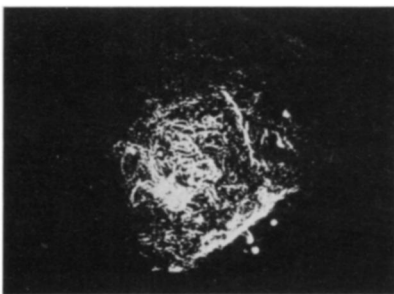


The strings at the heart of Orion

Riveting even to the eye, the Orion nebula also bewitches astronomers who observe this star-forming region at radio wavelengths. Penetrating the heart of the dusty nebula with the Very Large Array radiotelescope near Socorro, N.M., Farhad Yusef-Zadeh has discovered that Orion's center contains a surprising network of arcs and filaments, some of which extend about 1.5 light-years in length. Such large structures have not been found in other star-forming regions, notes Yusef-Zadeh of Northwestern University in Evanston, Ill.



Stellar winds originating in the center of the Orion nebula may have sculpted the filaments and arcs of ionized gas in this radio image of Orion.

He suggests two possible explanations for the unusual string-like features that surround a cluster of bright stars, known as Trapezium, at Orion's center. The first scenario attributes the pattern to powerful collisions occurring when hot gas rushes out of the stars and zips through surrounding layers of cooler, denser gas. This stellar "wind" creates a shock wave that pushes aside cooler interstellar gas, creating cavities where the material once resided and filaments where the material now congregates. Alternatively, Yusef-Zadeh speculates, ultraviolet radiation from the stars may ionize surrounding gas that then expands to form the radio-emitting filaments.

If further studies confirm the role of stellar winds in filament creation, researchers may need to take wind phenomena more seriously when constructing theories about the early evolution of hot, massive stars and their surroundings, Yusef-Zadeh says. At an astronomically close 1,500 light-years from Earth, "Orion is a fantastic place to examine our thoughts [about star formation]," he notes. The astronomer details his work in the Sept. 20 *ASTROPHYSICAL JOURNAL LETTERS*.

Hydrogen clouds colder than expected

Analyzing the absorption of quasar light passing through hydrogen clouds near the edge of the observable universe, astronomers have found indications that some of these clouds are about 20,000 kelvins colder than previously thought.

Using a high-resolution, wide-area spectrograph, Linda Smith of University College London in England and her colleagues studied absorption lines in the spectra of quasar light that older instruments had rendered too blurry to analyze. They found that the lines were narrower than believed, indicating that the hydrogen clouds had temperatures of 5,000 to 10,000 kelvins, well below the expected 30,000.

Smith notes the finding has several implications for the evolution of the clouds, which astronomers believe do not contain enough hydrogen to form galaxies. If the clouds maintain thermodynamic equilibrium with their surroundings at the lower temperature inferred from the new data, the material must concentrate in thin sheets, Smith says. A competing theory holds that the clouds possess the standard spherical shape but continue to expand and cool rather than maintain equilibrium.

She notes that recent calculations by other researchers support the expansion notion. Smith and co-workers in Australia at the University of Sydney and the Anglo-Australian Observatory in New South Wales report their findings in the Oct. 15 *MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY*.

OCTOBER 20, 1990

Another challenge to coffee's safety. . .

Most Americans drink caffeinated beverages, with coffee and tea among the most popular. But according to a report in the October *AMERICAN JOURNAL OF EPIDEMIOLOGY*, heavy caffeine consumption may increase the risk of osteoporosis — a condition involving bone loss and embrittlement, contributing to the high rate of hip fractures among the elderly.

Researchers with Boston University, Brown University in Providence, R.I., and the Framingham (Mass.) Study examined data on 3,170 elderly men and women taking part in the long-running Framingham project, in which volunteers have answered questionnaires and undergone health exams every two years for decades. In analyzing caffeine consumption and hip fractures between 1971 and 1985, the researchers calculated that volunteers with a history of drinking 2.5 to three cups of caffeinated coffee daily, or twice that much tea, experienced a 69 percent greater risk of osteoporosis than did caffeine abstainers. Those drinking more than 3.5 cups of coffee or seven cups of tea appear to have increased their risk by 82 percent compared with those who avoided caffeine. The researchers say these findings square with animal studies showing that caffeine increases urinary calcium excretion and may inhibit gastric absorption of calcium in the elderly.

. . . but on the other hand

Harvard researchers say they find no support for the idea that coffee increases heart risks. This appears to contradict conclusions of another large-scale study, reported last month, which suggested that downing four or more cups of java daily increases heart attack risk (SN: 10/6/90, p.220).

The newer study surveyed 45,589 male dentists, optometrists, osteopathic physicians, pharmacists, podiatrists and veterinarians, none of whom had a personal history of cardiovascular disease. After polling the volunteers on their consumption of regular coffee, decaf and tea, the researchers monitored their heart disease status for two years.

In the Oct. 11 *NEW ENGLAND JOURNAL OF MEDICINE*, Walter Willett and his colleagues report that 40 volunteers died of heart attacks or sudden death, another 181 suffered nonfatal heart attacks, 136 underwent coronary artery surgery and 54 had strokes. After adjusting for variables such as age, smoking, diabetes, alcohol use, fat consumption and family history of heart attack, the researchers saw no link between heart disease and consumption of tea or regular coffee.

They did find "a positive trend," however, between decaffeinated coffee and coronary artery disease. Decaf drinkers also showed "a slight and marginally significant increase" in overall risk of heart disease, they report.

"This is a good study," comments Arthur L. Klatsky of the Kaiser-Permanente Medical Center in Oakland, Calif., who directed the earlier investigation. He adds that the new data do not necessarily contradict his findings. For example, although the Harvard researchers all but "brushed off" their decaf findings, that link may be real, he asserts. Noting that his study could not segregate coffee risks by caffeine content, he speculates that the heart-disease/coffee link seen in the Kaiser Permanente data may trace to decaf. Klatsky cites several other differences between the two studies: The Harvard study included only men (Klatsky's team found that men may be less sensitive than women to coffee-mediated cardiovascular effects); involved fewer smokers; used a healthier population; and limited follow-up to two years (Klatsky's study followed some of its 101,770 participants for 12 years).

But Klatsky says neither study offers grounds for fearing coffee — decaf or otherwise. Even his data indicate that "if coffee causes a higher risk of heart attack, it isn't a much-increased risk," he says.

253