

953 State Street
Portsmouth NH 03801
April 8, 1988

Dear Mr. Cameron:

Thank you for sending the information.

I suspect that the big problem in our ufo research is misinformation, which is made public in different ways by some kind of large organization, which may be our government. I know when our capture became known back in 1965, within one week, all over this country, on radio call-in programs, a woman would call in. She told how she was a dear close friend of mine, and she was so upset because I had 'cracked up' (became mentally ill) and had been committed to a mental hospital, but I was doing ok, for she had visited me on Sunday. This was nation-wide, so it had to be a national organization doing this.

Over the years, this type of misinformation has become known nation-wide - I have read of my death published in newspapers. I 'died' in September 1969 of cancer. Apparently in some places this misinformation is still becoming known, for occasionally I receive a sympathy card, sent to the family of BH, so I write a letter thanking them. Another bit - Barney and I were divorced, and one of us called a news conference, and told the world the whole story of our capture was a hoax. Many incidents like this, all on a national basis.

In my opinion, I believe this type of misinformation has been spread thru out the whole ufo field, to anyone who was willing to listen and repeat. On the opposite side, if a person receives valid information, he might be in danger. We had a case here in NH of a man who lectured about ufos. One day, he received a slide, thru the mail, telling him if he used this in his lectures, he would receive more valid pictures. He used it, and received others, from an unknown source. Then he was arrested by the CIA for mail fraud, pleaded not guilty, but was found guilty and sent to a federal prison for one year. Later he received a copy of a letter, sent by the CIA to the federal judge, ordering him to find this man guilty. Again, an unknown source. By the way, this man was a college professor.

The tales being told now, in my opinion ^{ARE} to confuse and divide the ufo community and give them something to do, by chasing bizarre ones. Bennewitz, Lear, and others. And most of the reported captures.

Have you read Dr. Thomas Bullard's research paper, "Comparative Analysis of UFO abduction Reports". He used only published reports, on a world-wide basis. He lists all the reported captures known in the world - such as the Soviet Union had three valid captures (1/6 land area of this planet) Most reports are from England, South America, and USA. 3 in Africa, none in the Orient. The USA has the biggest majority of reports - only in this country, are witnesses captured more than once, have implants, taken on trips, given false information, raped or molested. The beings are described as ranging in height from 1 1/2 ft tall to 9 feet. Skin color is white, gray, black, tan, brown, green, red, and pink. Some are very human appearing, while others have faces like insects, bats, birds, rats, including Big Foot and a smaller animal type. No blonds, the human ones always have dark hair, and big noses. A very interesting report.

If you are ever in this area, and at a time the ufos are flying, I will take you there, but you will not see what you expect - most people have a Hollywood version of a ufo. However, I can show you many slides of ufos, which I show in my lectures - not just ufos but ufos doing different things. As for the idea that ufos can be invisible, I believe this. I filmed a plane and helicopter flying side by side, but when the picture was developed, I had a plane, helicopter, disk and barrel-shaped object - the last two I did not see. Daylight picture.

Sincerely,

Betty Heer

953 State Street
Portsmouth NH 03801
April 25, 1988

Dear Grant Cameron:

Thanks for your letter of April 15th. If you should be in this area in May, we can get together. I can not guarantee the ufos will be flying on that definite date - occasionally they miss a day or two, but I can show you my slides, which I use in my lectures.

The remote controlled objects used by ufos, I believe, to be sensors, or monitors, or probes. I know some are listening devices, for sometimes a person can make a request, and get a responses. Also I had a report of one of these hitting a house window, moving off, coming back, and then it became tangled in a plant in the garden. It rocked itself back and forth. When it freed itself, it tipped over, and the witnesses saw an ordinary tv camera, like those used in a bank.

It always interests ^{me} when a person claims to have been 'silenced', such as Bennewitz. Silenced by whom? I have had hundreds, maybe thousands, of reports over a period of 26 years, and no one has ever been threatened in any way. Except maybe Len Stringfield, because he was dealing directly with military personnel. But then I understand it was not done directly but by anonymous phone calls.

I read an interesting article in the April issue of Soviet Life magazine. A cosmonaut returned after 326 days in space on their lab. They found that life in space is much easier than life here. The lack of gravity results in greater energy, and the ability to go like a fish thru water, gave him a great sense of freedom. The big problem of space travel is the difficulties faced when returning to gravity. They estimate a person could be in space for 18 to 24 months, but would have incredible difficulty adjusting back to life here. If longer than that, it might be impossible. Undoubtedly ufos have been in space for a long time, maybe that is their problem in landing and making themselves known worldwide. This would explain some of the reports I have received of a ufo landing, and the beings leaving the crafts, running around, jumping, leaping as tho they were exercising, for about 20 minutes, and then returning to their craft.

If you should come to this area, my phone is 603 436 3803

Sincerely,

Billy Hill

BETTY HILL **THE** **CLOSEST ENCOUNTER**

By Jerome Clark

Late in the evening of Sept. 19, 1961, Barney and Betty Hill of Portsmouth, N.H., experienced what would prove to be the most famous UFO encounter in history. On their way home from a trip to Canada, the couple—he a postal employee, she a social worker—saw a UFO and noticed human-like figures looking down at them from inside the object. When they returned home to Portsmouth, they were puzzled to discover two hours unaccountably missing.

Between 1962 and 1964, under hypnotic regression directed by Boston psychiatrist Dr. Benjamin Simon, they recalled a frightening experience that seemed to have taken place during that missing period. They remembered being abducted into the UFO and subjected to physical examination by beings who appeared to be extraterrestrials.

*Since then, numerous other supposed UFO abductions have come to light, but none has received the publicity accorded the Hills' experience, which became the subject of John G. Fuller's best-selling book *The Interrupted Journey* (1966), and of an NBC television movie, *The UFO Incident*, broadcast on Oct. 20, 1975.*

Barney Hill died in 1969. Betty Hill, now 63 and retired, devotes full time to UFO research.

UFO REPORT: In retrospect—it's been 17 years since the original sighting, 12 years since the book came out—how has it affected your life?

BETTY HILL: For many years it did not have too much effect one way or another. I was working every day and was very much involved in my job. I had many hobbies and interests to occupy my spare time.

But three years ago I became ill and underwent surgery twice. I decided then to apply for early retirement. After I left my job, well, it was then that my experiences began to affect my life completely, because I entered UFO research in a serious way and got in contact with a great number of ufologists and UFO witnesses.

UFO REPORT: Let's pick up that story a little later. First, let's discuss a recent effort to debunk your report by "super-

screens. But after the articles appeared, not one single investigator, civilian or military, believer or skeptic, contacted him in any way. He was most upset about this. At the time we spoke, he was changing jobs; in the process, he threw all kinds of records and files out—because, he said, no one was interested in them.

UFO REPORT: Is he still alive?

HILL: Yes, but he's no longer writing. The lack of public interest in following

The most celebrated UFO abductee in the world talks about extraterrestrials, contactees, and her special "landing area" for unidentified flying objects.

skeptic" Robert Sheaffer, who claims that you and your late husband saw the planet Jupiter and merely "imagined" a UFO abduction.

Among other charges, for example, he says he and his colleague, Philip Klass, have been unable to find any substantiation for your assertion that seven radar stations in New England tracked the UFO you observed.

HILL: Our abduction story was published originally in the fall of 1965 in a Boston newspaper. It was done over our objections. We weren't interested in publicity and in fact we turned down a request for an interview by the reporter who wrote the series. I met him once after the articles had appeared and he told me that, prior to publication, the newspaper had done an extensive amount of legwork. They'd gone up into the White Mountains and talked with numerous witnesses to UFO sightings, including radar operators.

The reporter told me that "our" UFO had been picked up on seven radar



...that he no longer wants anything to do with UFOs. He doesn't even like to discuss them.

UFO REPORT: Sheaffer says that the people in the weather station at the top of Mt. Washington in the White Mountains had unlimited visibility for 130 miles, yet did not see the UFO you observed.

HILL: I've never heard that visibility from Mt. Washington extends to 130 miles. I've heard 90 miles.

But this aside, Sheaffer's observation is irrelevant. If he had bothered to glance at a map of New Hampshire, he would have seen that Mt. Washington is located off Route 16, which runs along the extreme eastern part of the state. Between Route 16 and Route 3—the road we were on—there's a range of mountains, so it isn't very likely the weather station people could have seen the UFO.

Even if they had, it's pretty unlikely they'd tell Sheaffer about it. Over the years there have been great numbers of UFO sightings. Some of the people who've seen them have made their reports public and some have really suffered for it. A few have lost jobs; others have been harassed by various groups. This has happened frequently enough so that UFO witnesses have become extremely reluctant to speak out. So, even if a UFO sat down on top of Mt. Washington, I doubt anyone would say anything about it, especially to someone like Sheaffer who intends to write an article about it.

UFO REPORT: Sheaffer makes a great deal of an alleged discrepancy in the time the UFO incident took place. Various reports have put it at 11 p.m., 12

midnight, or three a.m.

HILL: If Sheaffer had bothered to read John Fuller's book, as he says he did, he'd know that Barney and I left Colebrook, N.H., at about 10 that night. We first started seeing the object in the Lancaster area around 11. The object followed us for approximately 30 miles before it came out over the highway and stopped in mid-air. Then it stayed with us as we went off Route 3, off Route 175, onto a side road, and to the spot where we were captured by the UFO beings. We apparently were inside the UFO between 12 and two a.m. Then we heard the second "beeping" sounds after we got back onto Route 3 in the Ashland area. That would have been between two and three in the morning. So really, in a sense, all the times Sheaffer mentions are correct.

UFO REPORT: You have said that copies of the tapes of Dr. Simon's interviews with you and Barney exist in the Library of Congress. Sheaffer says this isn't true.

HILL: Soon after the book was published, Dr. Simon told me he had been in contact with someone who informed him that the tapes of our hypnosis sessions were in the National Archives or the Library of Congress. I'm not sure just where. Its use, he said, was highly restricted.

I didn't feel comfortable with the prospect of having the tapes exposed to the public. I believe he arranged it so that a person would have to get in touch with him in order to get authorization to hear the tapes. They're not really open to the public.

UFO REPORT: How credible do you find Sheaffer's contention that Barney was so flaky that he imagined he saw

humanoids piloting the planet Jupiter?

HILL: (*Extended laughter.*) As I tried to explain to Sheaffer after he had written me a letter—and, incidentally, that one letter was the extent of his effort to communicate with me—the object when it first appeared looked like a huge star in the sky. But that was only for a few moments. Then it moved and traveled across the face of the moon. This is when we got a good look at it through binoculars.

UFO REPORT: It definitely traveled across the face of the moon?

HILL: Yes, definitely.

UFO REPORT: Quite an achievement for Jupiter—or any other planet, for that matter.

HILL: As it traveled across the sky, it flashed multicolored lights. In fact, the lights were similar to those on a police cruiser; they were flashing and flashing. I didn't know what it was, but I knew it was nothing I had ever seen before.

UFO REPORT: Let's get on to some more realistic possibilities. What do you think of the idea, which both UFO proponents and UFO skeptics have proposed at various times, that your "abduction" was in fact a shared dream experience? As the theory goes, you dreamed that ufonauts had taken you aboard the object, and you talked about it with Barney on a number of occasions. By the time Barney was hypnotized, he merely recited your dreams, somehow convinced—at least on an unconscious level—that the "experience" had really happened.

HILL: Of course Barney and I really wanted to believe that, and we even tried to explore the possibility with Dr. Simon. He told us that if this was a real experience we would find the capture spot. He said, "You won't have to look for it, but you'll find it."

About one year and three months after the hypnosis sessions had ended, we were in the White Mountains with my parents and my niece. My father wanted to see a certain campsite, so we turned off Route 3 onto 175 heading in the direction of the site. As Barney made the turn, we both immediately recognized the spot—the area where we had been taken. Barney drove onto the side road, jumped out of the car, and ran down the path through the woods and into the clearing.

One of the things I had remembered was sand, very much like beach sand, not the kind of thing you'd expect to find in the mountains. But this area had that kind of sand.

Later, I went back with an investigator and took measurements because I could remember just where the craft had rested on the ground in relation to the trees and general area. We were able to determine that the craft was



about 60 to 65 feet across.

In addition to our being able to locate the capture spot, there is another, even more substantial item of evidence: namely, my dress, which was torn and covered with a pink powdery substance. When I got home after our sighting, without any idea of what had happened to the dress, I put it in the wastebasket. Then I took it out and thought maybe I should save it. I put it out on the clothes line and eventually the wind blew the pink substance away. But the stuff did stain the dress.

UFO REPORT: Has anyone ever tried to analyze the material?

HILL: From the time of the incident up till very recently I spent a great deal of time trying to find someone somewhere who could check it out. Finally, this past

happened to Barney when he was being examined; he was nowhere around. So, if this abduction experience was just a dream of mine, where did he get the idea that the aliens had put a cup on his abdomen? And where did those warts—which developed about two weeks after the incident and in the same spot where the cup had been placed—ever come from? It seems pretty improbable that *this* was the product of my imagination. The warts had to be removed surgically.

I also have a clipping that was published soon after our experience became known. It was the report of a man up in the White Mountains who thought he was going to be captured by a UFO just about the time we were. In fact, he was so terrified that he went to the police and reported that a UFO came

Labor Day and the tourist season was over. We were in an isolated area and we were the only ones available.

UFO REPORT: What did you think of the 1975 NBC-TV movie *The UFO Incident*?

HILL: The movie itself was accurate, but I wish it had concentrated more on the UFO aspect. The presentation of the UFO and the aliens was sort of hazy, almost dreamlike. I suppose that was intentional.

My only serious criticism concerns the movie's depiction of the aliens' physical appearance. They did not look like that. The real ones looked more human than their television counterparts. Also, the movie shows them as being very short, but they weren't. I'd say the leader was my size and I'm five feet tall. And they weren't of such slender build.

UFO REPORT: How accurate was the movie's portrayal of the human aspects of the situation—the way you and Barney responded and the kinds of personal problems it caused you?

HILL: I think it captured the relationship between Barney and me quite well. And the parts showing the two of us under hypnosis in Dr. Simon's office were really excellent. When James Earl Jones played Barney's part, I could close my eyes and it was almost like hearing Barney say those things over again. And Estelle Parsons did a fine job of capturing my reactions under hypnosis.

UFO REPORT: Did they talk with you about your experience?

HILL: I never talked with Jones. But I did go to New York City and met and conversed with Estelle Parsons, and with Richard Colla, the producer-director.

UFO REPORT: Since your own encounter, you've had dealings with other UFO witnesses . . .

HILL: Let me say this—I had to wait 12 years for Charlie Hickson and Calvin Parker. That was a long time to wait for someone else to come along—someone who I *know* was captured.

UFO REPORT: You're speaking, of course, of the famous fishermen from Pascagoula, Miss. How do you know they were captured?

HILL: Because of the bond that exists between me and them. It is stronger than any bond I have ever known.

UFO REPORT: Have they told you things they haven't told the rest of us?

HILL: Yes. There are also parts of my own experience that I have never revealed and will never discuss. Of course, some things they don't even know themselves because they have never undergone complete hypnotic regression. In the limited testing that has been done so far, they have repeated



summer, I found a person who promised to examine it. Right now I'm waiting to find out what he came up with. (Editor's note: As we went to press, the report had still not been completed.)

UFO REPORT: What other reasons do you have for believing yours was a real experience and not just an imagined one?

HILL: Well, there's the matter of the warts on Barney's abdomen. You have to remember that I had no idea what

zooming down on him. He told them he'd been sure it had come to take him away.

UFO REPORT: Have you any idea why the UFO beings chose you and Barney?

HILL: I don't think they *chose* us, in the sense that they thought we were anybody special. It was just circumstance. We were traveling along Route 3, alone, on a Tuesday night close to midnight. There was no other traffic. It was after

only what they already had remembered consciously.

UFO REPORT: Have you had any further UFO experiences since the famous one in 1961?

HILL: In the midst of the original newspaper publicity in 1965, Barney and I saw another UFO. This also helped confirm in our own minds that our first experience had been real. And just before that happened, the Exeter, N.H., area was flooded with sightings—so many of them that John Fuller wrote a book, *Incident at Exeter*, based on them.

Now, Exeter is only 12 miles from where I live. At the time, I was the child welfare worker for Exeter, so I was there two or three days a week working with people in the community, going into police stations regularly, and so on. So I was well aware of what was going on. After the stories about us appeared, our phone started ringing almost constantly from people telling us of their own UFO sightings.

I started putting the reports on a map to determine where they were happening, which direction the UFOs were coming from, etc. Soon, a pattern began to emerge on the map. After pinpointing the general area of the sightings, I started going to a particular area in New Hampshire where activity was particularly intense. I have been going down there now for six or seven years, sitting, watching, observing, taking notes and photographs. I call this—just to give it a name—my "landing area." The last three or four years I have started taking other people out there with me so they can also observe what's happening.

UFO REPORT: What are you seeing out there?

HILL: UFOs! All kinds of them.

I've found, in observing UFOs, that many times, what seems puzzling at first becomes understandable. You have to keep going back and observing it over and over again, until finally it makes sense.

For example, when I first went up there, I was seeing what looked like UFOs merging together, separating, and merging together again. It took some time for me to realize that it was one UFO behind the other; one would come up beside another, but at an angle where I couldn't see it. There'd be an orange light, then suddenly a green light, then a white light. So when these lights would line up it would look as if one small disc were suddenly becoming five or six discs. Actually, of course, it was just two UFOs which were positioning themselves together.

