

List of Participants

CETI Conference

Byurakan, 5-11 September, 1971

Soviet Organizing Committee

- V. A. Ambarzumian, Chairman; Byurakan Astrophysical Observatory, Armenian Academy of Sciences.
- N. S. Kardashev, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow.
- I. S. Shklovsky, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow; and Shternberg Astronomical Institute, Moscow State University.
- V. S. Troitsky, Institute for Radiophysics, Gorky State University, Gorky.

U. S. Organizing Committee

- C. Sagan, Chairman; Center for Radiophysics and Space Research, Cornell University, Ithaca, New York.
- F. D. Drake, Center for Radiophysics and Space Research, Cornell University, Ithaca, New York.
- P. Morrison, Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Soviet Participants

- S. Y. Braude, Institute of Radiophysics and Electronics, Ukrainian Academy of Sciences, Kharkov.
- V. L. Ginzburg, Lebedev Physical Institute, Soviet Academy of Sciences, Moscow.
- L. M. Gindilis, Shternberg Astronomical Institute, Moscow State University.
- E. M. Debai, Shternberg Astronomical Institute, Moscow State University.
- G. M. Idlis, Astrophysical Institute, Kazakh Academy of Sciences, Alma-Ata.
- Y. I. Kuznetzov, Institute of Energetics, Moscow.

- V. V. Kazutinsky, Institute of Philosophy, Soviet Academy of Sciences, Moscow.
- S. A. Kaplan, Institute for Radiophysics, Gorky State University, Gorky.
- V. I. Moroz, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow, and Moscow State University.
- B. E. Markarian, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- E. S. Markarian, Institute of Philosophy and Law, Armenian Academy of Sciences, Erevan.
- L. V. Mirzoyan, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- E. Mirzabekian, Institute of Radiophysics and Electronics, Armenian Academy of Sciences, Erevan.
- M. Y. Marov, Institute of Applied Mathematics, Soviet Academy of Sciences, Moscow.
- L. M. Mukhin, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow.
- L. M. Ozernoy, Lebedev Physical Institute, Soviet Academy of Sciences, Moscow.
- B. I. Panovkin, Radioastronomical Council, Soviet Academy of Sciences, Moscow.
- N. T. Petrovich, Electrotechnical and Communications Institute, Moscow.
- R. G. Podolny, "Knowledge is Power," Moscow.
- Y. N. Pariisky, Special Astrophysical Observatory, Soviet Academy of Sciences, Leningrad.
- V. A. Sanamyan, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- V. I. Slysh, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow.
- V. I. Siforov, Institute for Information Transmission, Soviet Academy of Sciences, Moscow.
- B. V. Sukhotin, Institute of the Russian Language, Soviet Academy of Sciences, Moscow.

- G. M. Tovmasyan, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- M. L. Ter-Mikaelian, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- E. E. Khachikyan, Byurakan Astrophysical Observatory, Armenian Academy of Sciences, Erevan.
- Y. K. Khodarev, Institute for Cosmic Research, Soviet Academy of Sciences, Moscow.

U.S. Participants

- B. Burke, Dept. Physics, M.I.T., Cambridge, Mass.
- F. Dyson, Institute for Advanced Study, Princeton, New Jersey.
- K. Flannery, Department of Anthropology, University of Michigan, Ann Arbor.
- T. Gold, Center for Radiophysics and Space Research, Cornell University, Ithaca, New York.
- D. Heeschen, National Radio Astronomy Observatory, Charlottesville, Virginia.
- S. von Hoerner, National Radio Astronomy Observatory, Charlottesville, Virginia.
- D. Hubel, Department of Physiology, Harvard Medical School, Cambridge, Massachusetts.
- K. Kellermann, National Radio Astronomy Observatory, Charlottesville, Virginia.
- R. B. Lee, Department of Anthropology, Rutgers University, New Brunswick, New Jersey.
- W. H. McNeill, Department of History, University of Chicago, Chicago, Illinois.
- M. Minsky, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- B. M. Oliver, Hewlett-Packard Corporation and Stanford University, Palo Alto, California.
- L. Orgel, The Salk Institute, La Jolla, California, and London University, London, U.K.
- J. R. Platt, Michigan Mental Health Center, University of Michigan, Ann Arbor.

