"WHERE IS EVERYBODY?" AN ACCOUNT OF FERMI'S QUESTION

by

Eric M. Jones

ABSTRACT

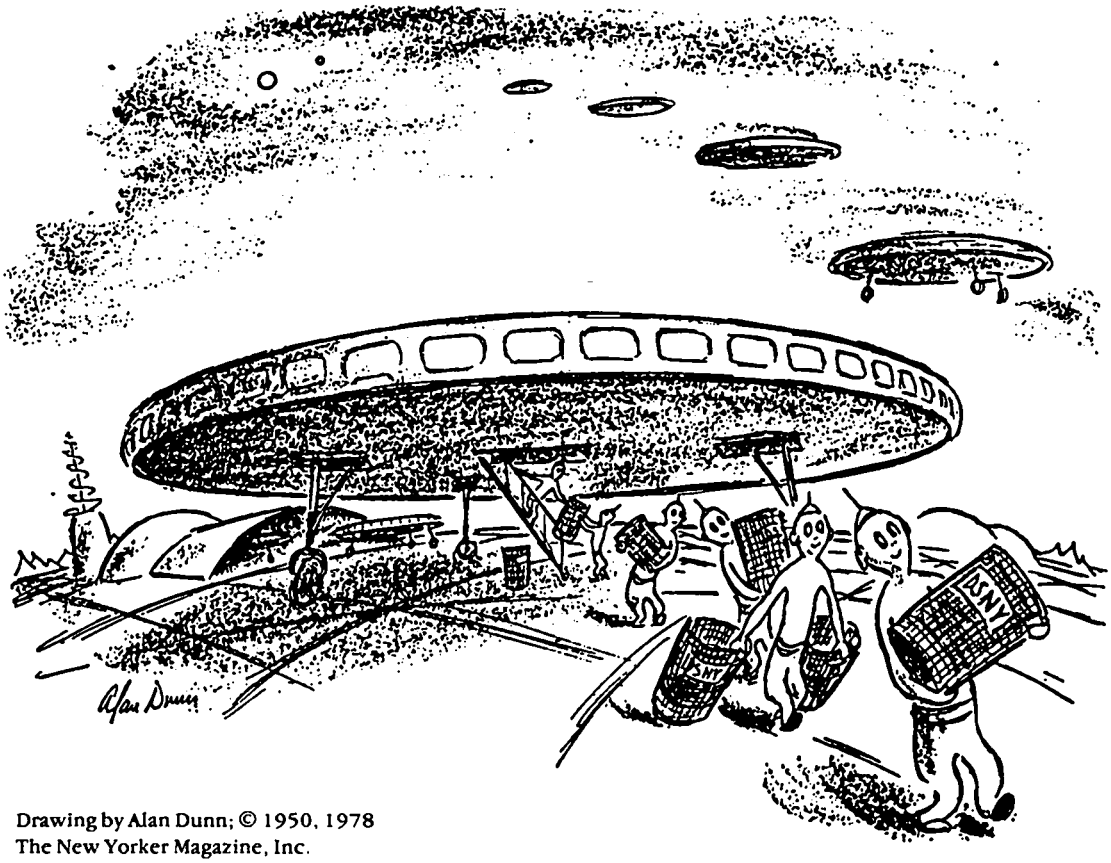
Fermi's famous question, now central to debates about the prevalence of extraterrestrial civilizations, arose during a luncheon conversation with Emil Konopinski, Edward Teller, and Herbert York in the summer of 1950. Fermi's companions on that day have provided accounts of the incident.

Part of the current debate about the existence and prevalence of extraterrestrials concerns interstellar travel and settlement.[1-3] In 1975, Michael Hart argued that interstellar travel would be feasible for a technologically advanced civilization and that a migration would fill the Galaxy in a few million years.[4] Since that interval is short compared with the age of the Galaxy, he then concluded that the absence of settlers or evidence of their engineering projects in the Solar System meant that there are no extraterrestrials.

