

THEY CALL IT CRE

Why would any reputable scientist agree to testify on behalf of the State of Arkansas in last month's creationist trial? Two who did tell SCIENCE NEWS.

BY JANET RALOFF

Not everyone in science shares the view that "creation science" has no scientific validity. Among them are two who testified on behalf of the defending Attorney General's office as its key witnesses during the creation science trial last month in Little Rock, Ark. (SN: 1/2/82, p. 12). About the only things these scientists have in common are the respect of the scientific community for the meticulous quality of their primary pursuits and their shared belief that life's grand scheme may be the product of "a creator."

By nearly any other gauge, they couldn't be less similar. Each, for example, defines creation differently, supports a different creation "model," adheres to a different belief as to where and when life formed, and has a different attitude about the place of religion in a scientist's work.

"From a historical standpoint," Nalin Chandra Wickramasinghe told SCIENCE NEWS, "it will be grossly in error to bracket everybody who concludes there may be evidence for a creator along with the religious nuts." The statement is meant to emphasize the fact that although a number of fundamentalist Christians have taken up the creationist crusade, the astrophysicist wants no part of them or what they stand for. Raised a Hindu in Ceylon (now Sri Lanka), he says he doesn't even share the basic premise of the Christian faith, much less the Christian fundamentalists' trust in the general "inerrancy of the Bible in its original autographs." And the book of Genesis couldn't be farther

from the source of his belief in a creator.

Robert V. Gentry, by contrast, was born in Chattanooga and raised a loosely discriminating Protestant ("the kind where you believed what you wanted to"). Then in 1959 he "ran across the Seventh Day Adventist Church," converted, and began to study the Bible seriously. His faith required belief in the inerrancy of the Scriptures. So to remain both spiritually and intellectually honest, Gentry began stalking scientific support for biblical references to creation and Noah's flood. His research led him into the study of radioactive halos — discolorations in rock wrought by trapped radioactive elements like uranium and polonium.

Says Gentry, a visiting scientist at the Oak Ridge National Laboratory, "I do feel there is scientific evidence for creation and evidence for the flood." God speaks to different people in different ways, he says; and it is Gentry's contention that phenomena, such as the mysterious radioactive polonium halos in granitic rock, are signs of creation left by God for scientists to uncover. Gentry's belief in creation "by fiat" — the secular euphemism for creator that he employs in his research — has gotten him in trouble with his colleagues over the years. It's no secret that most scorn as unscientific his seeking a nonmechanistic explanation for the development of granite and mica-form crystals. And virtually all of his peers challenge his assertion that the earth may only be on the order of 10,000 years old—a factor 4.5×10^5 smaller than the age most geochronologists give it. But to date, Gentry's critics have been rather "gentle," to quote one observer, out of respect for the quality of his halo research.

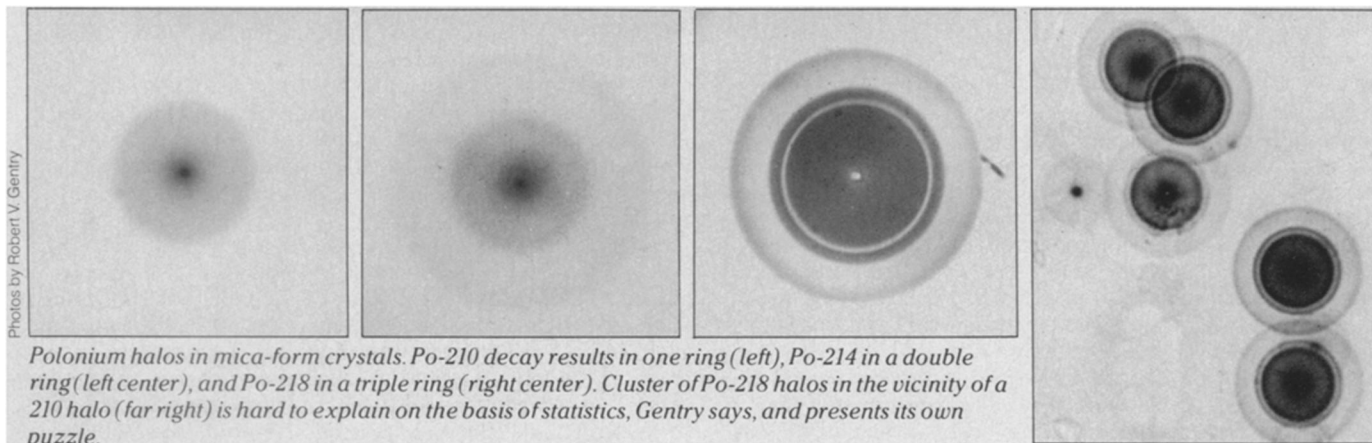
Conventional wisdom, as developed in the 1930s by G. H. Henderson at Dalhousie University in Nova Scotia, held that polonium halos might form if polonium or one of its radioactive precursors (such as uranium or radon) were allowed to migrate into a crystal along a crack or fissure. Henderson believed active sites were

