

## Movies on paper?

'Electronic paper' is four years away

By Rick Callahan  
THE ASSOCIATED PRESS

Scientists have created a new type of "electronic paper" that may one day enable books and newspapers to show full-color movies.

Tiny dots packed in columns and rows on the paper can change colors in just one one-hundredth of a second, fast enough that a whole array of these dots could display video images, said Robert A. Hayes, a scientist at Philips Research Laboratories in Eindhoven, the Netherlands.

Before the movies can begin, Hayes said researchers need to devise a system to control each dot's rapid changes.

He said the first products are three or four years away, and would probably have only one color at first.

The findings are reported in Thursday's issue of the journal Nature.

"You could see this leading to displays everywhere, the sides of trucks with live displays on them — like Times Square but moving," Robert Wisniewski, senior manager of IBM Corp.'s Advanced Display Technology Laboratory in Yorktown Heights, N.Y. "Imagine the traffic accidents."

The electronic paper is not really paper at all, but elec-

tronics embedded in a flexible piece of plastic as thin as a sheet of paper. It would have to be connected to a power source, such as a cell phone or a handheld organizer.

The paper's display surface is four times brighter than reflective liquid-crystal displays, such as those seen on mobile phones and personal digital assistants, Hayes said.

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— Robert Wisniewski  
Advanced Display  
Technology Laboratory

The Philips researchers developed two kinds of electronic paper. In the first system, each dot in the experimental paper contains water with a single layer of colored oil, along with an underlying transparent electrode and white foil.

The viewer sees the color of the oil, unless an electrical signal is applied that moves the oil aside. That reveals the

white foil underneath.

The researchers have taken that system a step further by creating dots that contain two layers of colored oil. Each of these dots is divided into three compartments, each containing combinations of cyan, magenta or yellow oils.

Each compartment is covered by a colored filter. Its hue depends on the colors of the oils beneath.

These compartments can be switched independently and are capable of displaying a variety of colors. That is achieved by varying which of the two colored oils in each compartment is pushed aside or left in place.

Hayes said this system can display a full palette of red, blue, green, cyan, magenta or yellow and black along with intermediate shades.

The researchers are not the first to produce a form of electronic paper.

Aris Silzars, former president of the Society of Information Display in San Jose, Calif., said the new material has some advantages over other forms, including its apparent ability to rapidly switch among a range of colors.

If Philips researchers can overcome the technical challenges, he said its first use would probably be in cell phones or handheld organizers.

## Former test-tube babies find comfort in doctors

By Bipasha Ray  
THE ASSOCIATED PRESS

BOSTON — Elizabeth Jordan Carr grew up reading and re-reading a letter her first doctor wrote to her the day she was born, telling her that in spite of her unusual conception — in a petri dish — she was a normal human being.

That four-page letter, she said, got her through the tough times of feeling insecure.

On Tuesday, for the first time since her birth, America's first test-tube baby met the doctor who cared for her after she was born 21 years ago in Norfolk, Va.

"She was perfect. She did everything exactly right. She was pink, she cried at the right time," Dr. Fred Wirth, 62, said. "When I wrapped her up in a blanket, she relaxed, her eyes opened up and I was the first person she saw."

He also determined how people perceived the nation's first test-tube baby, Carr said, by proclaiming her healthy and normal at the first news conference, which the nation watched eagerly at a time when such medical technology was new and scary.

Tuesday's meeting, at Simmons College where Carr is now a senior majoring in communications, came after years of missed calls, lost e-mails and phone tag.

Carr only knew Wirth from a television image of a masked doctor carrying her as a newborn down the hallway, "holding me like a football."

That, and his handwritten words to her.

"That letter was a comfort. When you're an awkward teenager, wearing braces, probably overweight at some point, it was a nice thing to have — to have someone other than your parents tell you that you're a normal human being," she said.

Earlier this year, when Carr was a reporting

intern at The Virginian-Pilot in Norfolk, she, with the help of a colleague and the in-house library, began trying to track down Wirth.

They found a Web site for Wirth's company, and Carr sent him an e-mail in May.