Newman, Sagan, and Shklovski[2,5] recall that a legend of science says that Enrico Fermi asked the question, "Where are they?" during a visit to Los Alamos during the Second World War or shortly thereafter. Fermi's question has been mentioned in several other recent publications, but historical basis for the attribution has not been established. Thanks to the excellent memory of Hans Mark, who had heard a retelling at Los Alamos in the early 1950s, we now know that Fermi did make the remark during a lunchtime conversation about 1950. His companions were Emil Konopinski, Edward Teller, and Herbert York. All three have provided accounts of the incident.

We begin with Konopinski: "I have only fragmentary recollections about the occasion. . . . I do have a fairly clear memory of how the discussion of extra-terrestrials got started—while Enrico, Edward, Herb York, and I were walking to lunch at Fuller Lodge.

"When I joined the party, I found being discussed evidence about flying saucers. That immediately brought to my mind a cartoon I had recently seen in the New Yorker, explaining why public trash cans were disappearing from the streets of New York City. The New York papers were making a fuss about that. The cartoon showed what was evidently a flying saucer sitting in the background and, streaming toward it, 'little green men' (endowed with antennas) carrying the trash cans. More amusing was Fermi's comment, that it was a very reasonable theory since it accounted for two separate phenomena: the reports of flying saucers as well as the disappearance of the trash cans. There ensued a discussion as to whether the saucers could somehow exceed the speed of light."



Drawing by Alan Dunn; © 1950, 1978
The New Yorker Magazine, Inc.

Teller remembers: "My recollection of the event involving Fermi . . . is clear, but only partial. To begin with, I was there at the incident. I believe it occurred shortly after the end of the war on a visit of Fermi to the Laboratory, which quite possibly might have been during a summer.

"I remember having walked over with Fermi and others to the Fuller Lodge for lunch. While we walked over, there was a conversation which I believe to have been quite brief and superficial on a subject only vaguely connected with space travel. I have a vague recollection, which may not be accurate, that we talked about flying saucers and the obvious statement that the flying saucers are not real. I also remember that Fermi explicitly raised the question, and I think he directed it at me, 'Edward, what do you think? How probable is it that within the next ten years we shall have clear evidence of a material object moving faster than light?' I remember that my answer was '10^{-6}.' Fermi said, 'This is much too low. The probability is more like ten percent' (the well known figure for a Fermi miracle.)"

Konopinski says that he does not recall the numerical values, "except that they changed rapidly as Edward and Fermi bounced arguments off each other."

Teller continues: "The conversation, according to my memory, was only vaguely connected with astronautics partly on account of flying saucers might be due to extraterrestrial people (here I believe the remarks were purely negative), partly because exceeding light velocity would make interstellar travel one degree more real.

"We then talked about other things which I do not remember and maybe approximately eight of us sat down together for lunch." Konopinski and York are quite certain that there were only four of them.

"It was after we were at the luncheon table," Konopinski recalls, "that Fermi surprised us with the question 'but where is everybody?' It was his way of putting it that drew laughs from us."

York, who does not recall the preliminary conversation on the walk to Fuller Lodge, does remember that "virtually apropos of nothing Fermi said, 'Don't you ever wonder where everybody is?' Somehow . . . we all knew he meant extra-terrestrials."

Teller remembers the question in much the same way. "The discussion had nothing to do with astronomy or with extraterrestrial beings. I think it was some down-to-earth topic. Then, in the middle of this conversation, Fermi came out with the quite unexpected question 'Where is everybody?' . . . The result of his question was general laughter because of the strange fact that in spite of Fermi's question coming from the clear blue, everybody around the table seemed to understand at once that he was talking about extraterrestrial life.

"I do not believe that much came of this conversation, except perhaps a statement that the distances to the next location of living beings may be very great and that, indeed, as far as our galaxy is concerned, we are living somewhere in the sticks, far removed from the metropolitan area of the galactic center."