UFO REPORT: Have you had any close encounter sightings?

HILL: I had some experiences with a

certain kind of UFO which seemed to specialize in following cars. On several occasions, while I was parked out at my "landing area," a UFO would hover over the roof of my car. It would be so close I could have thrown a rock up and hit the bottom of it.

Then, about two years ago, all of the UFOs disappeared completely for about three weeks. But when they returned they came back in greatly increased numbers and brought other kinds of UFOs with them. The whole pattern changed.

The "new" UFOs aren't friendly as the "old" ones were. Whereas before they would buzz cars, flying over the roofs, and behaving almost playfully, now they sometimes shoot beams, and dart at cars in menacing fashion—enough so that they usually are able to

the rim. Under them, there were two white headlights. I was out there one night with a retired military officer and his wife. When he saw the UFO, he got out of the car and started walking toward it. Suddenly, a large swirling mass shot out from the object. I don't know what it was, but it looked like a red ball rolling over and over and heading directly toward him.

I jumped out and tried to film this with my movie camera. But then—I know this sounds incredible—a green light hit my camera and burned out the switch and the circuitry so that my camera wouldn't work. When the officer saw this red ball coming at him, he turned and ran back to the car. The red ball stopped, rolled back to the craft, and disappeared.

UFO REPORT: Have you had any

chase people out of the area. I've had some bad experiences myself. They've backed me right down the road at times, and once they even blistered the paint on my car.

One particular UFO comes in almost every night. During the winter of 1976-77, when I saw it often, it was quite spectacular—a sort of flattened disc with brightly colored lights.

One night in January 1977, it landed and turned on 12 big white lights around

contact with UFO beings since your abduction?

HILL: No, not even a fleeting glimpse of the aliens. In the area I've been telling you about, no one has ever reported seeing UFO occupants.

UFO REPORT: In our various private conversations you're very insistent that abductees are different from contactees. How are they different?

HILL: Abductees are people like

CONTINUED ON PAGE 67

the craft look like?" "It's a small one," she said. "Three people are on it, the commander and two others." And I said, "Tell the commander, next time you see him, that I want to know what he did to get himself demoted." (Laughs.) You see, the one that captured us had 11 occupants aboard.

Seriously, I think the contactee has always been with us. It's nothing new. Throughout the history of mankind there have always been individuals who craved power, prestige, and protection, and who looked outside themselves for it—to gods, prophets, spirits, and devils. It's an ancient yearning. Where once people talked with God, now they talk with godlike UFO beings. It's hardly surprising that so many people should attempt to tie religion in with UFOs.

UFO REPORT: So you don't think these types of claims are connected with the real UFO phenomenon?

HILL: No, I don't.

UFO REPORT: What should someone do if he has some missing time and thinks he might have had an abduction experience?

HILL: He should go straight to a medical doctor. There's been so much publicity about missing time and UFOs that people tend to assume automatically that they might have been abducted. That's not only wrong but conceivably even dangerous. The "missing time" could be the first symptom of a brain tumor, a diabetic condition, or any of a number of other potential health problems.

I'm always getting letters from people who write, "I have two hours missing. Do you think I should be hypnotized?" I think hypnosis is probably one of the worst things they could do because I don't think hypnosis is the way to get at the truth.

UFO REPORT: You don't?

HILL: No, I certainly don't. Barney and I underwent deep trance hypnosis by one of the top men in this country—and

maybe in the world—but even Dr. Simon very seldom uses hypnosis. He did it with us only because Barney was suffering from some kind of stress that was preventing his ulcer from healing. We went to Dr. Simon to get relief from the emotional trouble and to determine what its cause was. We assumed that, once we found that out, the ulcer would heal—and by this time Barney was totally disabled. He couldn't even work.

In other words, we'd gone to Dr. Simon for medical help, not to find out about a UFO experience.

I just do not believe that UFOs are going around capturing people in great numbers, although I suspect there are millions who *think* they've been captured. When somebody tells me he thinks he might be an abductee, I tell him what Dr. Simon told Barney and me, namely that, even if we had not undergone hypnotic regression, in time we probably would have remembered the whole experience on our own.

For hypnosis to be really valid, Dr. Simon has told me, the person has to be a deep-trance subject, and Barney and I were both deep-trance subjects.

But many people still use hypnosis, often a light stage of hypnosis, and get their subjects to relate a "UFO experience." Often these stories are pure fantasy. I know one person who told about an on-board encounter under hypnosis; she always referred to the aliens as "Batman." It turned out that when she was a kid she had loved *Batman* comic books. I'm sure she was unconsciously drawing on memories of them and incorporating them into a fictitious flying saucer tale.

UFO REPORT: What do you think UFOs are? As you know, ufologists have a lot of theories these days. One, of course, is that they're interstellar spaceships. Another, more recent idea is that they are a little-understood paranormal phenomenon.

HILL: My opinion is that they're astronauts from another solar system. I

would like to clarify one point, though. I don't think the UFOs we're seeing here in New Hampshire are the UFOs that come from Zeta Reticuli, where the star map I saw inside the craft seemed to show the aliens came from. What we're seeing here is the development of craft that can navigate in our atmosphere and are probably being powered by materials they're getting here.

UFO REPORT: I'm not sure I understand what you mean.

HILL: I think the UFOs we are seeing nightly in this area are comparable, say, to the instruments and machines we developed for use on the surface of the moon. They're specially constructed for use in the Earth's atmosphere, and they use terrestrial sources of power. Maybe that's why so many UFOs are seen around power lines, bodies of water, and so forth.

UFO REPORT: I take it that you don't place any stock in theories that UFOs are paranormal rather than technological.

HILL: I think too many people try to equate UFOs and psychic phenomena. I believe that the psychic interpretation will be proven untrue as time goes by. There are just too many UFOs here and the sightings are increasing. They must have some purpose in being here.

UFO REPORT: What do you think that purpose is?

HILL: Maybe they're trying to find out if we're civilized! (Laughs.) If they're monitoring our television shows, they must really have some questions about that!

UFO REPORT: Do you expect eventual open contact?

HILL: In time they are going to make themselves known. In fact, that's beginning to happen right now and, in my opinion, the process will continue. I anticipate some awfully interesting developments in the next few years. But we'll just have to wait and see. ★

COINS

(Continued from page 47)

installed itself in the territory of Yukon in Alaska. Then, after shifting to the Sea of Greenland and after that to Hudson Bay, it settled in its present location about 12,000 years ago. Simultaneously, the South pole went through similar gyrations but in the opposite direction. We have to note that its three previous locations were in the southern part of the Indian Ocean between Australia and the Antarctic but never on Antarctica itself. Only the last movement, 12,000 years ago, brought the South pole to the middle of the great icy continent of Antarctica.

At least half of Antarctica, toward

South America and the South Atlantic, was ice free for 100,000 years, while Palmer Peninsula and Cape Horn, which may then have been joined to each other, enjoyed a fairly warm climate. There is no valid reason to doubt that, during these periods of the last three polar rounds, a very advanced civilization could have existed in this region and might have been the origin of all civilization and knowledge in astronomy, mathematics, metallurgy, and a variety of arts.

Much has been written about the polar rounds but very little has been said about the accompanying shift of the equator. The displacement of the tropical zones around the globe had certainly much more influence upon humans than the shift of the ice caps. Certainly, climactic changes in temper

ate and tropical zones have caused many more migrations, and led to the destruction of many more civilizations, than any changes in polar regions.

The polar rounds and the shift of the equator also explain why we have found traces of civilizations in regions of the Earth that today seem unfit for human habitation. The jungles of Guatemala and Cambodia, the icy high plateaus of Tibet, or the desert of Arabia, were all quite different at different turns of the polar rounds and this simple explanation solves many archaeological, ethnological, and geological mysteries.

If we consider where the equator was 90,000 years ago, we discover that this line was very close to many famous archeological sites like Hoggar and

Air Force jet pilot John William Wilson of Cincinnati stated positively that he knew something was wrong with his F-86 Thursday afternoon, Aug. 27, 1953, over southern Lake Michigan. The pilot of an F-86 does not have to pick up a microphone and raise it to his lips in order to transmit a message. The microphone is already strapped in place and he can key his transmitter by pressing a button on the control stick. Wilson did just that. He made a fragmentary distress call from 15,000 feet. He was cut off in midsentence. Search crews found no trace of the plane or pilot, despite the fact that Lt. Gill Garrett, in another F-86, witnessed the tragedy.

"I was trailing by about 500 feet," he said. "I heard Wilson call base saying there was an emergency and indicating he would bail out. But almost as he spoke the plane flew apart. No parachute was seen and I believe Wilson never got out of his seat," Garrett said.

*At work in the Great Lakes is a force that destroys those who venture there with devastating speed and power—a speed and power yet unexplained. **

BETTY HILL

(Continued from page 41)

Hickson and Parker. The UFO entities grab them, look them over, and drop them off. The experience is traumatic and troubling, so much so that the abductee usually will seek help immediately afterwards.

Contactees are individuals like the late George Adamski, who really got the whole thing started. After Barney and I had our encounter—but before it had been publicized—we quietly tried to search out someone else who might have had a similar experience. This brought us directly in touch with the contactee phenomenon. We met people who'd tell us about their beautiful meetings with friendly extraterrestrials. One even said he'd gone on a trip to the moon.

After Barney's and my experience became known, we were amused at the contactees' reactions. They'd say, "You've seen the evil ones," or, "Yours came from another dimension, not from outer space." Even they made it very clear that their experiences and ours were totally different.

Two or three times a week, someone will call me to announce, "I'm in contact with the ones that captured you. They want to know why you're telling such lies about them." (Laughs.) In fact, one woman called to tell me the commander of the UFO that captured me was landing in a hole outside her cellar somewhere. So I said, "O.K., what does

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Betty Hill's STAR MAP: An Extraterrestrial Link

By T. Scott Crain, Jr.



T. Scott Crain, Jr.

On September 19, 1961 a New Hampshire couple, Betty and Barney Hill of Portsmouth were allegedly abducted by a UFO and given physical examinations. The Hills, unable to account for several "lost hours" while driving through the White Mountains of New Hampshire, were plagued for three years by nightmares, finally submitted to time-regression hypnosis by Dr. Benjamin Simon, a Boston psychiatrist and neurologist.

Although this case is not new to UFO buffs, new findings in astronomy tend to boost the authenticity of the Hill's contact, as well as present striking similarities between Duncan Lunan's orbiting-probe hypothesis (see *Flying Saucers* Fall 1973) and certain data of Mrs. Hill's recollection of her abduction.

As well as undergoing extensive physical examinations, Betty Hill

talked for some time with the crew leader. During the course of the conversation, Mrs. Hill said she was shown a star map of exploration between certain stars located somewhere in the universe. In 1964, under posthypnotic suggestion from Dr. Simon, Mrs. Hill drew the star map shown her by the aliens.

When the synopsis of the book *The Interrupted Journey* (New York: Dial Press, 1966), by John G. Fuller was published in *Look*, a Ohio schoolteacher, Marjorie Fish, became quite interested in checking out the map.

Because the crew leader had asked Mrs. Hill whether she could point her own sun (she was unable to identify anything on the map, so obviously couldn't) Marjorie Fish assumed that the star map was drawn from the aliens "home port". She also assumed

that our sun appeared on the map—undoubtedly with a line drawn to it—and that the base stars were the two largest circles with lines radiating from them. She then collected all available positions, distance and type data of all stars within roughly 50 light-years of the sun in an attempt to match the star pattern in Mrs. Hill's drawing. She even constructed several accurate 3-dimensional models using beads to represent stars held by threads attached to a frame. By July 1969, she successfully identified nine of the stars that appeared in an angular pattern that was too precise to be a coincidence, and was able to identify many of the other stars with little trouble.

But not until 1972, after six years of extensive research, could Marjorie Fish locate the triangle of background stars that were in the exact positions as in Betty Hill's drawing.

The reason why is that the location of the last three stars (known as Gliese 86.1, 95 and 97) weren't publicly known until the updated Gliese Catalogue of Nearby Stars became available in the fall of 1969. *Therefore, no one from earth could accurately have drawn the map Betty Hill drew, with the knowledge available to us at the time it was drawn in 1964.*

Hence in 1964, Betty Hill's drawing:

1. showed Gliese 86.1, a star not listed in any earthly star catalog.
2. showed two other stars, that

were catalogued, but appeared in incorrect parallax positions.

Dr. Allen Hynek, Director of Lindheimer Astronomical Research Center at Northwestern University remarks: *"No astronomer on Earth between 1961 and 1964 could have known that the triangle of background stars existed in its present geometric position."*

Why? Because prior to 1969, the identification of the three stars that form the triangle in the left part of the pattern were not correctly determined by us until that date.

Marjorie Fish could find only one pattern of stars that made any sense at all in terms of correlating the distance of angles between stars. From her completed map, one can deduce that only travelers coming towards our solar system from the constellation Reticulum could have plotted the positions of those three stars.

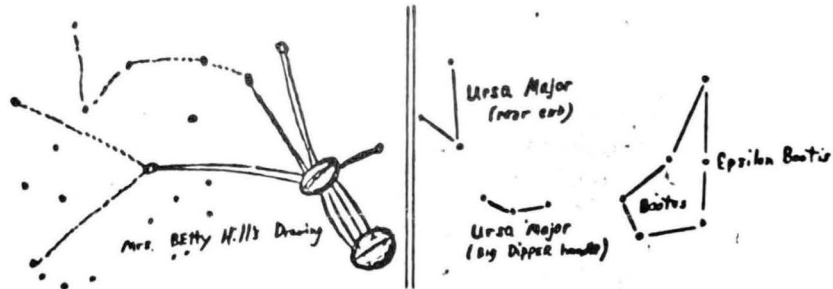
However, time and distance factors concern scientists, which appear considerably imaginable and seemingly impossible. To make a trip from Zeta 1 Reticuli to the White Mountains of New Hampshire, it would be a distance of thirty light years or approximately 176,340,000,000,000 miles.

But when one considers Einstein's theories on time dilation, these factors become less significant. According to Einstein, as one speeds up, time slows down. Therefore, approaching the speed of light would slow down the traveler's time clock in relation to clocks on earth.

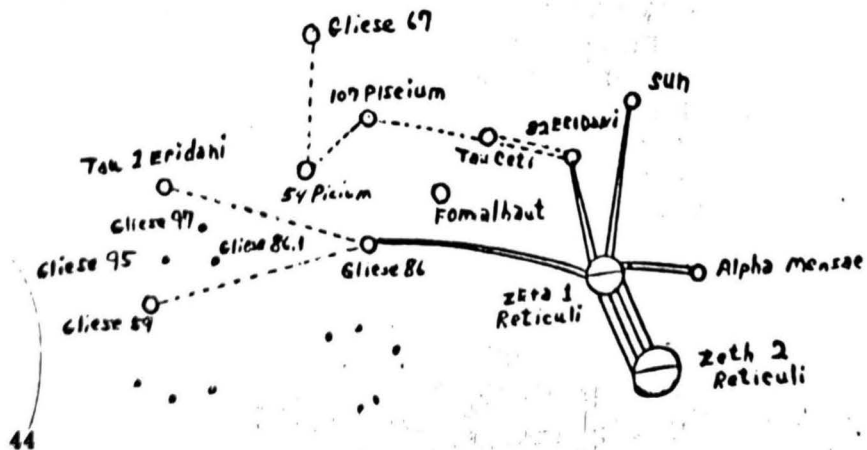
Utilizing Einstein's time-change factor to the case in point, it would take 22 years moving at 80 percent of the speed of light at a constant velocity to make a one-way trip. Moving at 99 percent the speed of light, it would take a little over five years. At 99.9 percent, the trip could

easily be made in only 20 months.

If the crew leader did indeed inform Betty Hill that the solid lines leading to what proved to be Zeta 1 and 2 Reticuli to Sol were trade routes, this specific star pattern may well be part of an enormous one-sided trading operation!



Under hypnosis, Betty Hill described a star map shown her by the aliens. Afterwards she sketched it. She was told by one of the aliens that the heavy lines represented regular trade routes, while the broken lines recorded space expeditions. Striking similarities exist in the stars in the left and lower segments of Betty Hill's drawing and those of Bootes and parts of Ursa Major. Below is Marjorie Fish's star map.