necessary to selectively trap the radioactive atoms. Then by alpha-particle decay, these atoms left a print of their energy deposition as discoloration in the crystals. An estimated 100 million alpha particles represent the threshold needed to print a single tiny halo—measuring no more than 10 to 34 micrometers in radius. "But I began to wonder what was going on," Gentry says, "when I noticed polonium (Po) halos out in the middle of nowhere" and situated inside otherwise pristine, structurally intact crystals. There were no signs that gas or solution infiltrations had ever occurred in the rock's past.

"About that time, fission-track techniques came into vogue," Gentry says. By etching mica crystals with hydrofluoric acid (HF), "fossil" (pre-existing) tracks left by a fissioning atom appeared as a starlike pattern clustered about the radioactive atoms bound inside a halo's inclusion (center). Gentry etched uranium halos and revealed dark stars about their inclusions. When he etched Po halos, there were no such stars. Then he took new pairs of halos, irradiated them with neutrons to induce new fission tracks, and etched them with HF. This time the uranium star was even bigger, representing an increased number of fission tracks. Again the Po halos revealed virtually none.

Fossil alpha-recoil techniques permitted the etching, again with HF, of tracks left by radioactive atoms as they ejected alpha particles. Each time the atom fired off an alpha, it recoiled a small distance. The goal was to search around halos for a potential "source track" indicating the path Po's potential precursors trekked on the way to invading its inclusion. Gentry looked but never found them.

"As uranium and thorium were primordial," Gentry recalls, "I began to think in terms of the polonium in the halos as having a primordial origin." There was no sign of how the Po entered the granitic rock Gentry was studying, so it must have been there when the rock cooled, he reasons. However, the rock is supposed to have



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cooled slowly, over millions of years. And Po's three species that leave halos — 210, 214 and 218 — all have half-lives that should have left them largely decayed away with no source of replenishment before the rock's crystalline structure was complete. It's a problem that has puzzled many reviewing Gentry's research. But virtually none of them accept Gentry's interpretation—that the rock cooled almost instantaneously (from a geological-time perspective). Finally, the elliptical Po halos in "coalified" wood described in the Oct. 15, 1976 *SCIENCE* raise questions "about the validity of present concepts regarding the antiquity [of Eocene, Jurassic and Triassic geologic formations] and about the time required for coalification," Gentry says. The uranium-to-lead ratio of the shale deposit associated with the coalified wood fragments would tend to suggest the formation isn't nearly as old as had been previously thought.

But the real significance of coalified wood, Gentry says, is that when Henderson's conditions for Po halos are met, as in coalified wood (rapid transport and an abundant supply of uranium-derived Po), only one type of halo — Po-210 — forms. "How, then, can Henderson's model account for all three Po-halo types in mica, where both the uranium content and transport rate are considerably lower?" Gentry asks.

Ideologically, Gentry embraces main-line creationist beliefs: that a supernatural force (God) created the universe, energy and life from nothing, and probably over the span of six days; that only micro-evolutionary, fine-tuning of originally created plants and animals has occurred; that the earth is only some 6,000 to 12,000 years old; and that earth's present geography results from catastrophism, including a world-wide flood.

Wickramasinghe won't buy that. The only part he will accept is that evolution (mutation and natural selection) alone is insufficient to account for the development of complex plants and animals from

METEORITIC AMINO ACIDS HAVING BIOLOGICAL SIGNIFICANCE			
Amino Acid	Murchison	Murray	Nagoya
(percent of total amino acids)			
Aspartic acid	3.4	5.5	10.1
Glutamic acid	6.6	4.8	20.3
Glycine	33.6	17.7	27.6
Alanine	14.0	6.6	7.8
<i>α</i> -Aminoisobutyric acid	19.4	50.7	0
<i>β</i> -Alanine	6	5.7	11.9

Hoyle and Wickramasinghe

more simple ones. "Recent evidence points to life first appearing on earth about 3.8 billion years ago," he said at the trial. "Life appears in an instant, geologically speaking, almost at the very first moment the earth possessed a quiescent crust, an atmosphere and oceans—at the very first moment, in fact, that life was able to survive." But he discounts what he calls the neo-Darwinian theory that "the full spectrum of life as we see it today as well as in the past is accounted for by the steady accumulation of [DNA] copying errors and the consequent development of variety as a primitive living system is copied billions upon billions of times."