York believes that Fermi was somewhat more expansive and "followed up with a series of calculations on the probability of earthlike planets, the probability of life given an earth, the probability of humans given life, the likely rise and duration of high technology, and so on. He concluded on the basis of such calculations that we ought to have been visited long ago and many times over. As I recall, he went on to conclude that the reason we hadn't been visited might be that interstellar flight is impossible, or, if it is possible, always judged to be not worth the effort, or technological civilization doesn't last long enough for it to happen." York confessed to being hazy about these last remarks.

In summary, Fermi did ask the question, and perhaps not surprisingly, issues still debated today were part of the discussion. Certainly, the line of argument that York remembers became familiar a decade later as the Drake-Greenbank Equation.[6,7]

A final point: the date of the conversation. York is clearest on the date. "The conversation was either in the summer of 1950, 1951, or 1952, very probably 1951, and took place . . . when I was visiting LASL in connection with the forthcoming Greenhouse tests—specifically, the George shot." The George test occurred on May 8, 1951, suggesting a 1950 date. Surviving correspondence from the time indicates that Fermi was an annual summer visitor during the years in question. Unfortunately, attendance and travel records for those years have been destroyed. However, we have the evidence of the cartoon Konopinski mentions. Drawn by Alan Dunn, it was published in the May 20, 1950, issue of *The New Yorker*. It seems quite probable that the incident of Fermi's question occurred in the summer of 1950.

I am grateful to Hans Mark and to the three surviving participants for their accounts. These accounts, together with my letters of inquiry, are reproduced in the following pages.

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

DATE: September 24, 1984
IN REPLY REFER TO: ESS-5:84-OU-538
MAIL STOP: F665
TELEPHONE: (505) 667-6386
(FTS) 843-6386

Dr. Emil Konopinski
Indiana University
Department of Physics
Swain West - Room 117
Bloomington, IN 47405

Dear Dr. Konopinski:

I recently got a letter from Herb York confirming that he was present at a luncheon conversation involving himself, Fermi, Teller, and you, a conversation that has become as famous in the SETI (search for extraterrestrial intelligence) community as "Newton and the Apple." According to a popular version there was some discussion of flying saucers and the like. Fermi became engrossed in a calculation and suddenly asked "Well, if you are right, then where is everybody?" The modern implication is that if interstellar travel is feasible then the Solar System ought to have been visited and settled many times in the past, something we see no convincing evidence of.

Do you remember the incident? If so, I would greatly appreciate a written account which I would use along with York's and Teller's (copies enclosed) in composing a "true" version of the Fermi Story. The composite will appear in the proceedings of a conference called "Interstellar Migration and the Human Experience" to be published by the University of California Press in September 1985. Ben Finney (an anthropologist at the University of Hawaii) and I are the editors.

Thank you for your help.

Sincerely yours,

Eric

Eric M. Jones

EMJ:gam

ENC. - a/s

CY: CRM-4 (2), w/o Enc., MS A150
E. M. Jones, ESS-5, MS F665
ESS-5 File (2)

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INDIANA UNIVERSITY

DEPARTMENT OF PHYSICS
Swain Hall-West 117
Bloomington, Indiana 47405
(812) 335-7658

October 17, 1984

Dr. Eric M. Jones
Los Alamos National Laboratory
MS F665
Los Alamos, New Mexico 87545

Dear Dr. Jones:

I have only fragmentary recollections about the occasion that your letter refers to. I do have a fairly clear memory of how the discussion of extra-terrestials got started--while Enrico, Edward, Herb York, and I were walking to lunch at Fuller Lodge.

When I joined the party I found being discussed evidence about flying saucers. That immediately brought to my mind a cartoon I had recently seen in the New Yorker, explaining why public trash cans were disappearing from the streets of New York City. The New York papers were making a fuss about that. The cartoon showed what was evidently a flying saucer sitting in the background and, streaming toward it, "little green men" (endowed with antennas) carrying the trash cans. More amusing was Fermi's comment, that it was a very reasonable theory since it accounted for two separate phenomena: the reports of flying saucers as well as the disappearance of the trash cans.