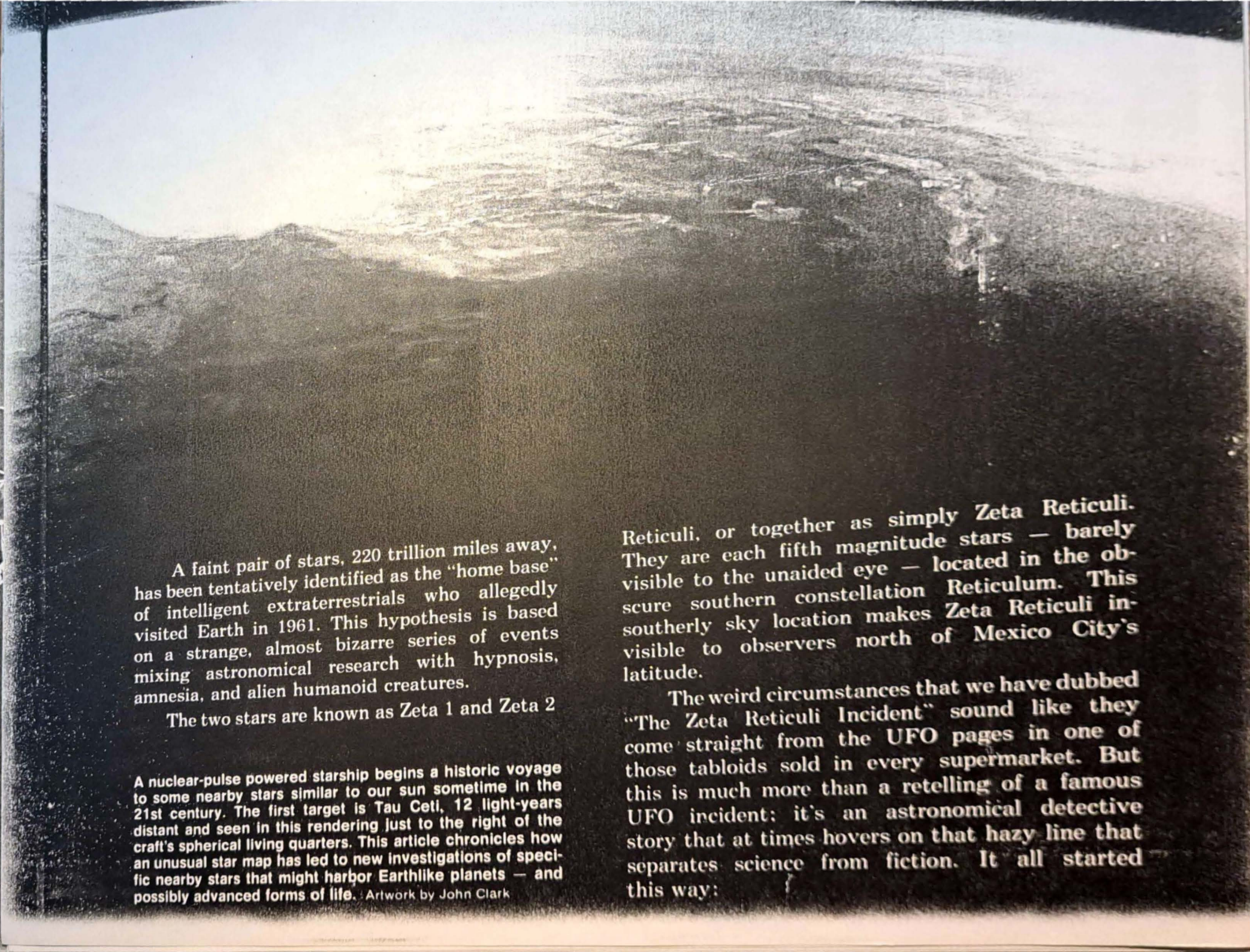


THE ZETA RETICULI INCIDENT

by Terence Dickinson



**With Related Commentary by:
Jeffrey L. Kretsch, Carl Sagan,
Steven Soter, Robert Scheaffer,
Marjorie Fish, David Saunders,
and Michael Peck.**



A faint pair of stars, 220 trillion miles away, has been tentatively identified as the "home base" of intelligent extraterrestrials who allegedly visited Earth in 1961. This hypothesis is based on a strange, almost bizarre series of events mixing astronomical research with hypnosis, amnesia, and alien humanoid creatures.

The two stars are known as Zeta 1 and Zeta 2

A nuclear-pulse powered starship begins a historic voyage to some nearby stars similar to our sun sometime in the 21st century. The first target is Tau Ceti, 12 light-years distant and seen in this rendering just to the right of the craft's spherical living quarters. This article chronicles how an unusual star map has led to new investigations of specific nearby stars that might harbor Earthlike planets — and possibly advanced forms of life. Artwork by John Clark

Reticuli, or together as simply Zeta Reticuli. They are each fifth magnitude stars — barely visible to the unaided eye — located in the obscure southern constellation Reticulum. This southerly sky location makes Zeta Reticuli invisible to observers north of Mexico City's latitude.

The weird circumstances that we have dubbed "The Zeta Reticuli Incident" sound like they come straight from the UFO pages in one of those tabloids sold in every supermarket. But this is much more than a retelling of a famous UFO incident; it's an astronomical detective story that at times hovers on that hazy line that separates science from fiction. It all started this way:

The date is Sept. 19, 1961. A middle aged New Hampshire couple, Betty and Barney Hill, are driving home from a short vacation in Canada. It's dark, with the moon and stars illuminating the wooded landscape along U. S. Route 3 in central New Hampshire. The Hills' curiosity is aroused when a bright "star" seems to move in an irregular pattern. They stop the car for a better view. The object moves closer, and its disklike shape becomes evident.

Barney grabs his binoculars from the car seat and steps out. He walks into a field to get a closer look, focuses the binoculars, and sees the object plainly. It has windows — and behind the windows, looking directly at him are... humanoid creatures! Terrified, Barney stumbles back to the car, throws it into first gear and roars off. But for some reason he turns down a side road where five of the humanoids are standing on the road.

Apparently unable to control their actions, Betty and Barney are easily taken back to the ship by the humanoids. While inside they are physically examined, and one of the humanoids communicates to Betty. After the examination she asks him where they are from. In response he shows her a three-dimensional map with various sized dots and lines on it. "Where are you on the map?" the humanoid asks Betty. She doesn't know, so the subject is dropped.

Betty and Barney are returned unharmed to their car. They are told they will forget the abduction portion of the incident. The ship rises, and then hurtles out of sight. The couple continue their journey home oblivious of the abduction.

But the Hills are troubled by unexplained dreams and anxiety about two hours of their trip that they can't account for. Betty, a social worker, asks advice from a psychiatrist friend. He suggests that the memory of that time will be gradually restored over the next few months — but it never is. Two years after the incident, the couple are still bothered by the missing two hours, and Barney's ulcers are acting up. A Boston psychiatrist, Benjamin Simon, is recommended, and after several months of weekly hypnosis sessions the bizarre events of that night in 1961 are revealed. A short time later a UFO group leaks a distorted version of the story to the press and the whole thing blows up. The Hills reluctantly disclose the entire story.

Can we take this dramatic scenario seriously? Did this incredible contact with aliens actually occur or is it some kind of hallucination that affected both Barney and Betty Hill? The complete account of the psychiatric examination

from which the details of the event emerged is related in John G. Fuller's *The Interrupted Journey* (Dial Press, 1966), where we read that after the extensive psychiatric examination, Simon concluded that the Hills were not fabricating the story. The most likely possibilities seem to be: (a) the experience actually happened, or (b) some perceptive and illusory misinterpretations occurred in relationship to some real event.

There are other cases of alleged abductions by extraterrestrial humanoids. The unique aspect of the Hills' abduction is that they remembered virtually nothing of the incident.

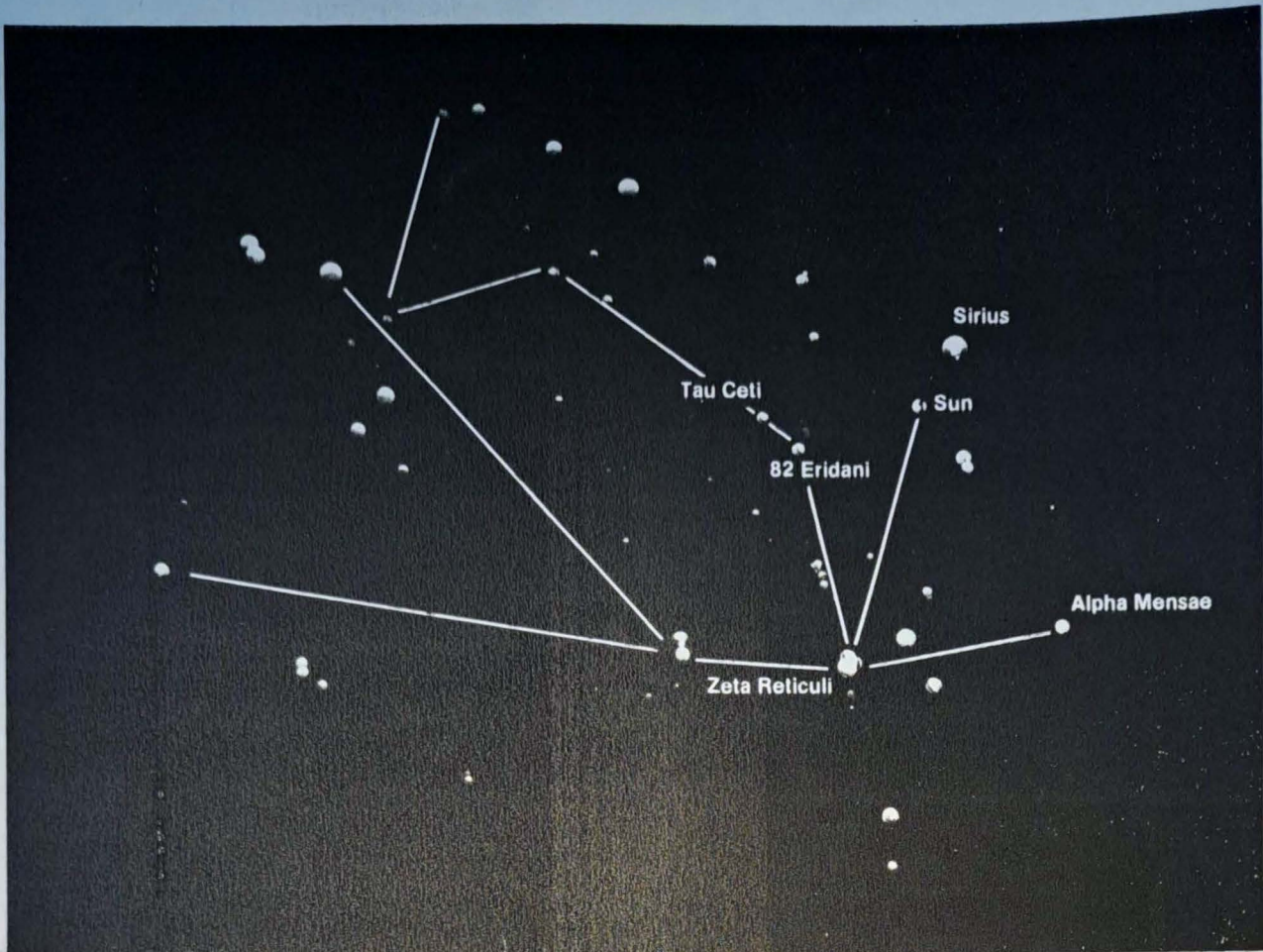
Intrigued by the Hills' experience, J. Allen Hynek, chairman of the department of astronomy at Northwestern University, decided to investigate. Hynek described how the Hills recalled the details of their encounter in his book, *The UFO Experience* (Henry Regnery Company, 1972):

"Under repeated hypnosis they independently revealed what had supposedly happened. The two stories agreed in considerable detail, although neither Betty nor Barney was privy to what the other had said under hypnosis until much later. Under hypnosis they stated that they had been taken separately aboard the craft, treated well by the occupants — rather as humans might treat experimental animals — and then released after having been given the hypnotic suggestion that they would remember nothing of that particular experience. The method of their release supposedly accounted for the amnesia, which was apparently broken only by counterhypnosis."

A number of scientists, including Hynek, have discussed this incident at length with Barney and Betty Hill and have questioned them under hypnosis. They concur with Simon's belief that there seems to be no evidence of outright fabrication or lying. One would also wonder what Betty, who has a master's degree in social work and is a supervisor in the New Hampshire Welfare Department, and Barney, who was on the governor of New Hampshire's Civil Rights Commission, would have to gain by a hoax? Although the Hills didn't, several people have lost their jobs after being associated with similarly unusual publicity.

Stanton T. Friedman, a nuclear physicist and the nation's only space scientist devoting full time to researching the UFO phenomenon, has spent many hours in conversation with the Hills. "By no stretch of the imagination could anyone who knows them conclude that they were nuts," he emphasizes.

So the experience remains a fascinating story despite the absence of proof that it actually happened. Anyway — that's where things were in



1966 when Marjorie Fish, an Ohio schoolteacher, amateur astronomer and member of Mensa, became involved. She wondered if the objects shown on the map that Betty Hill allegedly observed inside the vehicle might represent some actual pattern of celestial objects. To get more information about the map she decided to visit Betty Hill in the summer of 1969. (Barney Hill died in early 1969.) Here is Ms. Fish's account of that meeting:

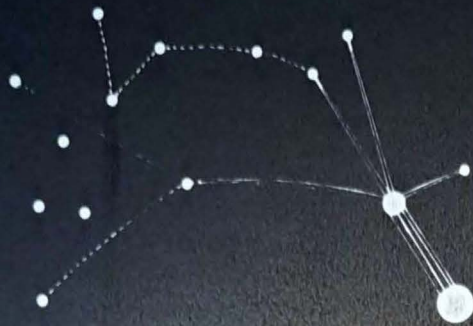
"On Aug. 4, 1969, Betty Hill discussed the star map with me. Betty explained that she drew the map in 1964 under posthypnotic suggestion. It was to be drawn only if she could remember it accurately, and she was not to pay attention to what she was drawing — which puts it in the realm of automatic drawing. This is a way of getting at repressed or forgotten material and can result in unusual accuracy. She made two erasures showing her conscious mind took control part of the time.

"Betty described the map as three-dimensional, like looking through a window. The stars were tinted and glowed. The map material was flat and thin (not a model), and there were no noticeable lenticular lines like one of our three-dimensional processes. (It sounds very much like

This model, prepared by Marjorie Fish, shows all the stars located in a vast volume of space extending out about 55 light-years in the direction of Zeta Reticuli. The viewing angle is from a point in space beyond that limit looking back toward the sun. Each star is suspended on a separate thread at its appropriate distance and position from the sun, and colored according to its spectral type (solar type stars are yellow). The star "behind" the two components of Zeta Reticuli is Zeta Tucanae. From a model such as this, using the same viewing angle seen here, Marjorie Fish noted 16 stars whose positions are remarkably close to the stars in the drawing made by Betty Hill. The fact that all the stars in the "Hill configuration" are solar type stars is one of several intriguing areas that enshroud the "Zeta Reticuli Incident".

a reflective hologram.) Betty did not shift her position while viewing it, so we cannot tell if it would give the same three-dimensional view from all positions or if it would be completely three-dimensional. Betty estimated the map was approximately three feet wide and two feet high with the pattern covering most of the map. She was standing about three feet away from it. She said there were many other stars on the map but she only (apparently) was able to specifically recall the prominent ones connected by lines and a small distinctive triangle off to the left. There was no concentration of stars to indicate the Milky Way (galactic plane) suggesting that if it rep-

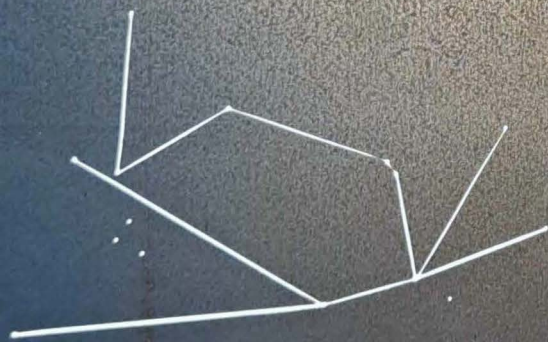
Hill Map



Fish Interpretation



Computer Generated Map



Three key phases in the analysis described in this article are illustrated here. Top diagram is a copy of the map Betty Hill drew, allegedly a duplicate of one she saw inside an extraterrestrial vehicle. Center map is derived from a model of our stellar neighborhood by Marjorie Fish. It shows the stars that coincide with those on the Hill map (the Fish model is illustrated on page 5). The only area of significant incongruity is the wide separation of Zeta Reticuli in the Hill version. Lower photo shows a cathode ray tube computer readout that was run at Ohio State University as a check on the Fish model. Data used to derive the Fish model and the computer readout were taken from Gliese catalog.

resented reality, it probably only contained local stars. There were no grid lines."

So much for the background material on the Hill incident. (If you want more details on the encounter, see Fuller's book). For the moment we will leave Marjorie Fish back in 1969 trying to interpret Betty Hill's reproduction of the map. There is a second major area of background information that we have to attend to before we can properly discuss the map. Unlike the bizarre events just described, the rest is pure astronomy.

According to the most recent star catalogs, there are about 1,000 known stars within a radius of 55 light-years of the sun.

What are those other stars like? A check of the catalogs shows that most of them are faint stars of relatively low temperature — a class of stars astronomers call *main sequence* stars. The sun is a main sequence star along with most of the other stars in this part of the Milky Way galaxy, as the following table shows:

Main sequence stars	91%
White dwarfs	8%
Giants and Supergiants	1%

Typical giant stars are Arcturus and Capella. Antares and Betelgeuse are members of the ultrare supergiant class. At the other end of the size and brightness scale the white dwarfs are stellar cinders — the remains of once brilliant suns. For reasons that will soon become clear we can remove these classes of stars from our discussion and concentrate on the main sequence stars whose characteristics are shown in the table on the opposite page.

The spectral class letters are part of a system of stellar "fingerprinting" that identifies the main sequence star's temperature and gives clues to its mass and luminosity. The hottest, brightest and most massive main sequence stars (with rare exceptions) are the A stars. The faintest, coolest and least massive are the M stars.

Each class is subdivided into 10 subcategories. For example, an A0 star is hotter, brighter and more massive than an A1 which is above an A2, and so on through A9.

