

## Could a girl who mixes up red and green be colorblind?

Only if the father is colorblind and the mother is a carrier for the disorder, the chances of which are about 0.64 percent. Colorblindness is an inherited gene defect that is carried only on the X sex chromosome. A male's sex chromosomes are XY; a female's sex chromosomes are XX. One of a daughter's X sex chromosomes comes from her father and the other



X sex chromosome comes from her mother. In order for a daughter to be colorblind, both of her X chromosomes would have to carry the gene for colorblindness. While the mother could have a gene for colorblindness, be a carrier for the disorder and still not be colorblind, the husband would have to be colorblind if his X chromosome carried the colorblindness

gene defect. If he is not, the daughter cannot be colorblind. Learning the colors is just a matter of play, observation and practice. Colorblindness is uncommon in women. About 5 percent of men and 0.5 percent of women in the world are born colorblind. This equals one out of 20 men and one woman out of 200. Most people who are colorblind have difficulty distinguishing between red and green.



## Fertility and cryogenics

The New England Fertility Institute and Lifeline Cryogenics in Stamford will hold a reproductive health tour and informational program from 5 to 8:30 p.m. Nov. 16. The in vitro fertilization and embryology laboratories will be visited. The institute has facilities in Stamford and Hamden, and a third in Shelton is scheduled to be open by the end of the year. Lifeline Cryogenics, a sister company, is the only umbilical cord blood bank in Connecticut. Founder and medical director of the clinic, Dr. Gad Levy, and other specialists will make presentations. Reservations are necessary. Call Joy Kelley at (203) 325-3200.

# Health/Science

## Are humans still evolving these days?

**M**EN SEEK OUT MATES who look good, while women go for men who have a lot of money.

That's what the latest research suggests. Why anyone is studying this would be an interesting study.

Meanwhile, the theory is that men want healthy-looking women to bear their offspring and spread their precious paternal genes. This means men don't care much about whether the woman is intelligent or funny or a good conversationalist. Just good baby-birthing hips, and so on.

Women would probably prefer someone handsome rather than Quasimodo. This too helps perpetuate genes, on the maternal side. But a man who has a lot of stuff is far more fetching. The reasoning is that wealth apparently ensures security and sufficient food and shelter.

In the real world, the factors that attract men and women are far more complicated, and affected by environment and guided by cultural and social dictums. Polynesians rarely have the opportunity to mate with Swedes, for example, and someone born with "good" genes won't look good if he grows up chronically malnourished.

If the simplistic men seek beauty, women seek money theory were really strong, the world would be populated by beautiful people. The really ugly men and women would not reproduce as well as the rich, good-looking people.

Of course, what's considered beautiful in one place might be perceived as so-so somewhere else. More importantly, men and women are not free to mate whenever they want with whomever they choose.

Perhaps people do look better than they did 1,000 or 5,000 years ago. Without photographs, it's hard to tell. Portraits suggest little change in appearance. We've become taller and heavier, but is that evolution or the result of better nutrition and modern medicine?

This inevitably leads to the question, are humans still evolving?

One school of thought believes that advances in public health and the advent of antibiotics, vaccines and other lifesaving drugs skews the natural process by leaving the sickly around to have kids. This is a dangerous school to enter because the lesson seems to be "get the unfit out of the gene pool."

Germany tried this in the 1930s, which led to tens of millions dead and the destruction of Europe.

Civilization has become smarter, except for lunatics in the Sudan, Rwanda, Bosnia, Cambodia and a few other places.

Otherwise, assuming that no one tries to intervene on behalf of some crazy and homicidal ideology, will humans evolve, or have our oh-so-smart brains left us in a dead end?

Short answer yes, long answer no. Humans just got here. From 3.8 billion to 350 million years ago, algae, plants, invertebrates and fish dominated life. Dinosaurs were around from 250 million to 65 million years ago. That's around 185 million years, which is a long, long time.

The oldest human relative is about 6 million or 7 million years old, and modern people like us have been here for a mere 50,000 years or so, give or take a few thousand.

That is, as geologists are wont to say, a blink of an eye.

Check back in 100 million years to see what's happening. Continents will be in different locations.

In the meantime, do not assume that recent advances are all positive. We know about air pollution being bad for human health, the downside of pesticides, the destructive potential of thermonuclear weapons and the consequences of other modern conveniences, like cars, power plants, and over fishing.

Inexpensive sugar and a surplus of food puts evolutionary pressure on humans in the form of diabetes. Antibiotics breed resistant bacteria. Electricity powers all sorts of contrivances and also lets us sleep less, which research suggests may contribute to depression, obesity and other problems.

It's not hard to think of groups hurt by every modern labor saver and health benefit. The "haves" always create "have-nots."

Where all of these evolutionary pressures will lead is anyone's guess.

