

Synthetic Emeralds 'Grown' By Youthful S. F. Scientist

Hundred-Karat Stones
Produced Here
In Laboratory

By KENNETH EHRLMAN

A young San Francisco chemist who, when he was a Lowell High School kid, "always had the cops out in our neighborhood" because he liked to experiment with explosives, is the target of some of the world's biggest chemical companies today.

They would all like to have his secret—a secret he carries in his head, with his mouth shut tight.

For Carroll F. Chatham, who is 33, is believed to be the only man in the world who has been able to produce, by literally growing them from a seed, synthetic emeralds comparable to the natural gem in quality.

Puny German Gems

As early as 1840, European scientists produced emerald crystals in microscopic sizes. And in the 1930's Germany's I. G. Farbenindustrie, the great chemical trust, made some tiny "igmeralds" which they proudly presented to their fuhrer.

These were worth nothing commercially, however — and looked it, compared with Chatham's stones, which go up to 100 karats.

By August, the young chemist says, he hopes to be in full production here.

"I expect to make about 100 karats a month of finished quality," he explains. "Probably average about \$10,000 a month at retail prices."

This little production quota will be turned out by one man—Chatham himself.

"I don't want anyone else helping me—not that there aren't plenty of people who would like to be my partners," he says.

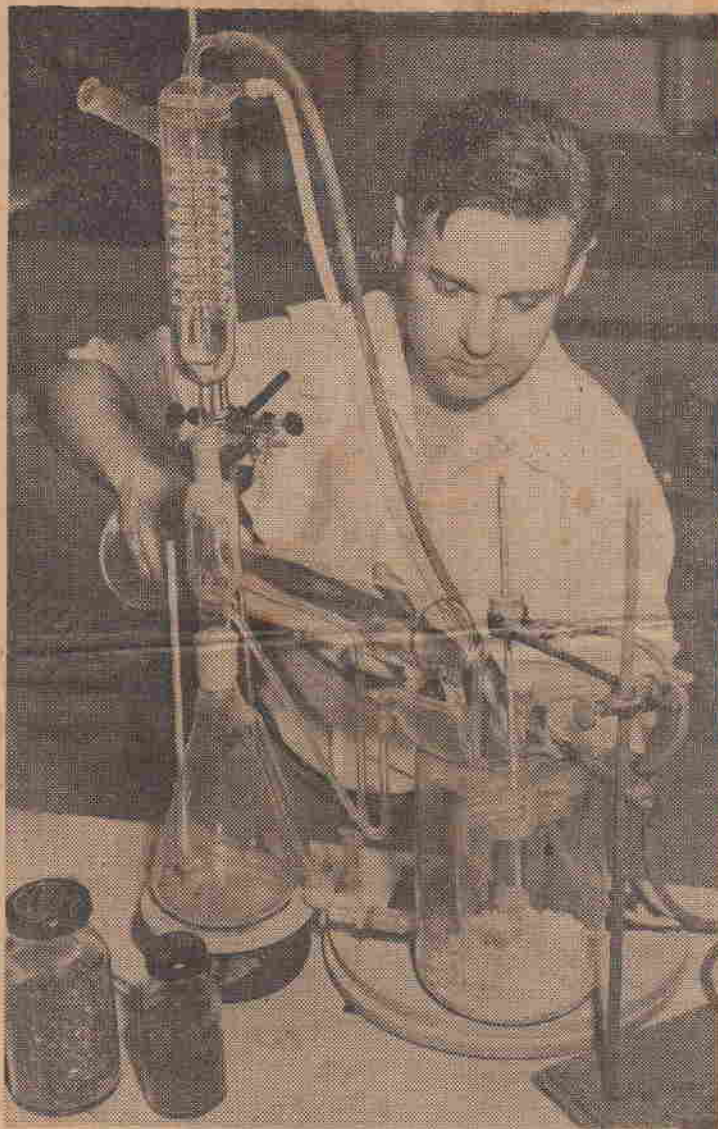
From Rock Beryl

His small laboratory at 70 Fourteenth-street reflects this feeling for security. The office space is limited and neat, with nothing but a few bottles of rough emeralds, worth about \$50,000, cluttering it up.

Toward the rear is a locked door with a sign: "Control Laboratory. NO ADMITTANCE." And he means it.

"My most secret work is done at a lab down in San Mateo County," Chatham says. "Don't ask me where it is, though."

He explains that the emeralds are grown from rock containing beryl, a compound which, when green, is in fact emerald.



Carroll F. Chatham, San Francisco chemist, shown making synthetic emeralds comparable to the natural gem. The process? It's a secret known only to him.

—Call-Bulletin Photograph.

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"Growing emeralds is sort of like making rock candy," he said. "Only it takes 10 months to produce a batch of rough emeralds. Why, just to get the process started takes a month and a half.

"Fundamentally, though, it's just a question of making the crystals grow. Crystals are almost alive, you know. The only difference between crystals and plants is that a plant can seek its own food, whereas crystals must be fed. And plants grow from within, while crystals add to the outside."

The green color is imparted by adding traces of compounds containing chromium and iron and

oxygen. The whole process is carried out under high pressures and temperatures.

His secret, he explains, is in a new technique of crystallization and accurate control, rather than in the synthesis itself.

"It took me 18 years, on and off, and about \$85,000, to perfect the process," he said. "I got my first colorless beryl crystals in 1930. Four years later I made some small but perfect green crystals. Then in 1941 I grew a batch of commercially good emeralds.

"One thing amuses me, though. Here I've been making emeralds on a large scale for at least two years. I've sold them in almost every country in the world. Yet no San Francisco jewelers knew what I was doing.

"Why, one jeweler wrote to New York to find out where he could buy these synthetic emeralds he had seen. It turned out he lived two blocks from me."

Wary at First

Chatham says that at first he had a hard time selling his emeralds. Jewelers were afraid his stones would break the market in real gems, and tried to discourage him.

"Now I can't supply the demand," he said. "The jewelry trade knows I'm not going to flood the market, and I sell only unfinished emeralds."

His price for synthetics is about one-tenth of the price of natural gems, although the only way the two can be told apart is by heating them until the natural emerald cracks. ("Not a practical test if you want to keep your emerald," Chatham points out.)

Although he realizes that some other chemist may discover a similar process, Chatham would

like to keep the secret for his children, John, 5½, and Thomas, 2½.

He also hopes his methods, which he says involve "entirely

new chemical principles," can be applied to other crystals. He has worked unsuccessfully on diamonds, and is trying to grow quartz.

Man-made emeralds were produced in Europe before the war but were too small and too costly for practical use, Chatham said.

The synthetic emerald is the second recent American achievement in the field of man-made gems. The Linde Air Products Co. recently began production of synthetic star rubies and star sapphires.

Chatham's next goal is synthetic diamonds, one of the dreams of scientists since the days of alchemy.