This table supplies much additional information and shows how a slightly hotter and more massive star turns out to be much more luminous than the sun, a G2 star. But the bright stars pay dearly for their splendor. It takes a lot of stellar fuel to emit vast quantities of light and heat. The penalty is a short lifespan as a main sequence star. Conversely, the inconspicuous, cool M stars may be around to see the end of the universe — whatever that might be. With all these facts at hand we're now ready to tackle the first part of the detective story.

Let's suppose we wanted to make our own map of a trip to the stars. We will limit ourselves to the 55 light-year radius covered by the detailed star catalogs. The purpose of the trip will be to search for intelligent life on planets that may be in orbit around these stars. We would want to include every star that would seem likely to have a life-bearing planet orbiting around it. How many of these thousand-odd stars would we include for such a voyage and which direction would we go? (For the moment, we'll forget about the problem of making a spacecraft that will take us to these stars and we'll assume that we've got some kind of vehicle that will effortlessly transport us to wherever we want to go.) We don't want to waste our time and efforts — we only want to go to stars that we would think would have a high probability of having planets harboring advanced life forms. This seems like a tall order. How do we even begin to determine which stars might likely have such planets?

The first rule will be to restrict ourselves to life as we know it, the kind of life that we are familiar with here on Earth — carbon based life. Science fiction writers are fond of describing life forms based on chemical systems that we have been unable to duplicate here on Earth — such as silicon based life or life based on the ammonium hydroxide molecule instead of on carbon. But right now these life forms are simply fantasy — we have no evidence that they are in fact possible. Because we don't even know what they might look like — if they're out there — we necessarily have to limit our search to the kind of life that we understand.

Our kind of life — life as we know it — seems most likely to evolve on a planet that has a stable temperature regime. It must be at the appropriate distance from its sun so that water is neither frozen nor boiled away. The

planet has to be the appropriate size so that its gravity doesn't hold on to too much atmosphere (like Jupiter) or too little (like Mars). But the main ingredient in a life-bearing planet is its star. And its star is the only thing we can study since planets of other stars are far too faint to detect directly.

The conclusion we can draw is this: The star has to be like the sun.

Main sequence stars are basically stable for long periods of time. As shown in the table below, stars in spectral class G have stable lifespans of 10 billion years. (Our sun, actually a G2 star, has a somewhat longer stable life expectancy of 11 billion years.) We are about five billion years into that period so we can look forward to the sun remaining much as it is (actually it will brighten slightly) for another six billion years. Stars of class F4 or higher have stable burning periods of less than 3.5 billion years. They have to be ruled out immediately. Such stars cannot have life-bearing planets because, at least based on our experience on our world, this is not enough time to permit highly developed biological systems to evolve on the land areas of a planet. (Intelligent life may very well arise earlier in water environments, but let's forget that possibility since we have not yet had meaningful communication with the dolphins — highly intelligent creatures on this planet!) But we may be wrong in our estimate of life development time. There is another more compelling reason for eliminating stars of class F4 and brighter.

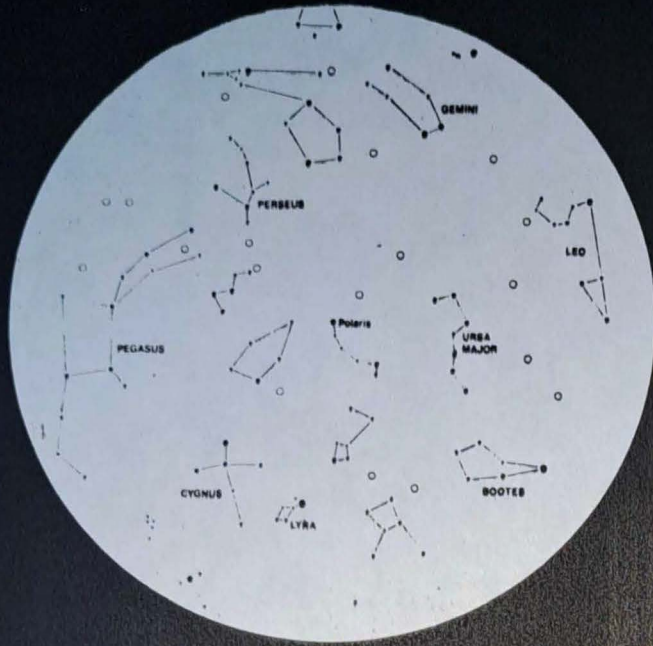
So far, we have assumed all stars have planets, just as our sun does. Yet spectroscopic studies of stars of class F4 and brighter reveal that most of them are in fact unlike our sun in a vital way — they are rapidly rotating stars. The sun rotates once in just under a month, but 60 percent of the stars in the F0 to F4 range rotate much faster. And almost all A stars are

CHARACTERISTICS OF MAIN SEQUENCE STARS

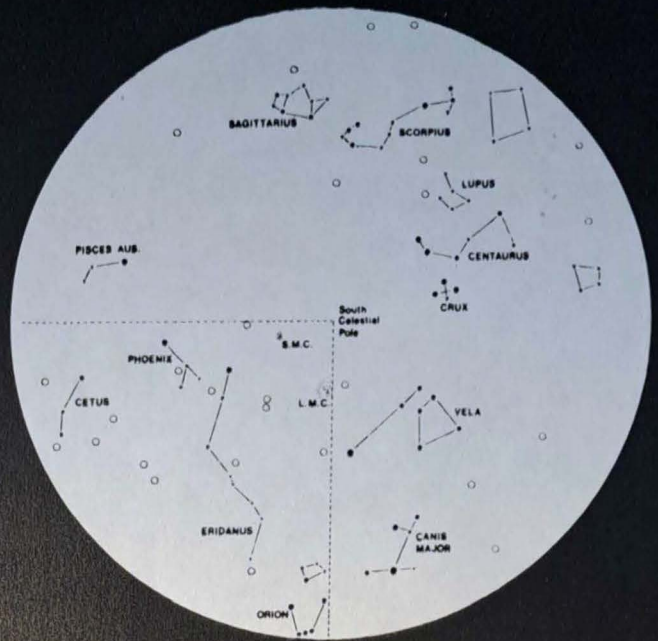
Class	Proportion of Total	Temperature (degrees Fahrenheit)	Mass (solar)	Luminosity (sun=1)	Lifespan (billions of years)	Examples
A0	1%	20,000	2.8	60	0.5	Vega
A5		16,000	2.2	20	1.0	
F0	3%	13,000	1.7	6	2.0	Procyon
F5		12,000	1.25	3	4.0	
G0	9%	11,000	1.06	1.3	10	Sun
G5		10,000	0.92	0.8	15	
K0	14%	8,000	0.80	0.4	20	Epsilon Eridani
K5		6,000	0.69	0.1	30	
M0	72%	7,000	0.48	0.02	75	Proxima Centauri
M5		5,000	0.20	0.001	200	

Location of Solar-type Stars

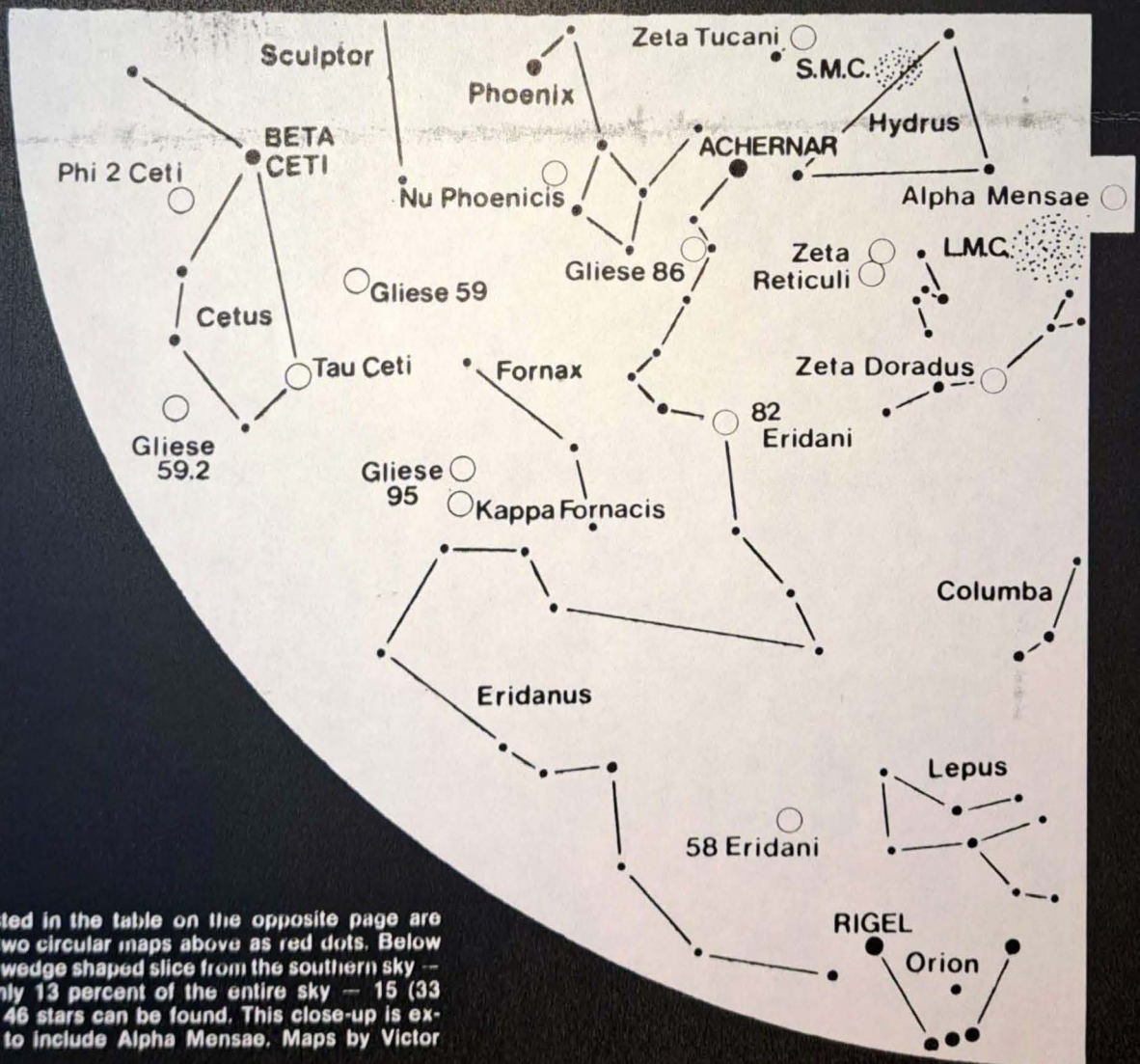
Northern Sky



Southern Sky



Detail of Quadrant from Southern Sky



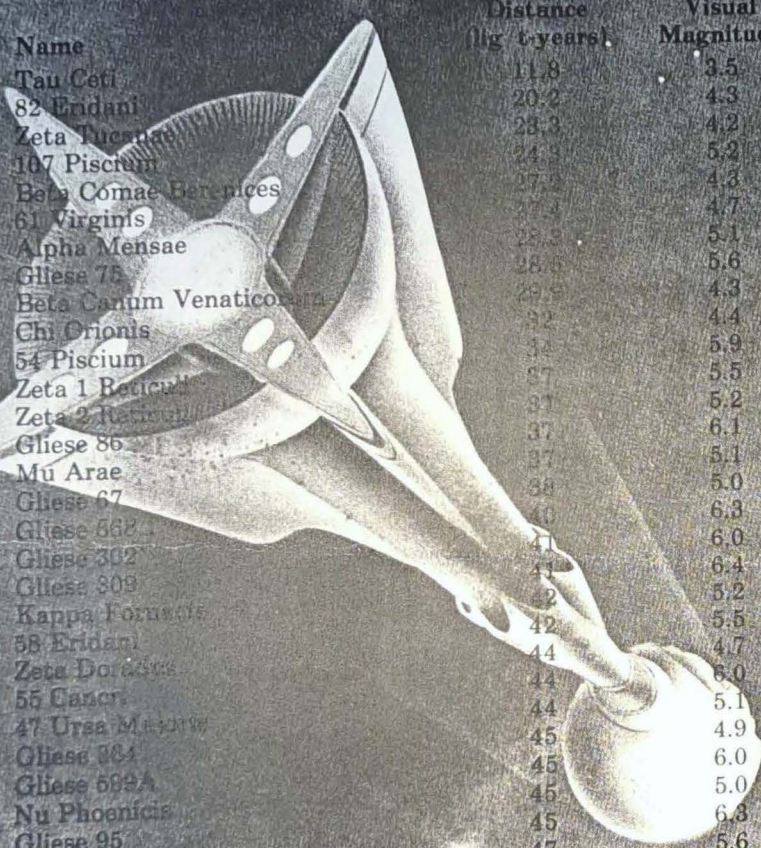
All the stars listed in the table on the opposite page are plotted on the two circular maps above as red dots. Below these maps in a wedge shaped slice from the southern sky — representing only 13 percent of the entire sky — 15 (33 percent) of the 46 stars can be found. This close-up is extended slightly to include Alpha Mensae. Maps by Victor Costanzo.

rapid rotators too. It seems, from recent studies of stellar evolution that slowly rotating stars like the sun rotate slowly *because* they have planets. Apparently the formation of a planetary system robs the star of much of its rotational momentum.

For two reasons, then, we eliminate stars of class F4 and above: (1) most of them rotate rapidly and thus seem to be planetless, and (2) their stable lifespans are too brief for advanced life to develop.

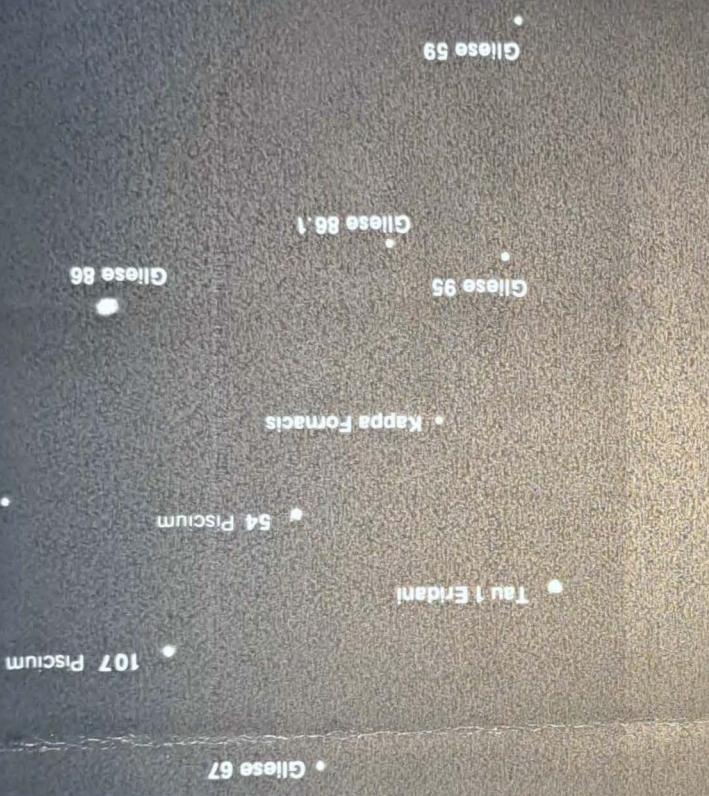
Another problem environment for higher

THE 46 NEAREST STARS SIMILAR TO THE SUN



Name	Distance (light-years)	Visual Magnitude	Luminosity (sun=1)	Spectrum
Tau Ceti	11.8	3.5	0.4	G8
82 Eridani	20.2	4.3	0.7	G5
Zeta Tucanae	23.3	4.2	0.9	G2
107 Piscium	24.3	5.2	0.4	K1
Beta Comae Berenices	27.2	4.3	1.2	G0
61 Virginis	27.4	4.7	0.8	G6
Alpha Mensae	28.3	5.1	0.6	G5
Gliese 75	28.5	5.6	0.4	K0
Beta Canum Venaticorum	29.5	4.3	1.4	G0
Chi Orionis	32	4.4	1.5	G0
54 Piscium	34	5.9	0.4	K0
Zeta 1 Bootis	37	5.5	0.7	G2
Zeta 2 Bootis	37	5.2	0.9	G2
Gliese 86	37	6.1	0.4	K0
Mu Arae	37	5.1	0.9	G5
Gliese 67	38	5.0	1.2	G2
Gliese 662	40	6.3	0.4	G9
Gliese 302	41	6.0	0.6	G8
Gliese 309	41	6.4	0.4	K0
Kappa Fornacis	42	5.2	1.3	G1
58 Eridani	42	5.5	0.9	G1
Zeta Doradus	44	4.7	2.0	F8
55 Cancri	44	6.0	0.7	G8
47 Ursa Majoris	44	5.1	1.5	G0
Gliese 364	45	4.9	1.8	G0
Gliese 682A	45	6.0	0.6	G6
Nu Phoenicis	45	5.0	1.8	F8
Gliese 95	45	6.3	0.5	G5
Gliese 796	47	5.6	0.5	G8
20 Leo Minoris	47	5.4	1.2	G4
39 Tauri	47	5.9	0.8	G1
Gliese 290	47	6.6	0.4	G8
Gliese 592	48	5.7	1.0	G2
Psi Aurigae	49	5.2	1.5	G0
Gliese 722	49	5.9	0.9	G4
Gliese 788	49	5.9	0.8	G5
Nu 2 Lupi	50	5.6	1.1	G2
14 Herculis	50	6.6	0.5	K1
Pi Ursa Majoris	51	5.6	1.2	G0
Phi 2 Ceti	51	5.2	1.8	F8
Gliese 641	52	6.6	0.5	G8
Gliese 972	52	6.9	0.4	K0
Gliese 5411	53	6.5	0.6	G8
109 Piscium	53	6.3	0.8	G4
Gliese 651	53	6.8	0.4	G8
Gliese 59	53	6.7	0.4	G8

This table lists all known stars within a radius of 54 light-years that are single or part of a wide multiple star system. They have no known irregularities or variabilities and are between 0.4 and 2.0 times the luminosity of the sun. Thus, a planet basically identical to Earth could be orbiting around any one of them. (Data from the *Catalog of Nearby Stars*, 1969 edition, by Wilhelm Gliese.)



affected by our planet's tidal forces. Long ago our satellite stopped rotating and now has one side permanently turned toward Earth. The same principles apply to planets of small stars that would otherwise be at the right distance for moderate temperatures. If rotational lock has not yet set in, at least rotational retardation would make it impossible to have long days and nights (as evidenced by Mercury in our solar system).