If you'd told a dinosaur that in 100 million years the world would be covered with concrete, asphalt, bipedal mammals, airplanes, telescopes, rockets and computers, it probably wouldn't have understood a word you said.

Perhaps that's what whatever is here 100 million years hence will think too, assuming it can.

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# Buried insights

By Abram Katz

Register Science Editor

**A**LMOST every kind of odd and interesting information is on a map at your fingertips.

Find out how many people in Connecticut live within 1,000 feet of a landfill, or see where coyotes have been spotted — and then look at how many coyote sightings are within 1,000 feet of a landfill. Or, in an area with a certain median income or level of education.

The possibilities are almost endless and many of them reveal surprising relationships.

Eric West, assistant professor of geography at Southern Connecticut State University, "drew up" the landfill map as a demonstration. A few clicks of a mouse to call up the location of every solid waste disposal site in the state, and another to put circles around each.

The five-minute exercise showed that it's hard to live in Connecticut without being relatively close to a landfill. Who knew?

West, who runs Southern's geographic information science lab, can use information from the World Wide Web to create image after image like this. Even the most mundane data can take on surprising forms when displayed on a map.

Hardly anyone wants to know who lives near solid waste, but geographic modeling can yield eye-opening results on climate change, wildlife conservation, land values, population dynamics, law enforcement, public safety and other important subjects.

"Geographic information systems tabular data with map analysis and display capabilities," West said.

"Eighty-five percent of all data is spatial," he said, meaning that it pertains to location, distance or area. Most of this information is kept in tabulated files and never sees the surface of a map. This is unfortunate, because a written page presents the data in a way that the brain cannot truly appreciate.

West put the addresses of 12,000 Southern students on a map and the expected mundane image revealed some interesting relationships. For instance, a cluster of students are from the same vicinity in Florida.

Word of mouth? A group of families from Connecticut? Coincidence?

The handful of Florida home addresses was in a thick sheaf of papers and would not have been evident to the casual reader. This is why geographic information science has attracted the interest of businesses, government and other organizations,



Southern Connecticut State University professor of geography Eric West displays some results from a geographic information systems class project on nighttime light intensity.

## Linking geography and data can show surprising relationships

West said.

Banks examine maps of average income when deciding where to place automatic teller machines and branches.

Examining a detailed rendering of Greater New Haven, West finds an area of a few blocks that contains distinctly different income groups. Putting an ATM in a neighborhood where few have checking or savings accounts would make little sense.

Parcel delivery companies use geographic information systems to spot bottlenecks, locate under-used routes, keep track of assets and other logistics.

After natural disasters, insurance companies use their own sophisticated systems to decide the most efficient assignments for claims adjusters and what routes they should take.

Not that computers are running the show. "Maps help make decisions. They don't make them for you," West said.

West's students, equipped with light meters, ventured into

the night around the SCSU campus and measured the illumination at various distances from street lights. The students also had hand-held global positioning systems to give the light readings a definite location.

The data was fed into a computer and placed over a map of the campus. The completed map showed light, presumably safe spots, and dark dangerous patches of sidewalks and parking lots.

An unilluminated area in one of the lots looked like an ideal place for a car thief. A big black area represented the cemetery some students must cross to get to class.

Most students can recognize light and dark, but the map could do much more than that. For example, information about different kinds of lights or bulbs could be mapped, along with electrical consumption. There could be more efficient lights that use less electricity. Or, perhaps, the existing lights could be relocated to provide more even illumination.

Another group of students recorded the location of emergency call boxes and measured the distance between the call boxes and other campus features pertaining to accessibility.

Yet another group obtained information about utility poles, cables, electric lines, sewers, telephone systems, irrigation and other functional features on campus. They produced a digital, mapped inventory of the campus infrastructure.

Many large companies do the same thing, West said. This information can contribute to decisions on improvements, where additional sewers can be placed to accommodate new buildings, how much road salt to stock or how much paint to buy.

West is analyzing the geographic factors involved in which students graduate from Southern. Work is being done at the behest of the provost, whose office was instrumental in providing software and other support to the lab.

West said graduation rates could be inversely proportional to the distance between the student and the campus, along with the price of gasoline and drive time.

All of this can be plotted by knowing student addresses and a list of graduates.

"There are hundreds of other variables," West said, including family income, which is tied to location and distance.

A subsequent "regression study" will show how well spatial variables predict who will graduate and who won't, West said.

The information could be useful in setting academic policies, in recruitment and for financial and other kinds of assistance.

Geographic information science often collides with ethics, West said.

Politicians use sophisticated mapping techniques to draw districts that either concentrate or dilute votes. This can have a dramatic and undemocratic effect on elections, which is becoming an increasing concern.

Population growth models could affect current property values and the map could become a self-fulfilling prophecy, West said.

Geographical information science is transforming and expanding the study of geography and converting it into a discipline that retired professors might not recognize.

"I want to make geography applied and relevant," West said.

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