
Radio evidence for gravitational lens

Albert Einstein predicted that gravitational fields should force light rays to follow bent paths. Many years later it occurred to some astrophysicists that this light-bending effect might be able to mimic a lens. Instead of simply making the light source appear out of its true position, gravity might produce multiple images of a single source. A distant quasar might appear to be triplets or quintuplets if its light passed through a galaxy of a certain structure at just the right angle.

It was one of those theoretical proposals that make observers wonder how they are going to start looking for such a thing, but as often happens in astronomy, when they had the idea in their heads, they soon found candidates. There are now at least two. The first of these, the double quasar 0957 + 561, has now been examined by radio astronomers, and they now add their conclusion to that of the spectroscopists who examined it before: It looks like a gravitational lens effect.

When 0957 + 561 was first discovered, study of the light from what was ostensibly two quasars close together in the sky showed that the light from both had the same spectrum. The chances that two independent quasars might have identical

spectra are remote. The more likely assumption was that this was two images of one quasar done by a gravitational lens.

Radio interferometry, which is the adding together of records taken simultaneously at widely separated stations, can bring out detail about the shape and contours of an astronomical body that optical astronomy really can't see. As reported in the Feb. 26 *NATURE*, R. W. Porcas of the Max Planck Institute for Radio Astronomy in Bonn and R. S. Booth, I. W. A. Browne, D. Walsh and P. N. Wilkinson of the University of Manchester Nuffield Radio Astronomy Laboratories used antennas at Jodrell Bank, England, Effelsberg (near Bonn), Green Bank, W. Va., and Onsala, Sweden, to determine something about the shapes of the two components, called A and B, of 0957 + 561. The radio astronomers report that A and B have the same "core and jet" structure and are thus identical enough to be considered gravitational lens images.

Radio observations show the same curiosity as the optical: In theory, a spheroidal galaxy doing the lensing should produce an odd number of images, and they should be spaced quite evenly around a circle. Here are only two, and they are not evenly spaced. The situation seems to cry for a third image. Radio concurs with light in not showing it. The other option is that the galaxy-lens is not spheroidal, but what its shape may be is far from clear. □

Landmark award for 'microwave sickness'

On June 10, 1974, Samuel Yannon, a Staten Island radio technician, died as a result of chronic exposure to microwave radiation. That's the ruling handed down Feb. 26 by a New York state workers' compensation board. It is believed to be the first ruling to acknowledge "microwave sickness" as a cause of death, and it goes a long way in establishing legal precedent for awarding civil claims in cases alleging health damage from prolonged exposure to low-level microwave radiation.

There are no federal microwave-exposure standards yet. But to ensure safety, federal guidelines suggest an upper level microwave-exposure limit of 10 milliwatts per square centimeter. "If you work within less than that formula, you're supposed to be safe," says Angelo Gucciardo, the attorney who handled the workers' compensation claim by Yannon's widow. "The exposure here was certainly less than that," he told *SCIENCE NEWS*, and probably around 1.5 mw/cm².

Yannon, an employee of the New York Telephone Co. since 1930, went to work in 1954 on the 87th floor of the Empire State Building where he tuned television-transmission signals being broadcast to local receiving stations. Beginning in 1965, Yannon complained of difficulty with his vision and hearing. Telephone company medical records show he had suspected

his exposure to microwaves might be implicated. Eventually Yannon developed cataracts, a loss of equilibrium and severe, premature senility. He ended up in a mental hospital, unable to recognize even his wife. Accompanying the mental deterioration was a physical wasting. When Yannon died at age 63, his 180-pound frame had withered to a mere 67 pounds.

Phone company experts contend that Yannon died of Alzheimer's disease (SN: 10/1/77, p. 218). "But none of the attending physicians who saw him ever made the diagnosis of Alzheimer's disease," Gucciardo says, "and this was a major point in developing our case. Also, certain features of Alzheimer's disease were not present." Milton Zaret, Scarsdale ophthalmologist and New York University professor, agrees. He has studied an association between cataract formation and worker exposures to microwaves. He testified that Yannon's symptoms indicated microwave sickness — "a disease that's been known in the Soviet Union for over 20 years" and, like Alzheimer's, is characterized by "premature, abnormal aging."

It is expected the case will be appealed in the civil courts system. Meanwhile, a \$3.5 million lawsuit is pending against RCA Corp., manufacturer of the relay equipment emitting the microwaves to which Yannon was exposed. □

Aggressive behavior: The hormonal input

Synthetic sex hormones were supposed to help prevent miscarriages, but 30 years and millions of pregnant women later it appears that these hormones (especially those, such as progestins, responsible for development of masculine characteristics) are ineffective in preventing miscarriages and also have unwanted side effects — masculinization of the genitalia in as many as 18 percent of the females born to treated women. Ongoing studies of the offspring of treated women now are finding more subtle side effects and helping clarify the role of gonadal, or sex, hormones in fetal development. June Machover Reinisch of Rutgers University in New Brunswick, N.J., reports in the March 13 *SCIENCE* that progestins administered during pregnancy may result in an increased potential for aggressive behavior in both male and female offspring.

Reinisch studied 17 females and 8 males whose mothers had been treated with one of several progestins during pregnancy. Each of these children was tested and compared with at least one sibling of the same sex who had not been exposed to synthetic hormones. The exposed children were found to have a significantly higher potential for aggressive behavior than did controls.

How this potential for aggression translates into real-life behavior has yet to be definitively determined, explains Reinisch, but in the children she has studied the effects have been "quite positive — they do better in school and are very athletic." Reinisch previously reported that progestin-exposed children are more independent, sensitive, individualistic, self-assured and self-sufficient than their nonexposed siblings (SN: 4/23/77, p. 267). Hormones play a role, but postnatal factors, such as rearing practices and socialization, Reinisch emphasizes, are especially important influences on human behavior. It may be, she says, that these children are just more assertive.

On the other hand, synthetic sex hormones could have negative effects. At least one study of children whose mothers had been treated with naturally occurring progesterone found that the boys were subject more often than controls to disciplinary action in school. The girls reported getting angry more often and more intensely than did controls. Also, there are some extremely aggressive persons in our society, says Reinisch, and excess hormones in combination with the environment may help explain their problem. In either case, she concludes, these studies "suggest that differences in frequency of aggressive behavior between males and females as well as individual differences may be related to natural variations in hormone levels prior to birth." □