What stars are left after all this pruning? All of the G stars remain along with F5 through F9 and K0 through K4. Stephen Dole of the Rand Corporation has made a detailed study of stars in this range and suggests we should also eliminate F5, F6 and F7 stars because they balloon to red giants before they reach an age of five billion years. Dole feels this is cutting it too fine for intelligent species to fully evolve. Admittedly this is based on our one example of intelligent life — us. But limited though this parameter is, it is the only one we have. Dole believes the K2, K3 and K4 stars are also poor prospects because of their feeble energy output and consequently limited zone for suitable Earthlike planets.

Accepting Dole's further trimming we are left with single, nonvariable stars from F8 through all the Gs to K1. What does that leave us with?

These stars quite likely have planets. Indeed, one M star — known as Barnard's star — is believed to almost certainly have at least one, and probably two or three, Jupiter sized planets. Peter Van de Kamp of the Sproul Observatory at Swarthmore College (Pa.) has watched Barnard's star for over three decades and is convinced that a "wobbling" motion of that star is due to perturbations (gravitational "pulling and pushing") caused by its unseen planets. (Earth sized planets cannot be detected in this manner.)

But the planets of M stars and the K stars below K4 have two serious handicaps that virtually eliminate them from being abodes for life. First, these stars fry their planets with occasional lethal bursts of radiation emitted from erupting solar flares. The flares have the same intensity as those of our sun, but when you put that type of flare on a little star it spells disaster for a planet that is within, say, 30 million miles. The problem is that planets have to be that close to get enough heat from these feeble suns. If they are farther out, they have frozen oceans and no life.

The close-in orbits of potential Earthlike planets of M and faint K stars produce the second dilemma — rotational lock. An example of rotational lock is right next door to us. The moon, because of its nearness to Earth, is strongly

forms of life is the multiple star system. About half of all stars are born in pairs, or small groups of three or more. Our sun could have been part of a double star system. If Jupiter was 80 times more massive it would be an M6 red dwarf star. If the stars of a double system are far enough apart there is no real problem for planets sustaining life (see "Planet of the Double Sun", September 1974). But stars in fairly close or highly elliptical orbits would alternately fry or freeze their planets. Such planets would also likely have unstable orbits. Because this is a potentially troublesome area for our objective, we will eliminate all close and moderately close pairs or systems of multiple stars.

Further elimination is necessary according to the catalogs. Some otherwise perfect stars are labeled "variable". This means astronomers have observed variations of at least a few percent in the star's light output. A one percent fluctuation in the sun would be annoying for us here on Earth. Anything greater would cause climatic disaster. Could intelligent life evolve under such conditions, given an otherwise habitable planet? It seems unlikely. We are forced to "scratch" all stars suspected or proven to be variable.

This still leaves a few F stars, quite a few G stars, and hoards of K and M dwarfs. Unfortunately most of the Ks and all of the Ms are out. Let's find out why.

Forty-six stars.

Now we are ready to plan the trip. It's pretty obvious that Tau Ceti is our first target. After that, the choice is more difficult. We can't take each star in order or we would be darting all over the sky. It's something like planning a vacation trip. Let's say we start from St. Louis and want to hit all the major cities within a 1,000 mile radius. If we go west, all we can visit is Kansas City and Denver. But northeast is a bonanza: Chicago, Detroit, Cleveland, Pittsburgh, Philadelphia, New York and more. The same principle applies to the planning of our interstellar exploration. The plot (page 8) of all 46 candidate stars reveals a clumping in the direction of the constellations Cetus and Eridanus. Although this section amounts to only 13 percent of the entire sky, it contains 15 of the 46 stars, or 33 percent of the total. Luckily Tau Ceti is in this group, so that's the direction we should go (comparable to heading northeast from St. Louis). If we plan to visit some of these solar type stars and then return to Earth, we should try to have the shortest distance between stops. It would be a waste of exploration time if we zipped randomly from one star to another.

The route map on page 13 shows the culmin-

ation of our efforts. This group of stars is a "natural" for exploration when we achieve interstellar flight. Even if, as most exobiologists contend, we are highly unlikely to find advanced forms of life in such a small sample, the physical exploration of planets of other stars by beings from Earth is inevitable, and the stars of this group should be among the first targets.

Now we are ready to return to the map drawn by Betty Hill. Marjorie Fish reasoned that if the stars in the Hill map corresponded to a pattern of real stars — perhaps something like we just developed, only from an alien's viewpoint — it might be possible to pinpoint the origin of the alleged space travelers. Assuming the two stars in the foreground of the Hill map were the "base" stars (the sun, a single star, was ruled out here), she decided to try to locate the entire pattern. She theorized that the Hill map contained only local stars since no concentration of stars was evident. Such a concentration would be present if a more distant viewpoint was assumed and if both "us" and the alien visitors' home base were to be represented.

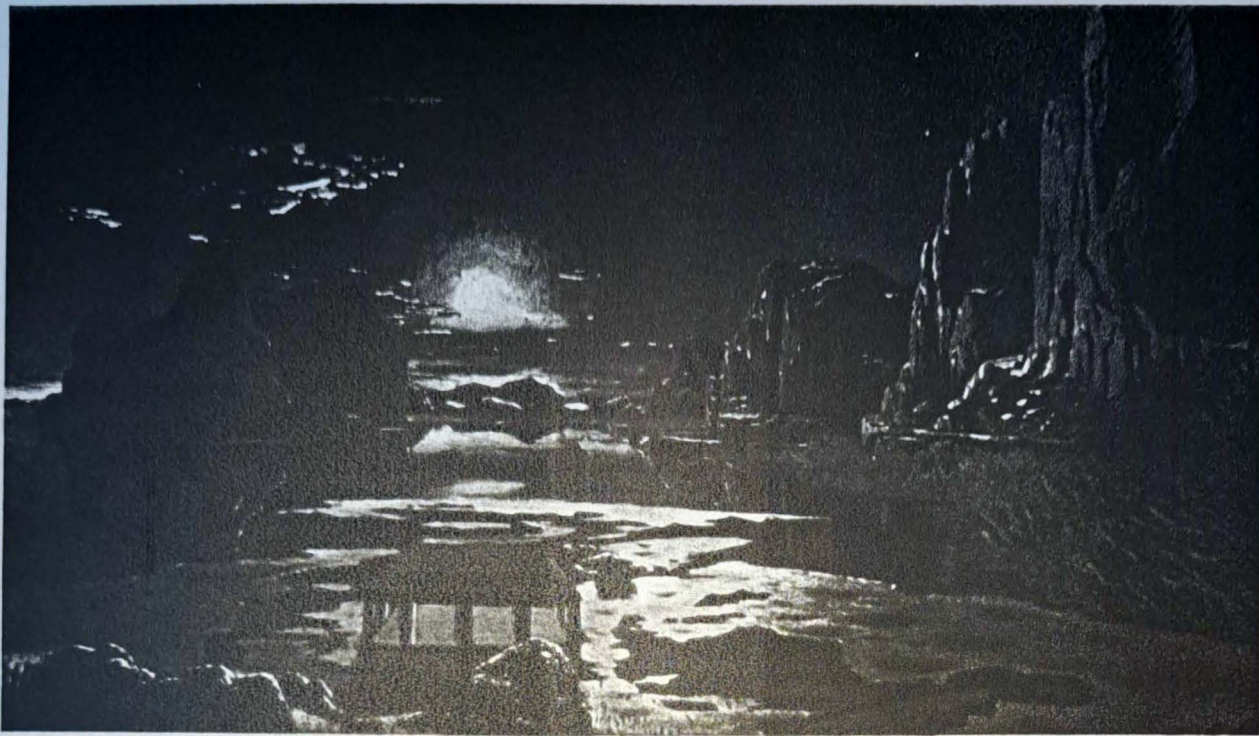
Let's assume, just as an *astronomical exercise*, that the map *does* show the sun and the star that is "the sun" to the humanoids. We'll take the Hill encounter at face value, and see where it leads.

Since the aliens were described as "humanoid" and seemed reasonably comfortable on this planet, their home planet should be basically like ours. Their atmosphere must be similar because the Hills breathed without trouble while inside the ship, and the aliens did not appear to wear any protective apparatus. And since we assume their biology is similar to ours, their planet should have the same temperature regime as Earth (Betty and Barney did say it was uncomfortably cold in the ship). In essence, then, we assume their home planet must be very Earthlike. Based on what we discussed earlier it follows that their sun would be on our list if it were within 55 light-years of us.

The lines on the map, according to Betty Hill, were described by the alien as "trade routes" or "places visited occasionally" with the dotted lines as "expeditions". Any interpretation of the Betty Hill map must retain the logic of these routes (i.e. the lines would link stars that would be worth visiting).

Keeping all this in mind, Marjorie Fish constructed several three-dimensional models of the solar neighborhood in hopes of detecting the pattern in the Hill map. Using beads dangling on threads, she painstakingly recreated our stellar environment. Between Aug. 1968 and Feb. 1973, she strung beads, checked data, searched and checked again. A suspicious alignment, de-





tected in late 1968, turned out to be almost a perfect match once new data from the detailed 1969 edition of the *Catalog of Nearby Stars* became available. (This catalog is often called the "Gliese catalog" — pronounced "glee-see" — after its principal author, Wilhelm Gliese.)

The 16 stars in the stellar configuration discovered by Marjorie Fish are compared with the map drawn by Betty Hill in the diagram on page 6. If some of the star names on the Fish map sound familiar, they should. Ten of the 16 stars are from the compact group that we selected earlier based on the most logical direction to pursue to conduct interstellar exploration from Earth.

Continuing to take the Hill map at face value, the radiating pattern of "trade routes" implies that Zeta 1 and Zeta 2 Reticuli are the "hub" of exploration or, in the context of the incident, the aliens' home base. The sun is at the end of one of the supposedly regular trade routes.

The pair of stars that make up Zeta Reticuli is practically in the midst of the cluster of solar type stars that attracted us while we were mapping out a logical interstellar voyage. Checking further we find that all but two of the stars in the Fish pattern are on the table of nearby solar type stars. These two stars are Tau 1 Eridani (an F6 star) and Gliese 86,1 (K2), and are, respectively, just above and below the parameters we arrived at earlier. One star that should be there (Zeta Tucanae) is missing probably because it is behind Zeta 1 Reticuli at the required viewing angle.

Advanced life on this planet was annihilated when its sun ended its "normal" phase as a main sequence star and ballooned into the red giant seen here. This change, which vastly increases a star's energy output, can occur at various times depending on the star's mass. It won't happen to the sun for six billion years. Artwork by Don Dixon

To summarize, then: (1) the pattern discovered by Marjorie Fish has an uncanny resemblance to the map drawn by Betty Hill; (2) the stars are mostly the ones that we would visit if we were exploring from Zeta Reticuli, and (3) the travel patterns generally make sense.

Walter Mitchell, professor of astronomy at Ohio State University in Columbus, has looked at Marjorie Fish's interpretation of the Betty Hill map in detail and tells us, "The more I examine it, the more I am impressed by the astronomy involved in Marjorie Fish's work."

During their examination of the map, Mitchell and some of his students inserted the positions of hundreds of nearby stars into a computer and had various space vistas brought up on a cathode ray tube readout. They requested the computer to put them in a position out beyond Zeta Reticuli looking toward the sun. From this viewpoint the map pattern obtained by Marjorie Fish was duplicated with virtually no variations. Mitchell noted an important and previously unknown fact first pointed out by Ms. Fish: The stars in the map are almost in a plane; that is, they fill a wheel shaped volume of space that makes star hopping from one to another easy and the logical way to go — and that is what is implied by the map that Betty Hill allegedly saw.

"I can find no major point of quibble with Marjorie Fish's interpretation of the Betty Hill map," says David R. Saunders, a statistics expert at the Industrial Relations Center of the University of Chicago. By various lines of statistical reasoning he concludes that the chances of finding a match among 16 stars of a specific spectral type among the thousand-odd stars nearest the sun is "at least 1,000 to 1 against".

"The odds are about 10,000 to 1 against a random configuration matching perfectly with Betty Hill's map," Saunders reports. "But the star group identified by Marjorie Fish isn't quite a perfect match, and the odds consequently reduce to about 1,000 to 1. That is, there is one chance in 1,000 that the observed degree of congruence would occur in the volume of space we are discussing.

"In most fields of investigation where similar statistical methods are used, that degree of congruence is rather persuasive," concludes Saunders.

Saunders, who has developed a monumental computerized catalog of more than 60,000 UFO sightings, tells us that the Hill case is not unique in its general characteristics — there are other known cases of alleged communication with extraterrestrials. But in no other case on record have maps ever been mentioned.

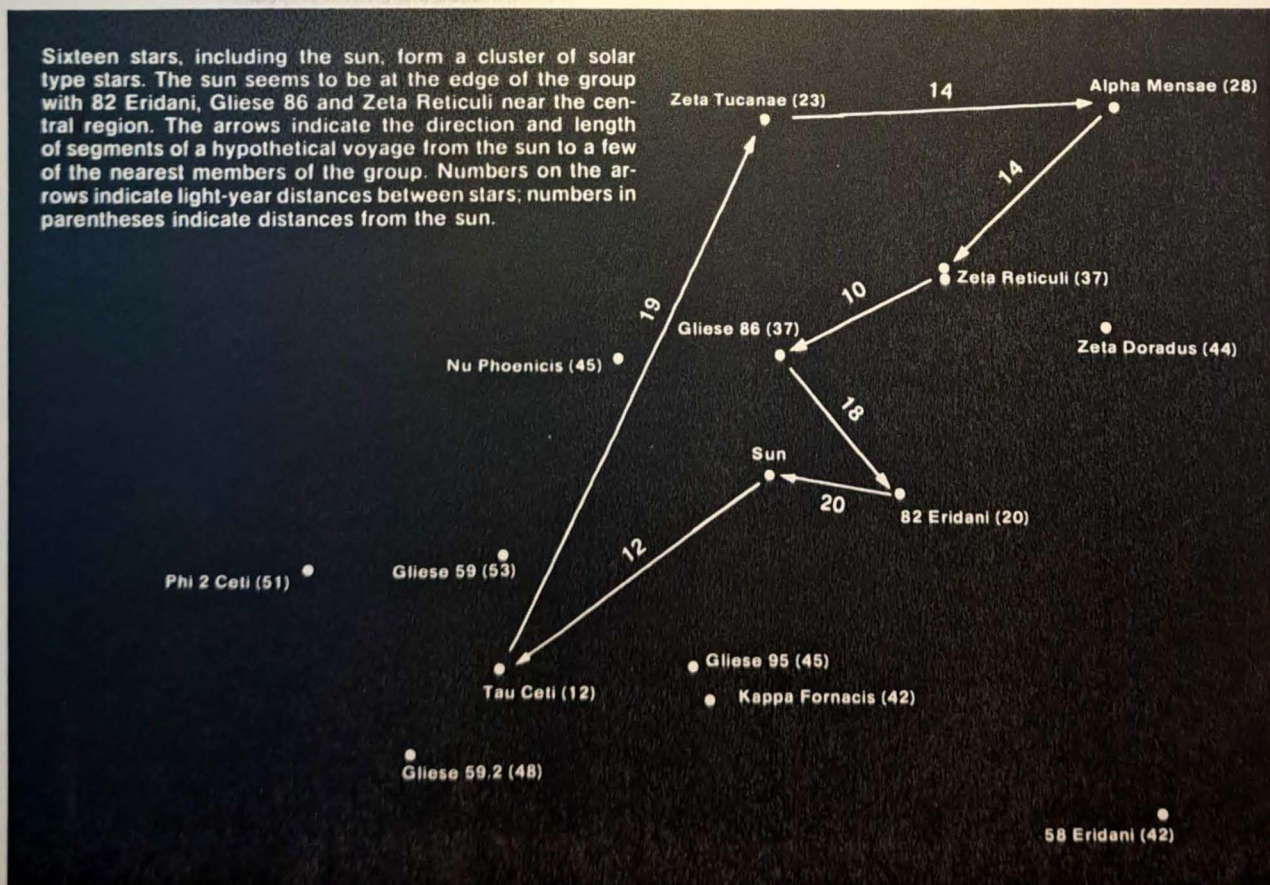
Mark Steggert of the Space Research Coordination Center at the University of Pittsburgh developed a computer program that he

calls PAR (for Perspective Alteration Routine) that can duplicate the appearance of star fields from various viewpoints in space.

