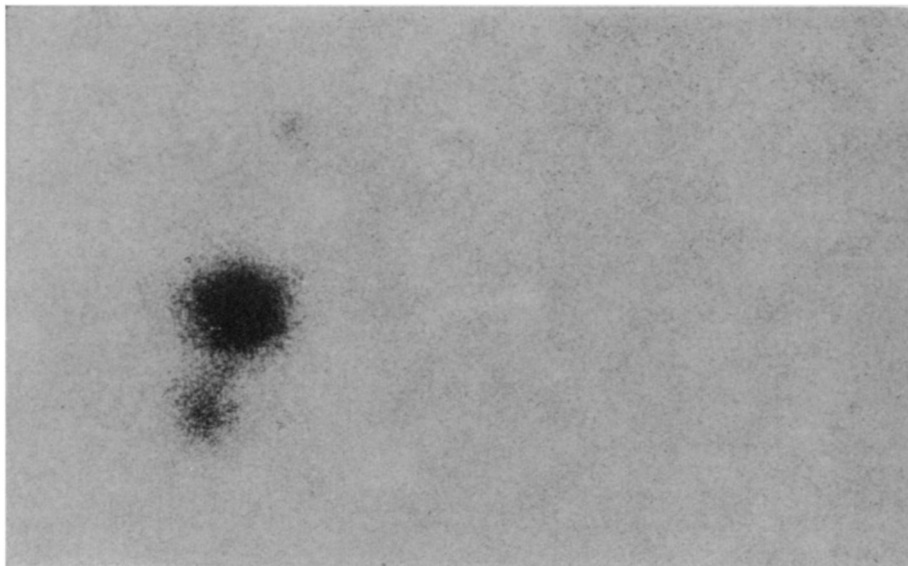


Quasar Distance Measured



Dr. Thomas A. Matthews

Bridge of matter links parts of quasar 3C-287.

In February the quasar 3C-287 will again be far enough from the sun to be visible, and astronomers will attempt to confirm its distance from earth. This distance, in the first such measurement ever accomplished, has proved astonishingly short.

Distances to quasars, mysterious and extremely intense sources of light and other radiation, have been debated since they were discovered in the early 1960s. Some astronomers place them, because of their large red shifts, at the far reaches of the universe. Others contend that they must be relatively close and that the red shifts are due to some other cause, such as the gravitational collapse of a star.

The distance measurement to quasar 3C-287 was made by Dr. Thomas A. Matthews of the University of Maryland, who places it between 100,000 and 1 million light years away. This means it is either close to the Milky Way galaxy or about half-way between it and the Andromeda galaxy.

Further observations to confirm the distance cannot be made until February, when 3C-287 will again be in a position to be photographed by large telescopes, particularly the 200-inch atop Mt. Palomar.

Dr. Matthews bases his distance measurement on changes that have taken place within the last year and during the last 16 years. Four photographs, as far as he knows, have been made of 3C-287 since 1950.

The four cannot easily be compared, however, because three of them were taken with different telescopes. The

two that were taken with the 48-inch Schmidt telescope, also on Mt. Palomar, were photographed on plates coated with emulsions sensitive to different regions of the light spectrum, also making comparison difficult.

When photographed in 1950 with the 48-inch instrument, 3C-287 was found to have two components: a bright blue star and a fainter red companion a slight distance away and seemingly joined to the star. In the 1964 photograph taken with the 200-inch telescope by Dr. Allan R. Sandage, the two objects did not appear to be joined, but this could be due to the blue sensitivity of the photographic emulsion or bad seeing that night, or both.

A 1965 photograph with a 100-inch telescope showed a definite bridge connecting the two objects. In the most recent photograph, taken in 1966 with the Schmidt, the bridge and the red object have been replaced by an expanded, faint but very definite nebulosity.

"If the nebulosity photographed in 1966 had existed in 1950, it should have been seen, despite the differences in emulsion resolution," Dr. Matthews said. He also discussed the differences in the plates due to the varying focal length of the three telescopes.

Dr. Matthews reported that "something in 3C-287 has changed" since 1950, and also in the nine-tenths of a year between the 1965 and 1966 photographs. In that time, he said, there was a "distinct difference between the narrow ridge photographed with the 100-inch telescope and the extended area visible on the 48-inch plate."

Since the angle between the two companion objects seen in 1950, 1964 and 1965 is known and since whatever happened between 1965 and 1966 could not have bridged the gap faster than the speed of light, Dr. Matthews could calculate the linear distance between them and triangulate the distance from earth to 3C-287, at least roughly. That is more than has yet been done for any other quasar.

At the conclusion of his report, Dr. Matthews cautioned that just because this one quasar has been found to be nearby, astronomically speaking, does not mean that all of the 100 or so now known are also close.

As is the custom at Astronomical Society meetings, the chairman called for questions or comments concerning the report. After more than a minute of total silence, during which both Dr. Matthews and the session chairman, Dr. Frank K. Edmondson of Indiana University's Goethe Link Observatory seemed equally stunned, Dr. Edmondson asked, "Does everyone here really believe this?"

There was a responding laugh but still no queries, so the 125th meeting of the American Astronomical Society was adjourned. The reason for the lack of questions was quite clear—Dr. Matthews had anticipated, so far as possible, the objections that could be raised, such as the problems of different emulsions, varying focal lengths and bad seeing.

The dozen or so who came up to discuss the report informally after adjournment asked about the radiation of 3C-287 in radio waves—no fluctuations

have been found as far as Dr. Matthews knows; and any changes in the proper motion—not detectable since 1950.

Dr. Matthews has submitted details of his findings, with pictures and diagrams to the *ASTROPHYSICAL JOURNAL* (Letters).

