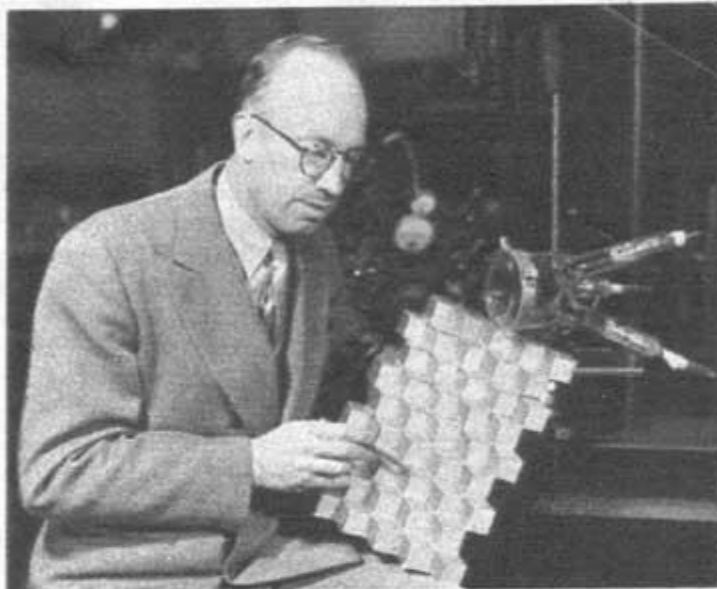


'Today I Invented Color TV, I Think'

How an ailing physicist produced a key patent —with sugar cubes and margarine

By Mary Wells Geer



Dr. Willard Geer with a model of his invention.

When a man finds himself seriously ill, and has a wife and two small children to provide for, what does he do?

In the case of my husband, Willard Geer, the only thing to do was to invent color TV. So he did.

(At the time, there wasn't even any black-and-white television broadcasting. It had been done experimentally, then suspended during the war. It was taken for granted that television would be an important service after the war, but it was also known that the ultimate would be television in color.)

The story starts in 1944, when my husband, an assistant physics professor at the University of Southern California, went into a diabetic coma. But even after he regained consciousness, there were complications; an impacted wisdom tooth had caused a systemic infection that affected his heart. And in those days, when antibiotics were still in the experimental stage and exorbitantly expensive, this meant a convalescence that would be long, costly and unpredictable.

Considering the financial burden, we pleaded with the doctor: could Willard

safely attempt his teaching assignment? Yes, he said, but only on rigid terms. I would have to drive Willard the 20 miles to and from the university and take over as gardener, cook, maid and home handyman. My husband would have to have complete rest at home, take catnaps at the university and undergo no additional strain.

We enrolled the children in a day-care center, freeing me to be Willard's chauffeur, and he began teaching his classes. Things went reasonably well, but gradually we realized that the prolonged periods of absolute rest were inimical to his nature.

To keep his spirits up and to occupy his keen and restless mind, I said to him one day in a bantering mood: 'Honey, while you've got all this spare time, how about thinking up an idea that will make us some money? In your physics classes you're always giving away million-dollar ideas for improving the world. Let's dream up a dilly and get ourselves a patent.'

It was a joke, but when the doctor bills and laboratory fees began to pile up, we stopped joking. One day Wil- →

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lard said firmly, "Next Saturday we'll decide what to invent."

Came Saturday. "What really needs doing," he said, "is a new approach to color television. But I don't know anything about the subject right now, and it would take more researching than I have strength for. So that's out."

I responded quickly—hastily, I suppose, for I very nearly bit off more than I could chew. "I sit in the car every day waiting for you to come from your classes," I said, "with virtually nothing to do. Why don't I boil the meat off the bones of every scientific article I can find and bring it home in small pieces for you to digest? It'll be more fun reading about TV in the library than camping out in a cold car."

And so we decided that, on the next day of classes, we would begin to "invent color television."

Over the following weeks I boiled down all the scientific articles I could find, and my husband eliminated all the ideas that had already been tried. Finally, he came up with his own original idea. In the kitchen I carried out Willard's instructions, wearing a leftover wartime gas mask to protect myself from the fumes of the acid with which I etched the screens. Considering I'd flunked chemistry, I learned to deposit phosphors rather well.

But the prime problem remained. One morning at breakfast, my husband picked up a few sugar cubes and embedded a corner of each in margarine, arranging the cubes in perfect alignment so that they made convex and concave pyramids impinging upon each other.

This was the solution—so simple—using three guns shooting from three different angles, separating the colors placed on the faces of the pyramids!

