manufacturer relations, product development, quality control, advertising, and marketing."



A Farrand technician (left) tests the Infinity Display system Al Nagler designed for the Lunar Module simulator (middle). During the test, the triangular lens opening shown fit against one of the module's windows. In the schematic of the Infinity Display (right), the small triangular "compressor lens" (bottom left) is that window. That lens provided a 110° field of view, had eye relief of 1 foot (30.5 centimeters) from the window, and included an exit pupil 1 foot in diameter. That way the astronaut could have his whole head near the window, with both eyes open, and move around.

Nagler had met Judith (Judi) Pearlman in 1959, taking her on their first date to Hayden Planetarium and then to a concert by the Bronx Symphony Orchestra.

"I took her to these two venues to see her reaction," Nagler says. "Of course, she wasn't into astronomy and classical music to the extent that I was, but at least she was able to tolerate both of my passions. Once we were married, she not only tolerated all my hobbies, she supported them."

Judi taught grade school until retiring to bring up David and daughter Meryl. "Later, when they were older and I had the idea for Tele Vue, she willingly became co-founder and its first full-time employee," Nagler says. "She managed the company and its growing staff alone from 1977 until the time when David joined in March 1988. Tele Vue would have gone nowhere without her. Sandy, David's bride-to-be, was hired by Judi as a 'surprise present' later that year for David's return from a business trip to Japan."

Personal ups and downs

Nagler recalls that his biggest optical inspiration came from looking at the 110°-wide view through the simulator window in the Lunar Module and "flying" over the Moon's surface. "Later, I was the optical designer for Farrand's team that created an optical probe for Wright-Patterson Air Force Base," he says. "It had a 140° field of view and 45 lens elements. All that stayed with me, so when I started Tele Vue, I thought the probe's objective principle could be the basis for developing a wide-angle eyepiece with a 'spacewalk' view. About a decade later, I was able to apply all that experience to designing the Nagler eyepiece."

His involvement with so many businesses offered opportunities. "In the mid-1970s, projection television sets were becoming popular," Nagler says. "I knew how to correct the out-of-focus images due to the convex television tubes and lenses borrowed from overhead projectors being used. So, I started Tele Vue with Judi.

"I named it Tele Vue (for television viewing) knowing I might also use it for 'telescope viewing.' At the 1977 Consumer Electronics Show, the show magazine had an article titled 'NASA Scientist Designs Projection TV Lens.' By 1978, Edmund Scientific was selling its '5-inch Super Projection Lens' with a booklet I wrote on how to build a cabinet for the set. We sold these lenses until 1985, when large, flat, rear-projection screen TV sets took over the market.

Amateur astronomer and artist Hulan Fleming painted a family portrait of the Naglers observing at Stellafane. From left to right: Sandy and David Nagler, Michael and Meryl (Nagler) Budnick, and Judi and Al Nagler. (The cat is Grey Cat.)

Apollo 12 astronaut Alan Bean (standing), the fourth human to walk on the Moon, spoke at the 2009 Stellafane Convention. Al Nagler gave a brief introduction, and later the two talked about the Apollo simulator Nagler worked on.

Tele Vue's initial product was the Tele-Kit projection system, which was the first to correct the backward-curving field of the television. Al Nagler designed the cabinetry as well as the lens system, which remained in production from 1977 to 1985.

"I learned a lot about business from this venture, including lessons in being careful about with whom you do business."

Aside from one particular nasty business snafu, Nagler recalls with some emotion what he considers his biggest personal mistake: "My father came from Austria. He was a physical therapist and chiropractor who spoke seven languages. He was a loving but stern father. My biggest mistake was failing to ask him about our family history before he came to the U.S.

"He passed away when I was 15," Nagler continues. "But before he did, at least he learned that I had been accepted into the Bronx High School of Science. So at least he had that.

"Besides being in a friendly manufacturing business with my good friend Matt, I can say that having a great family cooperating the way we do at Tele Vue is the reward of a lifetime. Judi worked full time on the business side until retiring in 2008. We had the joy of our son, David, asking us if he could join in 1988, and having Sandy join with us to follow in Judi's footsteps.

"With David's background in communications from Syracuse University, he moved the company forward in marketing, advertising, Internet, and, best of all, as my partner on virtually all technical matters. He developed the 100° Ethos concept and got the project going with Paul Dellechiaie, a longtime employee and my protégé in optical design. My name may make the headlines, but without such an ideal partner as David, along with a great staff, we could never have gotten where we are."

A standout event

At this point in his life, Nagler can reminisce about a great many things, but one event stands out to him as an example of how his professional work came full circle.

"In 2009, which was the 40th anniversary of the first Moon landing, the organizers of Stellafane [a major telescope show] invited Alan Bean [one of the moonwalking astronauts] to speak," he says. "Stellafane is my favorite place in the whole world. It's where I won third prize in 1958 for my high school telescope and first prize in 1972 for a 12-inch scope.

"So, before Alan's talk, there was a dinner held for him. The people at Stellafane asked me to say a few words because they knew of my work in the space program, especially on the Apollo simulator.

Al Nagler presented a special guest lecture at the 2012 Astronomischer Tausch und Trödelltreff European Astronomy Show in Essen, Germany.

"Alan Bean doesn't know me from Adam, but I gave a short talk for which he thanked me afterward. While we were speaking, I handed him a little booklet I had made that told the story of the Apollo simulator. It also contained a picture that I'd gotten from NASA of Bean in the simulator. On the booklet, I had written 'Dear Alan, glad it worked!'

"Now to me," Nagler says, "that was the perfect representation of how the things I did at Farrand, at Tele Vue, even as far back as high school and at Stellafane all worked together and brought me to that 'full-circle' moment."

Final thoughts

Nagler is quick to remind anyone that he has not retired. He still works largely full time, but his move to CEO in 2005, when his son David became Tele Vue's president, does allow him the opportunity to take more time off to travel.

"I'm having too much fun to retire," he says. "I get to talk to fellow amateur astronomers all the time. And every one of them is not only a potential customer, but also a potential friend." Indeed, with an attitude like that, Al Nagler must have many friends.

READ MORE ABOUT AL NAGLER'S TECHNICAL ACCOMPLISHMENTS AT **www.Astronomy.com/toc.**