EVOLUTION

Latent Diseases Rise Up

How old is malaria? For that matter, who cares? The important thing is to wipe it out now.

But, in fact, the age of the malaria organism matters very much in the eradication battle. So do the ages of the smallpox virus and most of the other viruses, protozoa and bacteria that infect human beings.

The importance of an evolutionary approach to infectious diseases is spelled out in a new book compiled and edited by Dr. Aidan Cockburn and published last week ("Infectious Diseases: Their Evolution and Eradication," Charles C. Thomas, Springfield, Ill., 420 pp., \$18.50).

Dr. Cockburn, now medical director of Detroit's war on poverty program, spent nearly eight years in the tropics, working at various times for the Agency for International Development and the World Health Organization.

From knowledge of a wide range of infectious diseases, Dr. Cockburn traces their origins and explains how living habits act upon man's infectious inheritance to draw out one disease or another.

Early man was probably infected with a good many disease organisms—some of which came from primate ancestors, some of which evolved with man himself, says Dr. Cockburn. Not all the infections became diseases for early man, since his living habits would suppress some and encourage others. Through centuries of cultural change, such as the agricultural and industrial revolutions, this same interplay would bring out diseases dormant in man since his earliest days.

Syphilis is a prime example. It first appeared in Europe in 1493 and soon after became a crucial fact in European life. (Henry VIII had syphilis, says Dr. Cockburn; he suspects that the king's resulting inability to produce an heir led him to divorce his first wife and establish the Anglican church.)

For 500 years, authorities have debated whether Columbus' crew infected Europe on their return from the New World in 1493. Dr. Cockburn believes cultural changes stemming from the Protestant Reformation gave rise to the disease.

The syphilis organism, *Treponema*, was probably present in earliest man, he says. It has recently been found in

baboons, and the appearance of human-like infections in lower primates gives reason to believe the organism has been passed down from generation to generation through centuries of evolution.

Syphilis doesn't easily coexist with yaws, a non-venereal form of *Treponema*. Yaws is mainly a disease of children and is passed through body contact in societies where people wear few clothes. Once a child has yaws, he is immune to syphilis.

Before the Protestant Reformation, with its stress on sexual morality, Europeans were not ashamed to sleep naked eight to a bed or clean themselves at community baths. But after the Reformation, people began wearing night-clothes and sleeping one or two to a bed, says Dr. Cockburn. The baths closed down. Yaws declined and syphilis appeared.

Scarlet fever organisms, streptococci, also appear in lower primates and were probably present in early man, says Dr. Cockburn. Yet scarlet fever didn't ravage Europe until the 19th century. Crowded slum conditions growing out of the industrial revolution suddenly changed scarlet fever from a minor disease into a virulent scourge, he believes.

Origins of the polio virus are so far unknown, but Dr. Cockburn suggests that improved hygiene let the disease loose.

During its first six months of life, an infant is protected by maternal antibodies against any disease the mother has had, he says. Under poor sanitary conditions, the infant contacts many infections and becomes immune to diseases like polio. Once hygiene improves, the child no longer runs through a series of infections in its early months and

becomes susceptible to polio later on.

Both polio and infectious hepatitis are seldom found among citizens of underdeveloped countries, says Dr. Cockburn. As a result, they see little reason to invest in eradication programs against either disease. Perhaps their reluctance may disappear with improved sanitation, he suggests.

Dr. Cockburn also believes cancer is caused by a virus that evolved with man, but didn't become prominent until a change in society—in this case living to old age.

Monkeys, apes and man share not only the syphilis and scarlet fever organisms but those causing encephalitis and yellow fever as well. Of 14 dysentery-causing protozoa in man, 13 also exist in monkeys and apes. For many of man's viruses, there are equivalent forms in lower primates. This is the case with the malaria parasite.

Even if malaria is successfully eradicated from humans in areas like Africa and Asia, man can still contact the disease from monkeys. And there is no way of getting rid of monkey malaria, says Dr. Cockburn.

Smallpox seems to offer the best chance for eradication. Once it is wiped off the face of the earth, it probably will not appear again since its closest relative infects animals like horses, cows and chickens. Man may have contacted the disease from his domestic animals when he first settled down to farm, but by now evolution may have created a gap too large for the virus to bridge.

But new diseases are bound to appear, Dr. Cockburn believes. "Every time there is a change in society, new diseases pop up"—many of them based on infections as old as man or older.

GENERIC DRUGS

Amendment Fails; the Idea Lives On

The Social Security bill emerged from the House-Senate conference last week without its generic drug amendment.

The amendment, sponsored by Senator Russell B. Long (D-Ark.) had won approval by the Senate in a 43 to 37 vote (SN: 12/9) but made little headway in conference. Designed to cut the Government's \$300 million a year drug bill by one-third, the Long amendment demanded that federally purchased prescriptions be written for inexpensive generics rather than higher priced brand-name drugs.

While the Conference committee was meeting, the Pharmaceutical Manufacturers Association, representing 95 percent of U.S. drug houses, was busy telegraphing committee members about the hazards it sees in a law that prohibits brand-name prescribing. To support PMA's argument that a brand

name is a sign of quality, Parke, Davis & Co. recently showed that competing generic versions of a potent antibiotic the company developed are less effective. Within a week, one of those competitors, McKesson & Robbins, announced it had recalled its total supply of the drug, chloramphenicol (p. 621).

Although the Long amendment was tabled this year, the Senate Finance Committee, of which Senator Long is chairman, sees it as only a temporary defeat. PMA expects its victory will be short lived. The amendment is expected to be reintroduced next year and observers say its eventual passage is inevitable.

Some of the language and spirit of the Long amendment was included in the current Social Security legislation. States purchasing drugs for patients under Title 19 (Medicaid) are instructed to do so with a view to "reasonable