By Dr. H. Paul Shuch,* N6TX

DR. SETI'S STARSHIP

Searching For The Ultimate DX

In The Beginning

In the beginning there was Frank Drake, and Frank Drake's word was . . . silence.

You really can't blame him. The year was 1959, and Drake was a newly minted Harvard University Ph.D. The ink on his diploma was as wet as he was behind the ears. Drake had just started his new job at the National Radio Astronomy Observatory (NRAO) in Green Bank, West Virginia, when he got this outlandish idea about searching for intelligently generated microwave signals from the stars.

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Whom was he going to tell? For a green astronomy post-doc to evidence interest in extra-terrestrial life back then would have been professional suicide. Only a fool would have admitted publicly to such interest, and Frank Drake was no fool.

Drake quietly set about the process of designing the search and setting up the equipment for Project Ozma, which was to become the first salvo fired in the newly emerging science of SETI, the Search for Extra-Terrestrial Intelligence. His idea was to use the 26-meter diameter Howard Tatel radio telescope at Green Bank (see photo) during its off-duty time to survey two nearby sun-like stars (*Tau Ceti* and *Epsilon Eridani*) for microwave evidence of other technological civilizations. He planned to search on the 1420 MHz resonant frequency of hydrogen atoms, the most abundant substance in space.

"Ours is a radio-polluting civilization," reasoned Drake. Because of this potential propensity for many, many radio signals in the universe, might not others similarly give away their positions by their radio emissions? Perhaps, Drake hoped, other civilizations might be less discrete than he was being. Furthermore, where better to give themselves away than on the hydrogen line, where radio astronomers on any planet could already be expected to be tuning their receivers?

Then the Cocconi and Morrison article came out. "Searching for Interstellar Communications" was a brief letter in the British scientific journal *Nature*. In it the two Cornell University professors laid

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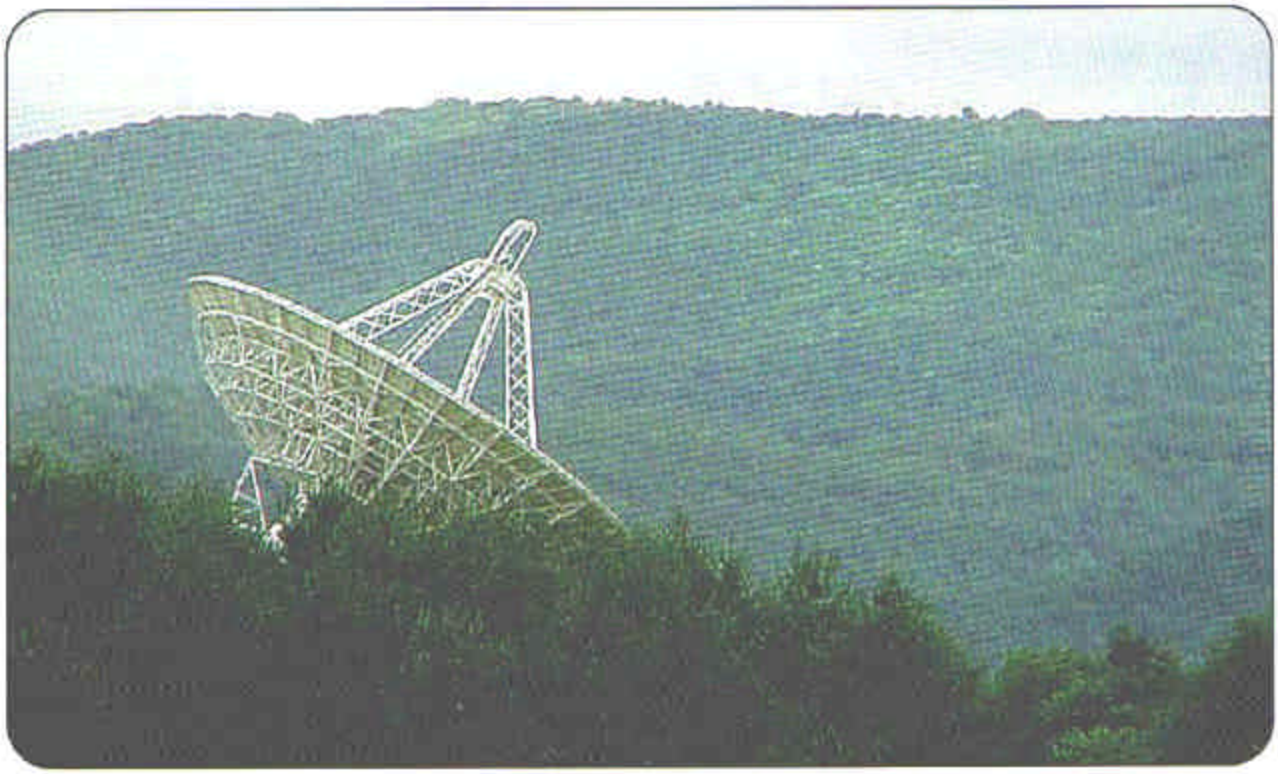