It was St. Valentine's Day—1944; and in my husband's diary (still impounded in the Patent Office) his notation reads: "How much I love Mary, and today I invented color TV, I think."

We knew nothing about obtaining a

patent, and (influenced by the cartoons) we believed a workable model was necessary before an inventor could even sit in a patent attorney's waiting room. Obviously we couldn't walk in with sugar cubes bedded in margarine as our "workable model."

I tooled screen molds in borrowed dental wax and plaster; we made a pyramid-shaped needle and I punched out wax models with a sewing machine bought at Good Will for \$5; we sacrificed copper pennies to electroplate our molds. When we had formed our glass screens, I painted the tiny pyramids with a fine brush, using a microscope to enlarge the surface. (Applying beryllium for the blue phosphor, I innocently put a point on the poison-filled brush by putting it in my mouth—which could have ended in disaster.)

In June we located our angel—a top-flight patent attorney who would take us on a contingency basis; and he prepared such an all-inclusive patent application that it is still used today, we're told, as a classic model in law schools. We filed our application for the patent on July 11, 1944.

On Aug. 5, Radio Corporation of America filed for a patent which claimed similar solutions to the problem of color television. They promptly brought an "interference suit" against us. Both parties were ordered by the court to submit proof of "date of conception" and "evidence of diligence" so that conflicting claims could be adjudicated.

Into court went the diary, the correspondence, the boxes of finished molds, the screens, and the affidavits from scientists and engineers who had witnessed our demonstrations. Four years of litigation later, and after a final attempt by RCA to pay us to abandon suit, the court announced its verdict: Geer had won on all 40 claims of his patent and had proved priority.

The great corporation with all its sophisticated laboratory potential must have smiled at the crude screens made

in our kitchen—but that all-inclusive U.S. Patent No. 2,480,848 (which RCA would have to possess in order to use multiple electron guns for any color-TV-screen configuration) was granted to Charles Willard Geer on Sept. 6, 1949.

By the time the patent was issued, complete health had returned to my husband, but our lives now took on a new and bizarre twist. The press buzzed with the news, and clipping services deluged our mail box with both true and distorted versions of our story, most of which attributed Willard's idea to a lucky stroke of mental lightning which had hit the professor while he was lecturing to a physics class.

Hollywood gossip columnists—Hedda Hopper, Louella Parsons, Florabel Muir and others—wrote articles about the millions being dangled in front of us as we talked one week with Bob Hope, the

next with Bing Crosby.

Finally RCA made an arrangement with Technicolor on a package trade-off of patents, whereby RCA would give money to Technicolor to pay Stanford Research Institute half a million dollars for the development of the Geer tube.

It was a complex deal that resembled a secret treaty negotiated in medieval times for the dowry of a European princess—especially since RCA still insisted the bride was "worthless" and Technicolor approached us by sending an envoy who was sworn to anonymity in the preliminary rounds.

We accepted the deal. And we still believe we were wise to take the substantial and generous amount offered. Life has been less hectic since those eventful days, but Willard has stayed right in character. He's still teaching. And he's still inventing. (END)

The Geer Patent

A 1975 science writer talks about Geer's 1944 invention.

Of course, no one person actually "invented" color television. Like black-and-white television, it was invented by literally thousands of the best scientific minds of our age and drew heavily on inventions and principles developed in earlier periods as well.

The color tube invented by Dr. Geer was never produced in quantity—in fact, it can only be ascertained that one crude working prototype actually was ever built. Nevertheless, its development was a contribution to the color-TV system in use today.

Today's shadow-mask color tube, originally developed by RCA, bears no resemblance to the cumbersome triple-necked device envisioned by Dr. Geer. But one principle covered by the Geer patent is used in every color picture tube in use today. That is the principle of using three electron guns (or three electron beams from a single gun) aimed at the same screen from different

angles so that the beam of each strikes only the phosphor representing the corresponding color.

The Geer tube had three electron guns, each positioned so that the beam it emitted could reach only the proper color phosphors on the surface of many tiny pyramids built up on the screen. Today's shadow-mask tube also uses three guns, or three electron beams, each angled to strike the proper color phosphor on the screen without spilling over to the other phosphors. But the tube in use today employs a metal mask etched with tiny holes or slits to direct the beam to the proper color phosphor. The positioning of the guns in relation to the holes and the phosphors determines the color rendition.

As Mrs. Geer notes, RCA filed an application for a similar patent only 25 days after her husband's application, but Dr. Geer's patent stands as the basis for the multibeam aspect of all of today's color tubes, although the complete concept of his color tube was never used.—*David Lachenbruch*