Though successive copying would indeed accumulate errors, he says, "such errors on the average would lead to a steady degradation of formation. It is ridiculous to suppose that the information provided by one single primitive bacterium can be upgraded by copying to produce a man, and all other living things that inhabit our planet." He, in fact, compared it to copying over billions of times the first page of Genesis expecting to accumulate through copying errors "not merely the entire Bible but all the holdings of all the major libraries of the world."

"What the fossil record does show beyond doubt is that new properties of life at the level of expressed genes have been introduced by successive experiments." However, he said, "If the earth were sealed off from all sources of external genes, bugs could replicate till doomsday, but they will

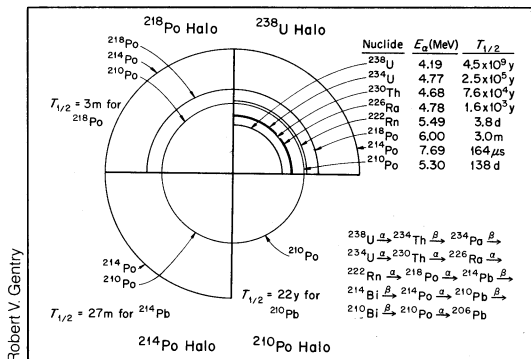
still only be bugs, and monkey colonies would also reproduce, but only to produce more monkeys."

Where, then, would Wickramasinghe have genes coming from? Space. "Two years ago Sir Fred Hoyle and I reached the conclusion that a whole body of astronomical data pointed to microorganisms being present on a colossal scale in space—some 10^{52} individual cells being present in our galaxy." A report appeared in *ASTROPHYSICS AND SPACE SCIENCE*.

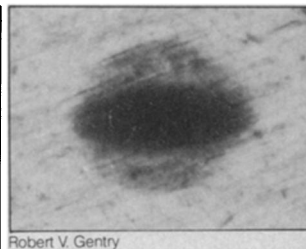
Wickramasinghe currently heads the Department of Applied Mathematics and Astronomy at University College in Cardiff, Wales. And for the past 20 years, his work has tended to focus on inquiries into the possible composition of interstellar dust.

By 1972 "there was a good argument for a polymer based on the molecule formaldehyde," he says. "Sir Fred Hoyle and I showed thereafter that a polymer similar to cellulose, built essentially of formaldehyde units, was required in order to explain certain aspects of the astronomical observations at infrared wavelengths."

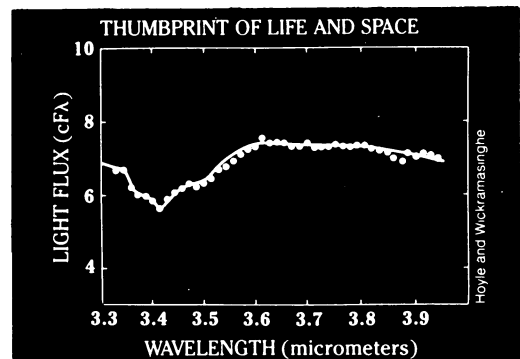
One of Wickramasinghe's students followed up the finding last year with a series of infrared (IR) absorption-property measurements using desiccated microorganisms — *E. coli*, *Lactobacilli*, blue-green algae and yeast cells. "We wanted to establish the properties of bacteria in space," Wickramasinghe explains. And what he found was "a particular [spectral] thumbprint — invariant from one microorganism to another." (Cont. on page 46)



Schematic identifies how halo rings correspond to the alpha-particle decay chain of uranium and polonium isotopes.



Polonium halos in coalified wood deformed to ellipses. Encircling round halos occurred later when daughter polonium nuclides decayed.



Data from biological "thumbprint" (line) overlay perfectly with data from the GC-IRS 7 astronomical observation (dots).

Wickramasinghe's brother, Dayal, an astronomer at the University of Edinburgh, returned a few weeks later from Australia where he had been observing "at a higher spectral resolution than before and over a slightly more extended wavelength region," the IR flux measurements for the astronomical source GC-IRS 7. Since radiation from the source, some 30,000 light-years away, had to pass through enormous quantities of interstellar dust, "it was ideally suited to study the behavior of any absorbers," Chandra Wickramasinghe told SCIENCE NEWS.