There ensued a discussion as to whether the saucers could somehow exceed the speed of light and it was after we were at the luncheon table that Fermi surprised us with the question: "But where is everybody?" It was his way of putting it that drew laughs from us. I think there were only the four of us just as Herb York remembers it.

I have absolutely no recollection of the numerical estimates that Edward mentions, except that they changed rapidly as Edward and Fermi bounced arguments off each other.

Sincerely,

Emil Konopinski

Emil Konopinski

EK:dsm

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545
MS F665
ESS-5:84-ou-394

July 13, 1984

Dr. Edward Teller
Physics Department
University of California
Berkeley, CA 94720

Dear Dr. Teller,

There is a story about Fermi's days in Los Alamos that is making the rounds in the SETI (search for extraterrestrial intelligence) communities which has, unfortunately, little solid basis. It was Sagan who first used it in his book with Shklovski, but Carl has forgotten where or from whom he heard it. Although Hans Mark has given me a secondhand account from a retelling he heard in the early fifties, I have found no one with closer knowledge of the tale. Several people have suggested that you might be a source.

The way the story is being told these days is that the lunchtime conversation turned to the possibility of interstellar travel and/or signaling. Fermi became engrossed in a quick calculation and then announced "If you are right, then where is everybody?" The implication of the question is that if interstellar travel is feasible, then the Galaxy would have been filled long ago by beings who originated somewhere else.

Do you have any firsthand information about this little tale? If so, your help and a written description of the events as you know them would be of great help. This story is slipping too rapidly into legend, and changes with each retelling. I am currently editing the proceedings of a conference called "Interstellar Migration and the Human Experience" which was held here last year. The book will be published by the University of California press next year, and I would very much like to include an accurate account of the Fermi Story.

Thank you for your help.

Sincerely yours,

Eric

Eric M. Jones

EMJ/kf

Cy: CRM-4 (2) MS A150
E. M. Jones, ESS-5, MS F665
ESS-5 File (2)

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Lawrence Livermore National Laboratory

August 13, 1984

Dr. Eric M. Jones
Los Alamos National Laboratory
MS F665
Los Alamos, New Mexico 87545

Dear Eric:

My recollection of the event involving Fermi that you wrote to me about is clear, but only partial.

To begin with, I was there at the incident. I believe it occurred shortly after the end of the war on a visit of Fermi to the Laboratory, which quite possibly might have been during a summer.

I remember having walked over with Fermi and others to the Fuller Lodge for lunch. While we walked over, there was a conversation which I believe to have been quite brief and superficial on a subject only vaguely connected with space travel. I have a vague recollection, which may not be accurate, that we talked about flying saucers and the obvious statement that the flying saucers are not real. I also remember that Fermi explicitly raised the question, and I think he directed it at me, "Edward, what do you think. How probable is it that within the next ten years we shall have clear evidence of a material object moving faster than light?" I remember that my answer was "10^{-6}". Fermi said, "This is much too low. The probability is more like ten percent" (the well known figure for a Fermi miracle).

This incident I have clearly in mind and I believe it was on the same occasion where the other question arose which you have mentioned. This latter point, however, I am not certain of.

At any rate, the conversation, according to my memory, was only vaguely connected with astronautics partly on account of flying saucers might be due to extraterrestrial people (here I believe the remarks were purely negative), partly because exceeding light velocity would make interstellar travel one degree more real.

We then talked about other things which I do not remember and maybe approximately eight of us sat down together for lunch. The discussion had nothing to do with astronomy or with extraterrestrial beings. I think it was some down-to-earth topic.

Then, in the middle of this conversation, Fermi came out with the quite unexpected question "Where is everybody?" What I am sure of is that your quote, "If you are right, then where is everybody?", is wrong. Fermi did not tie his question to any conversation which was then going on. The result of his question was general laughter because of the strange fact that in spite of Fermi's question coming from the clear blue, everybody around the table seemed to understand at once that he was talking about extraterrestrial

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life. I do not believe that much came of this conversation, except perhaps a statement that the distances to the next location of living beings may be very great and that, indeed, as far as our galaxy is concerned, we are living somewhere in the sticks, far removed from the metropolitan area of the galactic center.