The Howard Tatel telescope at the National Radio Astronomy Observatory, Green Bank, West Virginia, was home to Project Ozma, the world's first modern SETI search. The 85-foot dish is still in use, more than four decades later. (SETI League photo)

the groundwork for how one might search for intelligent signals from beyond.

The article appeared in 1960, while Drake was making final preparations to launch his Project Ozma. In the article Philip Morrison (formerly W8FIS) and Giuseppe Cocconi included a table that listed likely stars to survey, and topping the list were Drake's two selected targets. The Cornell professors discussed frequencies to tune and settled on the hydrogen line, just as Drake had done. In fact, the published proposal and the secret search bore a striking resemblance to one another, considering that neither player had any knowledge of the other.

The birth of modern SETI is a prime example of what I call the "Parenthood Principle," which is seen so often in science: When a great idea is ready to be born, it goes off in search of a parent. Sometimes it finds more than one.

As the scientific expression goes, the cat was out of Schrodinger's bag[1] and Drake had to go public. Thanks to Morrison and Cocconi, Frank Drake ended up with far more publicity than he had bargained for. While many in the academic community arched their eyebrows, the public was captivated. SETI truly was an idea whose time had come.

The Project Ozma search itself proved something of a disappointment. No intelligent life was detected save for interference from what we presume was a classified military aircraft. (I believe Frank Drake may have discovered the U-2 spy plane, but had the good sense to maintain reasonable silence on the subject.) However, the seeds planted by Drake at Green Bank in 1960, now fertilized by more than 40 years of progress, have brought SETI out of the realm of the unmentionable and into the scientific mainstream. The dozens of searches conducted since then (some of them by radio amateurs) have yet to turn up any definitive evidence of our cosmic companions. Nevertheless, not only have we yet to scratch the surface, we haven't even felt the itch.

Had Frank Drake done nothing more in the search for life in space than conduct Project Ozma, his place in history would still have been assured. Not one to sit by idly, Drake went on to host the world's first conference of SETI scientists at Green Bank in 1961. His agenda for that historic meeting was what is now known as the Drake Equation, which graces the pages of every contemporary astronomy textbook. Planned to simply identify the factors related to the emergence of technological extra-terrestrial life, the Drake Equation can be "solved" for the number of other communicative civilizations in the Milky Way galaxy. It is an elegant tool for quantifying our ignorance.

That, as they say, is only the beginning.

73, Paul, N6TX

Reference

1. Schrodinger's cat refers to early 20th century scientist Edwin Schrodinger's effort to explain quantum mechanics, a branch of physics that is designed to explain how fundamental particles, such as electrons, interact with one another. His proposal was to put a cat into a bag with a fragile bottle of a deadly poison, a hammer, and a radioactive atom. If the atom decayed, then a mechanism would detect this decay and swing the hammer at the bottle of poison, thereby breaking it and killing the cat. If the atom didn't decay, the mechanism wouldn't move the hammer, the poison would stay in the bottle, and the cat would live.

The ensuing debate following Schrodinger's proposal centered on the state of the atom and the state of the cat, neither of which could be predicted without examining them, which ultimately meant taking the cat out of the bag and thus ending the experiment. The ethereal conclusion was that the cat was both dead and alive at the same time, thereby prompting the notion of parallel universes.

In this column, author Shuch uses the coined expression "the cat is out of Schrodinger's bag" as a way of explaining how people working totally independent of each other can (nearly) simultaneously come up with the same idea. Such was the case of the Morrison and Cocconi team and Drake, who independent of one another (nearly) simultaneously proposed the hydrogen line as the most likely location to look for signals from extra-terrestrial intelligent communicators. The logical explanation that these men (nearly) simultaneously came up with the same idea of looking at the hydrogen line is found in explaining how the cat got out of Schrodinger's bag and whether or not the cat was alive when it did get out of the bag. ■