"I was intrigued by the proposal put forth by Marjorie Fish that she had interpreted a real star pattern for the alleged map of Betty Hill. I was incredulous that models could be used to do an astronomer's problem," Steggert says. "To my surprise I found that the pattern that I derived from my program had a close correspondence to the data from Marjorie Fish."

After several runthroughs, he confirmed the positions determined by Marjorie Fish. "I was able to locate *potential* areas of error, but no real errors," Steggert concludes.

Steggert zeroed in on possibly the only real bone of contention that anyone has had with Marjorie Fish's interpretation: The data on some of the stars may not be accurate enough for us to make definitive conclusions. For example, he says the data from the Smithsonian Astrophysical Observatory Catalog, the Royal Astronomical Society Observatory Catalog, and the Yale Catalog of Bright Stars "have differences of up to two magnitudes and differences in distance amounting to 40 percent for the star Gliese 59". Other stars have less variations in the data from one catalog to another, but Steggert's point is valid. The data on some of the stars in the map is just not good enough to make a definitive statement. (The fact that measurements of most



of the stars in question can only be made at the relatively poorly equipped southern hemisphere observatories accounts for the less reliable data.)

Using information on the same 15 stars from the Royal Observatory catalog (Annals #5), Steggert reports that the pattern does come out differently because of the different data, and Gliese 59 shows the largest variation. The Gliese catalog uses photometric, trigonometric and spec-

troscopic parallaxes and derives a mean from all three after giving various mathematical weights to each value. "The substantial variation in catalog material is something that must be overcome," says Steggert. "This must be the next step in attempting to evaluate the map."

This point of view is shared by Jeffrey L. Kretsch, an undergraduate student who is working under the advisement of J. Allen Hynek

The View From Zeta Reticuli

The two stars that comprise the Zeta Reticuli system are almost identical to the sun. They are the only known examples of stars that were once a part of a binary star system of wide separation.

Zeta 1 is separated from Zeta 2 by 23,000 astronomical miles — about 100 times the sun-Pluto distance. They may have been together until available observations suggest they are moving through space together. They are probably associated. They probably require at least 100,000 years to orbit around each other under their gravity.

Both Zeta 1 and Zeta 2 are excellent candidates for the search for life beyond Earth. According to our current theories of planetary formation, they both should have a retinue of planets something like our solar system. The only way of determining if any of the probable planets of either star is similar to Earth is by direct observation.

To help visualize the Zeta Reticuli system, let's take the sun's nine planets and put them in identical orbits around Zeta 1. From a celestial mechanics standpoint there is no reason why this situation could not exist. Would anything be different? Because of Zeta 2's slightly smaller mass as compared with the sun, the planets would orbit a little more slowly. Our years might have 390 days, for example. Zeta 2 would make a fine sun — slightly dimmer than "old Sol", but certainly capable of sustaining life. The big difference would not be our new sun but the superstar of the night sky. Shining like a polished gem, Zeta 1 would be the dazzling highlight of the night sky — unlike anything we experience here on Earth. At magnitude -9 it would appear as a starlike point 100 times brighter than Venus. It would be like compressing all the light from the first quarter moon into a point source.

Zeta 1 would have long ago been the focus of religions, mythology and astrology if it were in earthly skies. The fact that it would be easily visible in full daylight would give Zeta 1 supreme importance to both early civilizations and modern man. Shortly after the invention of the telescope astronomers would be able to detect Jupiter and Saturn sized planets orbiting around Zeta 1. Jupiter would be magnitude +12, visible up to 4.5 minutes of arc from Zeta 1 (almost as far as Ganymede swings from Jupiter). It would not make a difficult target for an eight inch telescope. Think of the incentive that discovery would give for interstellar space travel! For hundreds of years we would be away of another solar system just a few "light-weeks" away. The evolution of interstellar spaceflight would be rapid, dynamic and inevitable.

By contrast, our nearest solar type neighbor is Tau Ceti at 12 light-years. Even today we only suspect it is accompanied by a family of planets, but we don't know for sure.

From this comparison of our planetary system with those of Zeta Reticuli, it is clear that any emerging technologically advanced intelligent life would probably have great incentive to achieve star flight. The knowledge of a nearby system of planets of a solar type star would be compelling — at least it would certainly seem to be.

What is so strange — and this question prompted us to prepare this article — is: Why, of all stars, does Zeta Reticuli seem to fit in the hub of a map that appeared inside a spacecraft that allegedly landed on Earth in 1947? Some of the circumstances surrounding the whole incident are certainly bizarre, but not everything can be written off as coincidence or hallucination. It may be optimistic, on one extreme, to hope that our neighbors are as near as 23 light-years away. For the moment we will be satisfied with considering it an exciting possibility.

at Northwestern University in Evanston, Ill. Like Steggert, he too checked Marjorie Fish's pattern and found no error in the work. But Kretsch reports that when he reconstructed the pattern using trigonometric distance measurements instead of the composite measures in the Gliese catalog, he found enough variations to move Gliese 95 above the line between Gliese 86 and Tau 1 Eridani.

"The data for some of the stars seems to be very reliable, but a few of the pattern stars are not well observed and data on them is somewhat conflicting," says Kretsch. The fact that the pattern is less of a "good fit" using data from other sources leads Kretsch and others to wonder what new observations would do. Would they give a closer fit? Or would the pattern become distorted? Marjorie Fish was aware of the catalog variations, but has assumed the Gliese catalog is the most reliable source material to utilize.

Is the Gliese catalog the best available data source? According to several astronomers who specialize in stellar positions, it probably is. Peter Van de Kamp says, "It's first rate. There is none better." He says the catalog was compiled with extensive research and care over many years.

A lot of the published trigonometric parallaxes on stars beyond 30 light-years are not as accurate as they could be, according to Kyle Cudworth of Yerkes Observatory. "Gliese added other criteria to compensate and lessen the possible errors," he says.

The scientific director of the U. S. Naval Observatory, K. A. Strand, is among the world's foremost authorities on stellar distances for nearby stars. He believes the Gliese catalog "is the most complete and comprehensive source available".

Frank B. Salisbury of the University of Utah has also examined the Hill and Fish maps. "The pattern of stars discovered by Marjorie Fish fits the map drawn by Betty Hill remarkably well. It's a striking coincidence and forces one to take the Hill story more seriously," he says. Salisbury is one of the few scientists who has spent some time on the UFO problem and has written a book and several articles on the subject. A professor of plant physiology, his biology expertise has been turned to astronomy on several occasions while studying the possibility of biological organisms existing on Mars.

Salisbury insists that while psychological factors do play an important role in UFO phenomena, the Hill story *does* represent one of the most credible reports of incredible events. The

fact that the story and the map came to light under hypnosis is good evidence that it actually took place. "But it is not unequivocal evidence," he cautions.

Elaborating on this aspect of the incident, Mark Steggert offers this: "I am inclined to question the ability of Betty, under posthypnotic suggestion, to duplicate the pattern two years after she saw it. She noted no grid lines on the pattern for reference. Someone should (or perhaps has already) conduct a test to see how well a similar pattern could be recalled after a substantial period of time. The stress she was under at the time is another unknown factor."


"The derivation of the base data by hypnotic techniques is perhaps not as 'far out' as it may seem," says Stanton Friedman. "Several police departments around the country use hypnosis on rape victims in order to get descriptions of the assailants — descriptions that would otherwise remain repressed. The trauma of such circumstances must be comparable in some ways to the Hill incident."

Is it at all possible we are faced with a hoax?

"Highly unlikely," says Salisbury — and the other investigators agree. One significant fact against a charade is that the data from the Gliese catalog was not published until 1969, five years after the star map was drawn by Betty Hill. Prior to 1969, the data could only have been obtained from the observatories conducting research on the specific stars in question. It is not uncommon for astronomers not to divulge their research data — even to their colleagues — before it appears in print. In general, the entire sequence of events just does not smell of falsification. Coincidence, possibly; hoax, improbable.

Where does all this leave us? Are there creatures inhabiting a planet of Zeta 2 Reticuli? Did they visit Earth in 1961? The map indicates that the sun has been "visited occasionally". What does *that* mean? Will further study and measurement of the stars in the map change their relative positions and thus distort the configuration beyond the limits of coincidence?

The fact that the entire incident hinges on a map drawn under less than normal circumstances certainly keeps us from drawing a firm conclusion. Exobiologists are united in their opinion that the chance of us having neighbors so similar to us, apparently located so close, is vanishingly small. But then, we don't even know *for certain* if there is *anybody at all* out there — anywhere — despite the Hill map and pronouncements of the most respected scientists.

The only answer is to continue the search. Someday, perhaps soon, we will know. 

The Age of Nearby Stars

by Jeffrey L. Kretsch

The age of our own sun is known with some accuracy largely because we live on one of its planets. Examination of Earth rocks — and, more recently, rocks and soil from the moon — has conclusively shown that these two worlds went through their initial formation 4.6 billion years ago. The formation of the sun and planets is believed to have been virtually simultaneous, with the sun's birth producing the planetary offspring.

But we have yet to travel to any other planet — and certainly a flight to the surface of a planet of a nearby star is an event no one reading this will live to witness. So direct measurement of the ages of nearby stars — as a by-product of extra-solar planetary exploration — is a distant future enterprise. We are left with information obtained from our vantage point here near Earth. There is lots of it — so let's find out what it is and what it can tell us.

When we scan the myriad stars of the night sky, are we looking at suns that have just ignited their nuclear fires — or have they been flooding the galaxy with light for billions of years? The ages of the stars are among the most elusive stellar characteristics. Now, new interpretation of data collected over the past half century is shedding some light on this question.

Computer models of stellar evolution reveal that stars have definite lifespans; thus, a certain type of star cannot be older than its maximum predicted lifespan. Solar type stars of spectral class F5 or higher (hotter) cannot be older than our sun is today. These stars' nuclear fires burn too rapidly to sustain them for a longer period, and they meet an early death.

All main sequence stars cooler than F5 can be as old or older than the sun. Additionally, these stars are also much more likely to have planets

than the hotter suns. (Details on the reasoning behind this assumption can be found in "The Zeta Reticuli Incident", December 1974.)

There are several exciting reasons why the age of a star should be tracked down. Suppose we have a star similar to the sun (below class F5). If we determine how old the star is, we can assume its planets are the same age — a fascinating piece of information that suggests a host of questions: Would older Earthlike planets harbor life more advanced than us? Is there anything about older or younger stars and planets that would make them fundamentally different from the sun and Earth?

Of course we don't know the answer to the first question, but it is provocative. The answer to the second question seems to be yes (according to the evidence that follows).

To best illustrate the methods of star age determination and their implications, let's select a specific problem. "The Zeta Reticuli Incident" sparked more interest among our readers than any other single article in ASTRONOMY's history. Essentially, that article drew attention to a star map allegedly seen inside an extraterrestrial spacecraft. The map was later deciphered by Marjorie Fish, now a research assistant at Oak Ridge National Laboratory in Tennessee.

In her analysis, Ms. Fish linked all 16 prominent stars in the original map (which we'll call the Hill map since it was drawn by Betty Hill in 1966) to 15 real stars in the southern sky. The congruence was remarkable. The 15 stars — for convenience we will call them the Fish-Hill pattern stars — are listed on the accompanying table.

Since these stars have been a focus of attention due to Ms. Fish's work and the article mentioned above, we will examine them specifically to see if

The Fish-Hill Pattern Stars

Gliese Catalog No.	Alternate Name	Spectral Type	W-velocity (km/sec)	Total space velocity (km/sec)	Galactic longitude (l)	Galactic latitude (b)	Distance (light years)	Parallax (arcsec)
17	Zeta Tucanae	G2	14	35	22	0	125	0.008
27	54 Piscium	G6	11	40	40	27	160	0.006
39	HD 9540	G8	18	24	24	0	110	0.009
67	HD10302	G0	10	45	45	0	100	0.009
68	107 Piscium	K7	15	35	35	0	110	0.009
71	Tau Ceti	G8	12	36	36	0	125	0.008
86	HD13445	K5	24	30	30	0	100	0.009
86.1	HD13435	K5	24	30	30	0	100	not determined
95	HD14012	G5	15	35	35	0	110	0.009
97	Kappa Eriax	G5	15	35	35	0	110	0.009
111	Tau 1 Eridani	F6	14	31	31	0	110	0.009
136	Zeta 1 Reticuli	G2	15	79	79	0	125	0.008
138	Zeta 2 Reticuli	G1	-27	127	127	0	125	0.008
139	82 Eridani	G5	-12	37	37	0	110	0.009
231	Alpha Mensae	G5	-13	22	22	0	100	0.009
Sun	Sol	G5	0	0	0	0	0	0.009

All the stars listed here are main sequence or spectral group V stars. Tau Ceti has a slight peculiarity in its spectrum as explained in the text. W-velocity is the star's motion in km/sec in a direction above or below (-) in the galactic plane. Total space velocity relative to the sun is also in km/sec. Data is from the *Gliese Catalog of Nearby Stars* (1969 edition).

enough information is available to pin down their ages and (possibly) other characteristics. This will be our case study star group.

Consider, for example, the velocities of these stars in space. It is now known that the composition and the age of a star shows a reasonably close correlation with that star's galactic orbit. The understanding of this correlation demands a little knowledge of galactic structure.

Our galaxy, as far as we are concerned, consists essentially of two parts — the halo, and the disk. Apparently when the galaxy first took shape about 10 billion years ago, it was a colossal sphere in which the first generation of stars emerged. These stars — those that remain today, anyway — define a spherical or halolike cloud around the disk shaped Milky Way galaxy. Early in the galaxy's history, it is believed that the interstellar medium had a very low metal content because most of the heavy elements (astronomers call any element

All stars in the Milky Way galaxy have vast orbits around the galactic core. Any particular star requires millions of years to complete its orbit — the sun, for example, takes 230 million years. A star like the sun, in our part of the galaxy, will have an orbit similar to that traced out by the orange line. Such orbits identify Population I stars — basically solar type stars. Older stars are known to have more elliptical orbits either in the plane of the galaxy (Disk Population II, green line) or well beyond the main wheel shape of the Milky Way (Halo Population II, violet line). By determining its orbit and by collecting other data, astronomers can estimate a star's age. As discussed in this article, the age of a star is an elusive but valuable piece of information. Artwork by Victor Costanzo

All 16 stars are:

- main sequence type stars between spectral class F5 and K5, and thus have sufficient life-spans to allow life to evolve on any Earthlike planets.
- not members of multiple star systems except in cases where the components are widely separated.
- not variable in energy output according to most recent data.
- within 50 light-years of the sun.

heavier than helium "heavy" or a "metal") are created in the cores of massive stars which then get released into the interstellar medium by stellar winds, novae and supernovae explosions. Few such massive stars had "died" to release their newly made heavy elements. Thus, the stars which formed early (called Population II stars) tend to have a spherical distribution about the center of the galaxy and are generally metal-poor.

A further gravitational collapse occurred as the galaxy flattened out into a disk, and a new burst of star formation took place. Since this occurred later and generations of stars had been born and died to enrich the interstellar medium with heavy elements, these disk stars have a metal-rich composition compared to the halo stars. Being in the disk, these Population I stars (the sun, for example) tended

to have motions around the galactic core in a limited plane — something like the planets of the solar system.

Population II stars — with their halo distribution — usually have more random orbits which cut through the Population I hoards in the galactic plane. A star's space velocity perpendicular to the galactic plane is called its *W-velocity*. Knowing the significance of the *W-velocity*, one can apply this information to find out about the population classification and hence the ages and compositions of stars in the solar neighborhood — the Fish-Hill stars in particular.

High *W-velocity* suggests a Population II star, and we find that six of the 16 stars are so classified while the remaining majority are of Population I. A further subdivision can be made using the *W-velocity* data (the results are shown in the table on page 21).

According to this classification system (based on one by A. Blaauw), most of the 16 stars are in the same class as the sun — implying that they are roughly of the same composition and age as the sun. The sun would seem to be a natural unit for use in comparing the chemical compositions and ages of the stars of the Fish-Hill pattern because it is, after all, the standard upon which we base our selection of stars capable of supporting life.

Three stars (Gliese 59, 67 and 68) are known as Old Population I and are almost certainly younger than the sun. They also probably have a higher metal content than the sun, although specific data is not available. The Disk Population II stars are perhaps two to four billion years older than the sun, while the Intermediate Population II are believed to be a billion or two years older still.

For main sequence stars like the sun, as all these stars are, it is generally believed that after the star is formed and settled on the main sequence no mixing between the outer layers and the thermonuclear core occurs. Thus the composition of the outer layers of a star, (from which we receive the star's light) must have essentially the same composition as the interstellar medium out of which the star and its planets were formed.

Terrestrial planets are composed primarily of heavy elements. The problem is: If there is a shortage of heavy elements in the primeval nebula, would terrestrial planets be able to form? At present, theories of planetary formation are unable to state for certain what the composition of the cloud must be in order for terrestrial planets to materialize, although it is agreed to be unlikely that Population II stars should have terrestrial planets. But for objects somewhere between Populations I and II — especially Disk Population II — no one really knows.

Although we can't be certain of determining

whether a star of intermediate metal deficiencies can have planets or not, we can make certain of the existence of metal deficiencies in those stars. The eccentricities and inclinations of the galactic orbits of the Fish-Hill stars provide the next step in the information sequence.