When the brothers compared data—the laboratory "thumbprint" and the astronomical spectra — Wickramasinghe says "the overlay was 100 percent perfect." It was a crucial test, he says, because, "If the astronomical data turned out to be different, even in a very minor way, then we'd have to revise our ideas about bacteria in space."

Other data served to shore up the Hoyle-Wickramasinghe panspermia theory:

- Meteorites known as carbonaceous chondrites have been found bearing internal structural features that resemble fossil microbes. In their book *Lifecloud*, Hoyle and Wickramasinghe note five different types of fossil-like meteoritic structures, "of which four vaguely resemble certain types of single-celled terrestrial organisms living in water, such as algae."
- Other experiments using "contamina-

tion-proof" techniques identified 17 amino acids within the Murchison meteorite, a carbonaceous chondrite.

• A NASA report (N65-23980) describes U.S. balloon flights between 1962 and 1965 that detected living cells, bacteria mostly, in earth's upper atmosphere. Discussed by Hoyle and Wickramasinghe in *Evolution from Space* (1981, J. M. Dent, London), Wickramasinghe told SCIENCE NEWS that it's possible, though unlikely, that the bacteria had been lifted from earth. But since bacteria would fall faster at greater heights—in the thinner atmosphere—one would expect bacteria falling from space to pile up due to friction in the lower atmosphere. And according to Wickramasinghe, the NASA data are "decisively indicative of a falling, not a lifting [from earth] hypothesis."

• H. D. Pflug, of the University of Giessen in West Germany, reported informally at Cardiff in November that he has found evidence pointing "to the definite existence of bacterial and fungal microfossils in the Murchison meteorite," Wickramasinghe says. Pflug's data are to be published formally soon.

"The facts as we have them show clearly that life on earth is derived from what appears to be an all-pervasive galaxy-wide living system," Wickramasinghe asserts, "and continues to be driven by sources outside the earth, in direct contradiction to Darwinian theory."

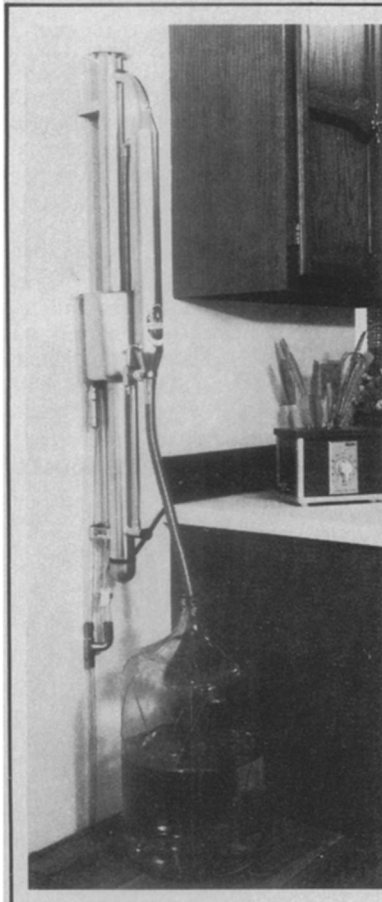
But other factors contribute to Wick-

ramasinghe's creationist bent. "Some 2,000 or so enzymes are known to be crucial [for] life — ranging from simple microorganisms all the way up to man... At a conservative estimate, say 15 sites per enzyme must be fixed to be filled by particular amino acids for proper biological function. ... [T]he probability of discovering this set by random shuffling is one in $10^{40,000}$," a number that "exceeds by many powers of 10 the number of all atoms in the entire observable universe."

It is the latter that compels the mathematician in Wickramasinghe to seek a nonmechanistic "creator" for life. While his "philosophical preference" would be to have life form in the cosmos by random shuffling, he sees no way to justify that with available data and an accepted age for the universe of a mere 15 billion years.

So he testified on behalf of Arkansas. "Many of the clauses [in Arkansas' Act 590] are obviously and demonstrably wrong," he told SCIENCE NEWS, "and I quite explicitly refrained from associating myself with details of [Arkansas'] Act. But the general concept of creation, that could be separated from the theological arguments, was one that I felt some intellectual sympathy for."

Even as the State's star witness, however, Wickramasinghe did not win over U.S. District Judge William Overton. In his opinion of the case (SN: 1/9/82, p. 20) issued Jan. 5, Overton concluded, "[C]reation science is not science." □



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