I can fully confirm that the question was brought up by Fermi, in Fuller Lodge, at lunch, probably before 1950.

Hoping that this is the information you wanted.

With best regards,

Edward

Edward Teller

P.S. Good of you to ask a question I can answer. These days it happens all too rarely.

Los Alamos
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Los Alamos, New Mexico 87545

Earth and Space Sciences Division
Geoanalysis Group

September 4, 1984
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(FTS) 843-6386

Dr. Herbert York
Physics Department
University of California at San Diego
La Jolla, CA 92093

Dear Dr. York:

There is a story about Fermi's days in Los Alamos that is making the rounds in the SETI (search for extraterrestrial intelligence) communities which has, unfortunately, little solid basis. It was Sagan who first used it in his book with Shklovski, but Carl has forgotten where or from whom he heard it. Hans Mark has given me a secondhand account from a retelling he heard in the early fifties; Edward Teller has also provided his recollection of the event. Several people have suggested that you might be a source.

The way the story is being told these days is that the lunchtime conversation turned to the possibility of interstellar travel, particularly faster-than-light travel. Fermi became engrossed in a quick calculation and then announced "If you are right, then where is everybody?" The implication of the question is that if interstellar travel is feasible, then the Galaxy would have been filled long ago by beings who originated somewhere else. Teller says that the conversation had moved on when Fermi asked "Where is everybody?" out of the blue, and without the qualifier. He says there was general laughter because everyone realized that Fermi was talking about extraterrestrials (I enclose a copy of Teller's letter).

Do you have any firsthand information about this little tale? If so, your help and a written description of the events as you know them would be of great help. This story is slipping too rapidly into legend, and changes with each retelling. I am currently editing the proceedings of a conference called "Interstellar Migration and the Human Experience" which was held here last year. The book will be published by the University of California press next year, and I would very much like to include an accurate account of the Fermi Story.

Thank you for your help.

Sincerely yours,

Eric

Eric M. Jones

EMJ:gam
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Herbert F. York
Director

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September 11, 1984

Eric M. Jones
Earth and Space Sciences Division
Geoanalysis Group
Los Alamos National Laboratory
Mail Stop F665
Los Alamos, New Mexico 87545

Dear Eric:

My recollection of Fermi's remarks about "where everybody is" is as follows:

At a luncheon in the Lodge which included just four people, Fermi, Teller, Emil Konopinski and myself, Fermi said, virtually apropos of nothing: "Don't you ever wonder where everybody is?" Somehow (and perhaps it was connected to the prior conversation in the way you describe, even though I do not remember that) we all knew he meant extra-terrestrials. He then followed up with a series of calculations on the probability of earthlike planets, the probability of life given an earth, the probability of humans given life, the likely rise and duration of high technology, and so on. He concluded on the basis of such calculations that we ought to have been visited long ago and many times over. As I recall, he went on to conclude that the reason we hadn't been visited might be that interstellar flight is impossible, or, if it is possible, always judged to be not worth the effort, or technological civilization doesn't last long enough for it to happen. I am much hazier about these last remarks so you should probably discount them.

The conversation was either in the summer of 1950, 1951 or 1952, very probably 1951, and took place at a time when I was visiting LASL in connection with the forthcoming Greenhouse tests (specifically the George shot).

Sincerely,

HFY:aw

Herbert F. York

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February 1, 1985

Dr. Eric M. Jones
Earth and Space Sciences Division
Geoanalysis Group
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Los Alamos National Laboratory
Los Alamos, NM 87545

Dear Dr. Jones:

The cartoon you found is indeed the one I referred to. It also sets the date of the discussion, since I am now certain that it took place in the summer of 1950--when the cartoon was still quite fresh in my mind.

My best wishes,

Emil Konopinski

EK:dsm

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