The table on page 19 also shows that the stars Gliese 136, 138, 139, 86 and 71 have the highest eccentricities and inclinations in their galactic orbits. This further supports the Population II nature of these four stars. According to B.E.J. Pagel of the Royal Greenwich Observatory in England, the correlation between eccentricity and the metal/hydrogen ratio is better than that between the *W-velocity* and the metal/hydrogen ratio. It is interesting to see how closely the values of eccentricity seem to correspond with Population type as derived from *W-velocity* — Old Population I objects having the lowest values. Since the two methods give similar results, we can lend added weight to our classification.

So far all the evidence for metal deficiencies has been suggestive; no direct evidence has been given. However, specific data can be obtained from spectroscopic analysis. The system for which the best set of data exists also happens to be one of the most important stars of the pattern, Zeta 1 Reticuli. In 1966, J. D. Danziger of Harvard University published results of work he had done on Zeta 1 Reticuli using wide-scan spectroscopy. He did indeed find metal deficiencies in the star: carbon, 0.2, compared to our sun; magnesium, 0.4; calcium, 0.5; titanium, 0.4; chromium, 0.3; manganese, 0.4; iron, 0.4; cobalt, 0.4; nickel, 0.2, and so on.

In spite of the possible error range of about 25 percent, there is a consistent trend of metal deficiencies — with Zeta 1 Reticuli having less than half the heavy elements per unit mass that the sun does. Because Zeta 1 Reticuli has common proper motion and parallax with Zeta 2 Reticuli, it probably also has the same composition. Work done by M. E. Dixon of the University of Edinburgh showing the two stars to have virtually identical characteristics tends to support this.

The evidence that the Zeta Reticuli system is metal deficient is definite. From this knowledge of metal deficiency and the velocities and eccentricities, we can safely conclude that the Zeta Reticuli system is older than the sun. The question of terrestrial planets being able to form remains open.

The other two stars which have high velocities and eccentricities are 82 Eridani (Gliese 139) and Gliese 86. Because the velocities of these stars are higher than those of Zeta Reticuli, larger metal deficiencies might be expected. For the case of Gliese 86, no additional information is presently available. However, some theoretical work has been

Population Classification of the Fish-Hill Stars

Old Population I (1 to 4 billion years old)	Young Population I (5 to 6 billion years old)	Disk Population II (6 to 8 billion years old)	Intermediate Population II (about 10 billion years old)
Gliese 69	Tau 1 Eridani	Zeta 1 Reticuli	Zeta Tucanae
Gliese 67	Alpha Mensae	Zeta 2 Reticuli	Gliese 86
107 Piscium	Kappa Fornacis		Gliese 86 I
	Beta Pictoris		82 Eridani

done on 82 Eridani concerning metal abundances by J. Hearnshaw of France's Meudon Observatory.

Although 82 Eridani is a high velocity star, its orbit lies largely within the galactic plane, and also within the solar orbit. Its orbit is characteristic of the Old Disk Population, and an ultraviolet excess indicates only a mild metal deficiency compared to the sun. Hearnshaw's conclusions indicate that the metal deficiency does not appear to be any worse than that of the Zeta Reticuli pair.

Because Gliese 86 has a velocity, eccentricity and inclination similar to 82 Eridani, it seems likely that its chemical composition may also not have severe metal deficiencies, but be similar to those of 82 Eridani.

Tau Ceti appears to be very much like the sun except for slight deficiencies of most metals and rarely seen abnormal abundances of magnesium, titanium, silicon and calcium. Stars in this class are known as alpha-rich stars, but such properties do not appear to make Tau Ceti unlikely to have planets similar to the sun's.

Tau 1 Eridani, an F6V star, has a life expectancy of 4.5 billion years — so it cannot be older than the sun. The low eccentricities and low moderate velocity support an age and composition near that of the sun.

Gliese 67 is a young star of at least solar metal abundances, considering its low velocity and eccentricity.

Having covered most of the stars either directly or simply by classifying them among the different Population classes, it is apparent that there is a wide age range among different stars of this group as well as a range of compositions. It is curious that the stars connected by the alleged "trade routes" (solid lines) are the older and occasionally metal deficient ones — while the stars connected by dotted lines seem to be younger Population I objects.

A final point concerning the metal deficiencies is rather disturbing. Even though terrestrial planets might form about either star in the Zeta Reticuli system, there is a specific deficiency in carbon to well within the error range. This is disturbing because carbon is the building block of organic

molecule chains. There is no way of knowing whether life on Earth would have emerged and evolved as far as it has if carbon were not as common here.

Another problem: If planets formed but lacked large quantities of useful industrial elements, could a technical civilization arise? If the essential elements were scarce or locked up in chemical compounds, then an advanced technology would be required to extract them. But the very shortage of these elements in the first place might prevent this technology from being realized. The dolphins are an example of an intelligent but nontechnical race. They do not have the means to develop technology. Perhaps some land creatures on another planet are in a comparable position by not having the essential elements for technological development. (This theme is explored in detail in "What Chariots of Which Gods?", August 1974.)

This whole speculation certainly is not strong enough to rule out the Fish interpretation of the Hill map given our present state of knowledge. Actually in some respects, the metal deficiencies support the Fish hypothesis because they support an advanced age for several of the stars — suggesting that if cultures exist in these star systems, they might well be advanced over our own.

The fact that none of the stars in the pattern is seriously metal deficient (especially the vital branch high velocity stars 82 Eridani and Gliese 86) is an encouragement to the Fish interpretation — if terrestrial planets can form in the first place and give rise to technical civilizations. Once again we are confronted with evidence which seems to raise as many questions as it answers. But the search for answers to such questions certainly can only advance knowledge of our cosmic environment. ◀

Jeffrey L. Kretsch is an astronomy student at Northwestern University working under the advisement of Dr. J. Allen Hynek. For more than a year Kretsch has been actively pursuing follow-up studies to the astronomical aspects of the Fish-Hill map. More of his studies and comments appear in In Focus.

The Marden-Stoner Study on Commonalities Among Abduction Experiencers

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The Marden-Stoner Study on Commonalities Among UFO Abduction Experiencers

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Nearly a year ago, Denise Stoner and I met to discuss the commonalities that alien abduction experiencers share. As longtime abduction investigators/researchers, we were aware of certain repeating patterns of information and characteristics. The pertinent literature, the academic social science studies and the works of David Jacobs, PhD, Thomas Bullard, PhD, Yvonne Smith, and the late Budd Hopkins, John Mack, MD, and others had identified several commonalities among abduction experiencers. But we had not been able to locate an academic study that was specific to our particular interests.

I earned a B.A. degree in social work from the University of New Hampshire in 1971, and participated in graduate studies in education at the University of Cincinnati and U.N.H., while working as a teacher and education services coordinator. I left my job in 1990 to pursue a career as a UFO investigator, researcher and writer. As the niece of Betty and Barney Hill and witness to the primary evidence and aftermath of their alien abduction in 1961, I had been aware of the UFO phenomenon for more than fifty years. My book (with nuclear physicist/scientific ufologist Stanton T. Friedman), *Captured! The Betty and Barney Hill UFO Experience* was published in 2007 and our second book *Science Was Wrong* was published in 2010. I had surveyed the psychological studies on self identified abduction experiencers for a chapter on alien abduction in *SWW* and a research paper I prepared for the *MUFON 2010 International UFO Symposium Proceedings*. In addition to my independent research, I am also Florida MUFON's Director of Abduction Studies and the National Director of the Abduction Research Team.

Denise has an educational background in business and psychology, and is a certified hypnotist specializing in regressive hypnosis. For 12 years Denise did background investigations for the military on recruits seeking highly classified clearances for work on nuclear submarines. Prior to retirement, Denise moved to a military research facility where she was the training coordinator for several hundred military and civilian employees. For the past several years, Denise has expanded her work with UFO research and investigation. She is an independent abduction researcher and hosts a study group for abduction experiencers and public interest meetings on the UFO phenomenon in general. She is Florida MUFON's Asst. Director of Abduction Studies and the former Chief Investigator for the state.

At our study's inception our stated goals were to benefit abduction experiencers by identifying specific traits that they have in common with other experiencers, and to expand the UFO research community's knowledge of alien abduction phenomena. The most efficient scientific method for obtaining this information, in our opinion, was through the use of simple straightforward questionnaires, designed to identify commonalities among the UFO abduction experiencers. Each of us brought to the table knowledge of several unique, unpublicized characteristics of the alien abduction experience. The commonalities study would ascertain how widespread these commonalities are across the abduction experiencer population.

We developed three questionnaires: The "UFO Abduction Experiencer Questionnaire" listed 45 multiple choice questions pertaining to experiencer's demographics, abduction memories, emotional responses, physiological responses, and psychic phenomena. The second questionnaire, the "Abduction Experiencer E.T. Technology Questionnaire" would increase our knowledge of E.T. technology. The third, "Commonalities among Non-Abductees Questionnaire", queried individuals, who denied having been abducted by aliens. It was developed after the first two questionnaires had been available for several months, and a commonalities trend had emerged. The 16 multiple choice questions would determine whether or not some of the commonalities among abduction experiencers are common across the general population.

We established a minimum sample size of 50 completed questionnaires for abduction experiencers (AE) and 25 for non-abduction experiencers (NAE). There were 54 participants in the "UFO Abduction Experiencer Questionnaire", but 4 questionnaires could not be tallied because they were too incomplete. The "Abduction Experiencer E.T. Technology Questionnaire" study is not yet complete, as there have been only 24 responses to date. This can be attributed to the fact that a much smaller percentage of experiencers have clear recall of the craft's interior and the technology observed. This part of the study is ongoing.

Participants for our study were solicited via the *MUFON UFO Journal* and several alien abduction and UFO oriented websites. We also appeared on several radio shows and invited listeners to participate. Last, there were questionnaires at my vendor table at several UFO conferences and at Denise's meetings. I posted the questionnaires, a letter of explanation, and an informed consent notice on my website at www.kathleen-marden.com. We communicated to participants that all questionnaires would be kept in a locked and secure location and destroyed at the end of the study. All personal identifying information that was volunteered would remain confidential. As a cautionary measure, we advised all potential participants that they should only complete the questionnaire if they could do so without feeling uncomfortable.

Demographics

Nearly twice as many women (32), as men (18) completed the "Abduction Experiencer Questionnaire". Does this indicate that abduction is far more prevalent among women? Not necessarily so. Statistical evidence indicates that men are less likely than women to answer surveys of any kind. But this trend was not supported when we tallied the results of the "Commonalities among Non-Abductees Questionnaire". The majority of respondents were men (15) as opposed to women (9). If trends in human behavior have not skewed the results, it suggests that more women than men have been abducted by aliens. This finding has been widely reported by other researchers.

We were interested in identifying possible trends among age groups, partly due to the fact that a significant number of abduction experiencers in the 50+ age group had reported their experiences to us within recent months. Our intuition was correct. 44% of the AE Group participants were born in the 1950's, although only 20% of the NAE Group was in the same age group. This figure drops dramatically for those born in the 1940's (18%) and the 1960's (26%).

Could these statistics indicate that the human abduction program began slowly, perhaps during the 1950's and 60's, and was in full swing beginning in the 1970's? Could this signify that the alien abduction program is winding down? Or could it be that younger people are less likely to fill out questionnaires? Only 12% of the AE Group respondents were under age 40. Yet 24% of the NAE Group was under 40.

We asked each group to identify the size of their area of residence. A survey of the relevant literature indicated that more UFOs were sighted in less populated areas than in large cities in the 1960's and 70's. Also, the majority of well investigated, famous abduction cases (Villas Boas, Hill, Walton, Buff Ledge, Casey CO., etc.), took place in rural areas. Yet the late Budd Hopkins wrote of alien abduction in New York City. We wanted to test whether or not a trend could be established.

- AE Group—Area of Residence: Rural (15), Small Town (13), Suburban (13), Urban (9)
- NAE Group—Area of Residence: Rural (3), Small Town (5), Suburban (12), Urban (5)

The AE participants' area of residence was fairly evenly divided among abduction experiencers, with 30% residing in a rural area, 26% in small towns, 26% in suburbs, and 18% in an urban area. 12% of the NAE group resides in a rural area, 20% in a small town, 48% in the suburbs and 20% in an urban area. These statistics indicate that no trend could be established. Slightly more experiencers (12%) are taken from a rural environment than from an urban area. But the difference is not statistically significant.

We wanted to determine if alien abduction is more prevalent one area of the US than another.

- AE Group—Time Zone: Eastern (33), Central (10), Mountain (2), Pacific (4), Eastern Australia(1)

➤ NAE Group—Time Zone: Eastern (20), Central (4), Mountain (0), Pacific (0), British (1)

66% of the AE group resides in the Eastern Time Zone, 20% Central, 4% Mountain, 8% Pacific, and 2% in foreign countries. These statistics are a bit perplexing. We asked, "Are there more abduction experiencers living in the Eastern US than in all other regions combined? Or did more people in the Eastern US listen to our radio interviews?" The NAE questionnaire answered this question. 80% reside in the Eastern Time Zone, 16% Central, 0% Mountain, 0% Pacific, and 4% in Great Britain. The majority of participants in both groups reside in the Eastern US. Therefore, the AE group presents no valid evidence that more experiencers reside in the Eastern US than elsewhere.

The majority of abduction experiencers believe that they have been taken repeatedly over a number of years or throughout their lifetime. We wanted to determine how frequently contact occurs.

➤ How many times do you think you've been taken? 1 time only (2), 2-5 (8), 6-10 (4), More than 10 (25), No certain (8), no answer (3)

50% stated that they have been taken more than 10 times. The next largest group was those who could not state a specific number (22%), followed by the 2-5 range (16%). This is a significant finding because the majority of abduction experiencers believe that their alien contact occurs periodically throughout their lifetime. Only two participants stated that they had been taken only one time. This is interesting because their answers on the questionnaire revealed that they had little in common with multiple abduction experiencers.

Many experiencers believe that they have been taken since they were small children. We asked for this information.

➤ Age when first abduction occurred? Under 5 (18), 5-9 (10), 10-19 (7), Over 20 (7), Not sure (8)

70% of the respondents indicated that they were under age 20 when their first abduction occurred. 36 % were under 5. In another question we asked how frequently their visitations had occurred. 68% stated that their abductions occurred most frequently when they were under age 30. However, a surprising 21% of the over 40 group stated that their contacts are still frequent. A clear pattern of frequency across all age groups could not be established. Only 20% stated that they had been taken more than one time per month. An equal number are not sure how often they've been visited by ETs. Others replied from one time per month to 2-3 times per year.

Abduction Memories

This section of the questionnaire is divided into four parts with subcategories.

1. Conscious recall
2. Emotional responses
3. Physiological responses
4. Psi phenomena

Conscious recall

- 88% stated that their abduction memories were consciously recalled; 56% through dreams; 36% through hypnosis; 16% through other means such as flashbacks.
- 67% stated that they consciously recalled (not with hypnosis), the observation of an unconventional craft at less than 1000 feet prior to an abduction.
- 56% stated that they consciously recalled (not with hypnosis), the observation of non-human entities immediately prior to an abduction while they were outside their home.
- 76% indicated that they were not alone when they were taken.
- 62% of the witnesses had conscious recall for at least part of the experience.
- 43% stated that witnesses reported the observation of a UFO near their house, vehicle, tent, etc. prior to or during their abduction.
- 58% stated that they are aware of having been examined on an alien craft.

These highly significant statistics reveal that the majority of the respondents had conscious recall of at least one abduction experience and were not alone when it occurred. More than half remembered observing a craft at less than 1000 feet and non-human entities prior to at least one abduction experience. We are often led by the media sources to believe that the majority of abduction experiencers are procured exclusively from their bedrooms and have no witnesses. The Marden-Stoner study indicates that this perception is false.

Emotional Responses (These open ended questions were not conducive to statistical analysis.)

- We asked, "What is your typical response to abduction?" More than one response was permitted. The most predominant reply was fear (26), followed by curiosity (23). 12 indicated that they felt despair and 11 felt pleasure. (More than one response was permitted.)
- We asked, "How did you feel after an abduction experience?" 15 stated that they felt angry. 15 felt tired, exhausted or physically drained and unwell. 11 were fearful. Only 3 felt peaceful.

We wanted to test several hypotheses pertaining to emotional stability as a factor in alien abduction experiences. Is there an increased sense of sadness among experiencers? Are there more mood swings among this group? Is there mood consistency throughout one's lifetime? Respondents were permitted to check more than one answer.

- AE Group—On a daily basis, how would you describe your mood? Happy (15), Sad (7), Frequent mood swings (6), Without unusual highs and lows (25)
- NAE Group—On a daily basis, how would you describe your mood? Happy (15), Sad (0), Frequent mood swings (4), Without unusual highs and lows (6).
- AE Group—As a child, how would you describe your mood? Happy (13), Sad (13), Frequent mood swings (5), Without unusual highs and lows (14), Anxious (7).
- NAE Group—As a child, how would you describe your mood? Happy (10), Sad (0), Frequent mood swings (4), Without unusual highs and lows (10), Anxious (2).

The majority of respondents in both groups stated that they are happy or do not have unusual highs or lows. It is interesting that a higher percentage of the NAE group reported frequent mood swings on a daily basis than the AE group. But a small percentage of the AE group reported that they experienced more sadness as adults. Several of the "sad" and "frequent mood swings" AE respondents reported that they had been the victims of childhood abuse. Their feelings of sadness and their mood swings have persisted throughout their lifetime. This group was more likely to report abuse by their ET captors. Additionally, those who reported traumatic memories of being abused by ETs are more likely to feel sad as adults.