"Twenty-one years ago, he held me like a football and declared I was a beautiful baby," she wrote. "I would like so much to contact him and talk to him to thank him for the beautiful letter he wrote me 21 years ago that I have read so many times on the days where things seemed tough."

"It just touched my heart to have her go to all

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— Elizabeth Carr  
former test-tube baby

this effort to reach me," said Wirth, who's now a neonatologist at the Reading Hospital and Medical Center in Pennsylvania.

"I've saved hundreds of children's lives, and none of them have bothered to even call me. I'm overwhelmed."

At their meeting, Carr brought Wirth a signed copy of an infertility book for which she wrote the foreword, and a newspaper column she wrote about her life and connections to Virginia.

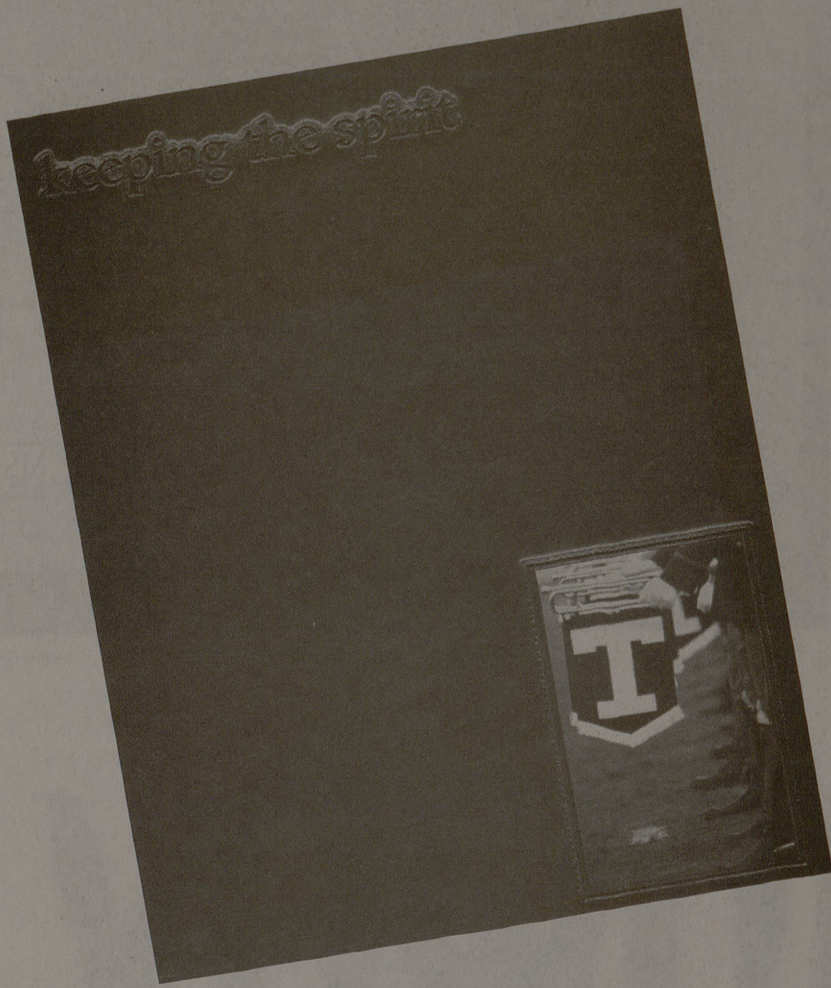
Wirth gave her a necklace bearing his company's logo — a round plate with the heads of a parent and child — and this month's issue of Time magazine, which had a photo of a diapered Carr in a list of greatest innovations in the last 100 years.

Carr was born on Dec. 28, 1981, three years after the world's first test-tube baby, Louise Brown, was born in England. About a million test-tube babies have been born since.

Wirth says he always wondered what kind of a woman Carr had become.

"She's incredible, not just intellectually, but more important, emotionally. When she talked to me on the phone last week, I went 'ka-ching!'"

Wirth said. "To me, she's a testament to the power of the reproductive energy that we have in the human race."



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