The majority of respondents reported that they used one or more coping mechanisms to deal with their fear or anxiety due to their abduction experiences. Only 3 reported that they have no fear. Coping mechanisms that give relief to experiencers include talking with a supportive, non-judgmental person, meditation or relaxation exercises, prayer and writing about their experiences.

We were interested in the sleep patterns of abduction experiencers. Did they have difficulty falling asleep and/or staying asleep? Could this be related to a fear of abduction? Or were other factors involved?

- Do you have difficulty falling asleep? Yes (37) No (13)
- Staying asleep? Yes (35), No (14). (1 respondent did not answer the second part of the question.)

74% of the AE group had difficulty falling asleep and 71% had difficulty staying asleep. 7 of the 8 people (16%) who indicated that they sleep well throughout the night attributed it to overcoming their fear of abduction. This is a very small percentage, but it might be an indicator that the loss of fear improves sleep quality. Only 1 person who reported the absence of fear has difficulty falling and staying asleep and that person is in the 60+ group.

We speculated that since 44% of the respondents are in the 50-59 group, and since older people tend to experience more sleep problems, that the results might have been skewed by this factor. The evidence did not bear this out. In fact, 5 of the restful sleepers are in the 50-59 age range. It is interesting, however, that all but one person in the over 60 group reported sleep problems regardless of whether or not they were fearful. 2 individuals in the under 40 group reported that they do not have sleep difficulties, and neither has a fear of abduction. The remaining 4 had difficulty falling asleep, but once they were asleep they were able to sleep through the night. (These questions were not on the NAE questionnaire.)

Physiological Responses

Alien implants have been widely reported in UFO abduction literature thanks to the work of Dr. Roger Leir and Derrel Sims. We wanted to ascertain the percentage of experiencers that suspected they have a palpable alien implant. It was also important to us to ask where the implants are located in the human body. 40 of the 50 respondents replied to this question.

- We asked, "Can you feel a foreign object in your body that you suspect is an alien implant?" Yes (21), No (19). If yes, where is it located?

53% believe that they can feel an alien implant in their body. The majority of participants indicated that it is located in their head, including the following: temple, eye, nose, behind ear, inside ear, groin, and eyebrow. Other areas mentioned are in the spine, lower leg, hand, chest and vagina.

Unexplained marks, such as patterned bruises, scoop marks, puncture wounds, and rashes are commonly reported by abduction experiencers. (I am collecting and cataloguing experiencers' photographic evidence.)

- AE Group—Have you awoken with unexplained marks on your body?" Yes (40), No (8), No answer (2)

- NAE Group—Have you awoken with unexplained marks on your body? Yes (5), No (20).

A highly significant 83% of the AE Group stated that they had awoken with unexplained marks on their bodies, whereas only 20% of the NAE group replied in the affirmative. Long, thin bruises were most often found on women's calves, thighs or buttocks, suggesting finger marks. Patterned bruises were found on the upper arm. Scoop marks were reported on arms, ankles, behind knees, or on feet. Puncture wounds were found on hands and rib cages, although one woman reported a vaginal puncture wound. Burn marks were on upper backs and sunburn like rashes were reported, sometimes on the entire body. Several participants mentioned plastic-like filaments, the size of a strand of hair, coming from various locations on their bodies.

- We asked, "Has your nose bled immediately following an abduction? Yes (26), No (23), not sure (1)

A significant 52% replied in the affirmative. Several mentioned significant scarring in their nasal cavity that had been of concern to their physicians. One mentioned that his physician found a strange metal object high in the respondent's nasal passage.

- We asked, "Have you noticed strange skin rashes immediately following an abduction?" Yes (17), No (29), Not sure (4)

42% have noticed rashes on their body following an encounter.

Earlier in the history of alien abduction, burns on one's neck or upper back, hair loss and conjunctivitis were reported. An example of this is the 1976 Casey County, KY abduction of Elaine Thomas, Louise Smith and Mona Stafford. We wanted to know if these problems have persisted.

- We asked, "Have you ever suffered burns, hair loss, or conjunctivitis following an abduction?" Yes (11), No (34) Not sure (4)

22% of the respondents stated that they had suffered burns, hair loss or conjunctivitis following an abduction experience. One participant stated that her sunburn-like rash was accompanied by a pins and needles tingling sensation after an abduction in 1978. She and several others reported that one or both eyes were red and swollen following a contact experience. One participant stated that she suffered a combination of all three physical affects in 1988.

We were interested in determining whether or not participants had undergone changes in their blood chemistry or bleeding disorders after an abduction experience.

- We asked, "Has your doctor noted changes in your blood chemistry, blood clotting easily, or bleeding too freely after an abduction?" Yes (9), No (41)

One respondent was diagnosed with a clotting disorder. Another mentioned problems with vitamin D and iron absorption. Others mentioned consistently high white blood cell counts.

Our next question did not pertain specifically to our research findings and we did not anticipate the result.

- AE Group—Do you crave excessive amounts of salt? Yes (29), No (18), No answer (3)

- NAE Group—Do you crave excessive amounts of salt? Yes (3), No (22)

62% of the AE Group craves salt, whereas only 12% of the NAE Group does. Dehydration is the most common cause of salt cravings. Although rare, Addison's disease is caused when the adrenal gland does not produce enough of the hormone cortisol. One might speculate that if the adrenal glands are continually tapped by ongoing stress due to alien abduction, it could lead to adrenal distress that is characterized by symptoms of fatigue, insomnia and salt cravings. However, this is another condition that is best studied by the medical community.

The following questions regarding physical affects were on the questionnaire. The answers are self explanatory.

- After your abduction did you notice any of the following?

1. More acute hearing? Yes 28%
2. More sensitive to light? Yes 56%
3. More allergies? Yes 36%
4. More fluctuation in your mood? Yes 34%

- Has your doctor noted changes in your blood chemistry, such as blood clotting easily, or bleeding too freely after an abduction? Yes 18%, No 82%

The following questions were asked of the AE and NAE Groups:

- AE Group—Do you suffer from migraine headaches? Yes (20), No (26), No reply (4)
- NAE Group—Do you suffer from migraine headaches? Yes (2), No (23)

40% of the AE Group suffers from migraine headaches (moderate to severe pulsing headaches that last 4-72 hours and worsen with physical activity), whereas only 8% of the NAE Group does. Medical studies indicate that on 10-12% of the general population suffers from migraines. This is a highly significant finding indicating that abduction experiencers suffer from migraine headaches at a considerably higher rate than the non-abduction experiencers that participated in our study, and the general population.

Gynecological problems among female abduction experiencers have been widely reported in UFO abduction literature. We wanted to obtain statistics on the prevalence of these disorders.

- AE Group—If you are a female, have you experienced gynecological problems? Yes (22), No (10)
- NAE Group—If you are a female, have you experienced gynecological problems? Yes (3), No (6)

A significant 69% of the AE Group reported that they had experienced gynecological problems, whereas 33% of the NAE Group made the same report. Two respondents from the AE Group mentioned that they had tested positive for pregnancy, but then were not pregnant, and there was no cramping or bleeding. The sample size in the NAE Group is too small to draw an acceptable comparison. We found it interesting, however, that three of the women in this group that answered "yes" had more in common with the AE group than the NAE group on all of the questions.

Several years ago, a study revealed that a high percentage of abduction experiencers suffer from Chronic Fatigue and Immune Dysfunction Syndrome, sometimes called Chronic or Reactivating Mononucleosis. Affecting less than 1% of the US population, CFIDS can be a devastating disorder. 2.5% of the US population has the symptoms, but no formal diagnosis. These include debilitating fatigue that is not improved by bed rest; problems with concentration and short term memory; flu-like symptoms; word finding problems; reading retention difficulties; and ambulation difficulties due to balance problems. It is not a depressive disorder. Medical researchers have noted immune, neurological, and endocrine abnormalities in CFIDS sufferers. 25% of sufferers are bedridden and 50% cannot work during flare-ups. We decided to revisit this question when we asked the following:

- Have you been diagnosed as having Chronic Fatigue Syndrome or Reactivated Mononucleosis? Yes (18), No (30) 2 respondents stated that they CFIDS symptoms but no formal diagnosis.

38% of the participants in our study have a CFIDS or RM diagnosis, whereas less than 1% of the US population has this diagnosis. This is a highly significant finding. Reports of such a high rate of CFIDS among abduction experiencers should be taken seriously by the medical community. One has to wonder if the alien environment is causing illness among humans. Are the ET's experiments passing this syndrome to experiencers? Could it be caused by the alien technology that allows the transfer of a human body through a solid structure? Is it an adrenal response caused by one's persistent fear of abduction? Is it the result of a sleep disorder? Is it a retrovirus created by ETs?

Psi Phenomena

Psi phenomena, such as telepathy, clairvoyance, psychokinesis, psychic healing, out of body experiences, etc. have long been associated with the alien abduction phenomenon. It is both perplexing and troubling to investigators. Many are not inclined to investigate reports of events that seem more like imagination than reality. Some consider it an embarrassment to the scientific study of UFOs and would prefer to sweep it under the rug. Others feel that they are not equipped to investigate psi phenomena. Yet, abduction experiencers consistently report being transported through solid surfaces, telepathic communication, light orbs that expand into non-human entities, poltergeist activity in their homes (soon after a contact experience), and new psychic abilities. In an attempt not to lead the participants to specific information we referred to these phenomena as "paranormal" rather than ghost related, mystical or psychic. The *Free Dictionary* defines paranormal as "Beyond the range of normal experience or scientific explanation." We developed 7 questions pertaining to these phenomena.

- AE Group—Have you witnessed paranormal activity in your home? Yes (43), No (6), No answer (1) If so, please describe it.
- NAE Group—Have you witnessed paranormal activity in your home? Yes (11) 44%, No (14) 56%. If so, please describe it.

88% of the abduction experiencers reported that they had witnessed paranormal activity in their homes, including light orbs that dart or float through the air. Sometimes the orbs pop like a bubble into 1-3 ETs. Many reported poltergeist activity such as household items flying through the air, pictures flying off walls, lights turning off and on, windows opening and closing, doors opening and closing and toilets flushing on their own. 44% of the NAE Group reported paranormal activities in their homes, but there was a slight variation between the AE and the NAE Groups. They reported ghosts, shadow people, spirits, mist clouds, strange sounds, strange odors, and cold spots. One respondent reported light orbs, but she had all of the characteristics of an abduction experiencer. A small percentage (4%) of the AE group reported ghost-like activity such as invisible beings that had weight in their beds and temperature changes in their home environment. For example, a room was 56 degrees although the thermostat was set at 83 degrees. We were struck by and hadn't anticipated the high percentage (44%) of paranormal activity reports by the NAE Group, as early on in this part of the study only a tiny percentage of the NAE group had reported paranormal activity. This increased dramatically following my interview on a popular paranormal radio show.

In order to determine whether or not the paranormal activity is directly tied to the alien abduction experience, we asked:

- Did it begin prior to or after your first abduction? Prior to (13), After (22), Not sure (3), no answer (5)

It is significant that 51% of the participants reported that their paranormal activity began after their first abduction experience. Many commented that this activity is not ongoing, but occurs immediately prior to or after a contact event.

The next question pertains to telepathic communication. We were interested in determining whether or not all communication between the "visitors" and the experiencers was telepathic.

- AE Group—Have you ever received telepathic messages from your visitors? Yes (44), No (6)
- NAE Group—Have you ever received telepathic messages? Yes (8), No (17)

A statistically significant 88% of the AE Group reported telepathic communication with their visitors, whereas only 32% of the non-experiencers reported telepathic communication. Many experiencers reported that they "sensed" a contact experience was about to occur or received a telepathic message prior to its onset. It is interesting to note that 2 of those who answered "No" reported having only one abduction experience.

- We asked those who answered yes, "Was the telepathic communication related to an abduction experience? Yes (30), No (2), not sure (1), No answer (11).

91% of those in the EA Group that answered the question replied in the affirmative.

The next two questions are closely related.

- Are you more or less "sensitive" or intuitive than you were prior to your abduction experience? More (36), Less (0), about the same (8), Not sure (6)
- Did you develop new psychic abilities after your abduction experience? Yes (26), No (7), Maybe (2), No answer (15)

72% stated that they are more sensitive or intuitive than they were prior to contact. 79% stated that they developed new psychic abilities after a contact experience. One person reported that they have always been psychic and another noted that his or her psychic abilities increased.

The following question was worded to ask whether or not abduction experiencers discovered that they had the ability to heal others following an abduction experience.

- Do you feel you have been given a gift of healing following an abduction experience? Yes (25), No (18), Don't know (5), No answer (1)

50% stated that noted that they were able to heal others for at least a short period following an abduction experience. This gift persisted for an extended period of time for some of the participants, but not for others. 2% mentioned that they had always been healers.

Miscellaneous

Kay Wilson, a well-known abduction experiencer, had written about her "invisibility" experience in an airport and two additional abduction experiencers reported to us that they, at times, felt literally invisible. We decided to determine whether or not others have experienced this sensation by asking, "Do you ever feel that you are literally invisible and others can't see you? It is interesting that 25% answered in the affirmative.

Blood types, Rh factors, and ancestral genetic links have long been of interest to alien abduction researchers. We decided to inquire about blood types.

- AE Group—What is your blood type? A (17), B (1), O (10), AB (1) Positive? (15) Negative? (8)
- NAE Group—What is your blood type? A (9), B (1), O (6), AB (2). Positive? (10) Negative? (2)

29 AE Group participants responded to the question. Of these 59% is type A and 34% is type O. Because 66% of the respondents reside in the Eastern Time Zone, we researched the distribution of blood types throughout the US. It is estimated that 20-25% of the US population residing in the Northeast and East-Central has type A blood and 70-80% are type O. Does this indicate that there is an elevated percentage of A blood types among abduction experiencers? We compared our statistics to the NAE Group and found that 50% are type A and 33% type O. This indicates that the majority of participants in both groups are type A regardless of whether or not they have experienced alien abduction.

We then evaluated the Rh factor knowing that 85% of all humans have Rh+ blood types. We found an elevated percentage of Rh-Factor (35%) among abduction experiencers. The Stanford School of Medicine Blood Center reports that 6.3% of their collected blood types are A negative and 6.6% are O negative. This elevated percentage among abduction experiencers could be significant. Among the NAE Group 83% had a positive Rh factor and 17% were negative indicating that both groups had elevated Rh negative blood types. It is interesting that a significantly higher percentage (18%) of AE Group reported a negative RH factor than in the NAE Group. However, many participants did not know their blood type, so the sample size is too small to be considered statistically reliable.

Throughout the history of alien abduction electrical malfunctions have been widely reported. We decided to address this issue in our questionnaire.

- AE Group—Following an abduction, did you ever experience malfunctions of electrical equipment such as lights, digital watches, computers, etc? Yes (34), No (16)
- NAE Group—Have you ever experienced malfunctions of electrical equipment such as lights, digital watches, computers, etc. for no obvious reason? Yes (8), No (17)

68% of the AE Group reported experiencing malfunctions of electrical equipment, whereas only 32% of the NAE Group had the same experience. The AE Group reported malfunctioning computers, watches, appliances, radios, televisions, cameras and compasses. Some reported that light bulbs blow out or blink off and on and the hands on their watches spin. One participant stated that the time clock at his place of employment malfunctioned only for him. The NAE group mentioned that street lights blink out when they drive or walk under them. This has also been reported to me by abduction experiencers. Another stated that when she became emotionally upset light bulbs would “shoot in the room I was standing in.” Both groups reported that televisions, appliances and computers would automatically switch themselves off and on.

Conclusion and Discussion

After we had excluded the demographic information and the open ended questions, we were left with 37 questions that could be analyzed for correlating information. Of these we found 23 positive, statistically significant correlations among abduction experiencers. A pattern emerged indicating that the majority of abduction experiencers had conscious recall of at least one event and were with a witness who also recalled the experience. They had a close encounter with an unconventional craft and sometimes observed its occupants. They are aware of having been examined aboard a craft and were left with perplexing, unexplained marks on their bodies. Slightly more than half had a nose bleed immediately after an experience. Women reported an elevated percentage of gynecological problems that appear to be related to reproductive procedures performed by alien entities.

The vast majority was revisited—some more than 10 times—and was taken from their homes to an alien craft. Often the abduction experiencers sensed an impending visitation by alien entities before it occurred. The mode of communication between alien entities and humans is almost entirely telepathic. A new psychic awareness has emerged in the majority of experiencers and about half have found that they now have new healing abilities.

Immediately before or soon after a visitation they become aware of paranormal activity in their homes, such as light orbs, objects flying through the air or from walls, doors opening and closing without assistance, etc. The majority noticed malfunctioning electrical equipment, appliances, watches, computers, TVs, radios, cameras, etc.

Slightly more than half developed a new sensitivity to light and now crave salt. They feel a foreign object in their body and are fearful of being abducted again. Most have difficulty falling asleep and remaining asleep throughout the night. Those who have resolved their fearfulness are more likely to sleep restfully.

Finally, we want to express our sincere gratitude to those who participated in this study. It wasn't an easy task. We asked them to visit my website and copy the 45 question or 16 question form. Then we requested that they fill in the multiple choice questions and add their comments and accounts of their personal experiences that would elucidate us regarding their specific information. They were then asked to mail their questionnaires to me or to return them via email. Although it required some effort on their part, it reduced the possibility that hoaxers would intentionally sabotage the study. In the end, we were very pleased with the knowledge we gained and the opportunity it gave us to support abduction experiencers and expand the UFO research community's knowledge of the alien abduction phenomenon.

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