G. Stent, Department of Virology, University of California,  
Berkeley.

C. Townes, Department of Physics, University of California,  
Berkeley.

Participants from Other Nations

F. Crick, Medical Research Council Laboratory of Molecular  
Biology, Cambridge University, U.K.

G. Marx, Department of Physics, Budapest University, Budapest,  
Hungary.

R. Pešek, Czech Academy of Sciences, Prague, Czechoslovakia.



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Laboratory for Planetary Studies

To: Each participant at the first  
Soviet/American Conference on  
Communication with Extraterrestrial  
Intelligence (CETI)

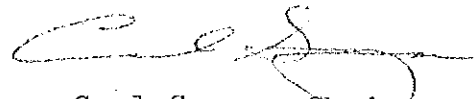
September 28, 1971

Dear Participant:

Enclosed for your information is the set of approved resolutions of the first conference on Communication with Extraterrestrial Intelligence (CETI). For the conference Proceedings, the editors would be happy to consider any additional material which you were not able to present in adequate detail in the actual meeting. We very much need any glossy prints of illustrative material which you presented. All participants will of course have an opportunity to check the accuracy of the stenotypic transcript of their remarks. The detailed publication plans of the English version of the conference proceedings will be announced as soon as they are made; the organizing committee felt that it would be a good idea to keep any royalties from such publication in a fund to be drawn upon to support travel to subsequent meetings on this subject.

With best wishes,

Cordially,



Carl Sagan, Chairman  
U.S. Organizing Committee  
First CETI Conference

CS/mw

Enc.

## RESOLUTIONS

### FIRST SOVIET - AMERICAN CONFERENCE ON COMMUNICATION WITH EXTRATERRESTRIAL INTELLIGENCE (CETI)

The first international conference on the problem of extraterrestrial civilizations, and contact with them, was held September 5-11, 1971 at the Byurakan Astrophysical Observatory of the Armenian Academy of Sciences, U.S.S.R. The Conference was a gathering of qualified scientists working in a variety of fields -- astronomy, physics, radiophysics, computer science and technology, chemistry, biology, linguistics, archaeology, anthropology, sociology, and history -- and included many distinguished scientists. The conference was jointly organized by the U.S. National Academy of Sciences (with assistance from the U.S. National Science Foundation) and the U.S.S.R. Academy of Sciences. Scientists from several other nations participated.

Many aspects of the problem of extraterrestrial civilizations were discussed in detail in the ten sessions of the Conference. Particular attention was devoted to the following questions: the plurality of planetary systems in the Universe, the origin of life on Earth, the possibility of life arising on cosmic bodies, the origin and evolution of intelligence, the origin and development of technological civilizations, problems in searching for intelligent signals or for evidence of astro-engineering activities, and the problems and possible consequences of establishing contact with extraterrestrial civilizations.

Conference participants differed on many details of these questions, but were agreed that the promise of contact with such extraterrestrial civilizations is sufficiently high to justify initiating a variety of well-formulated search programs; they also agreed that present technology may be capable of establishing contact with such civilizations. Some preliminary radioastronomical searches have been performed both in the U.S. and in the U.S.S.R.

The Conference participants reached the following conclusions:

1. The striking discoveries of recent years in the fields of astronomy, biology, computer science and radiophysics have transferred some of the problems of extraterrestrial civilizations and their detection from the realm of speculation to a new realm of experiment and observation. For the first time in human history it has become possible to make serious and detailed experimental investigations of this fundamental and important problem.

2. This problem may prove to be of profound significance for the future development of Mankind. If extraterrestrial civilizations are ever discovered the affect on human scientific and technological capabilities will be immense, and the discovery can positively influence the whole future of Man. The practical and philosophical significance of a successful contact with an extraterrestrial civilization would be so enormous as to justify the expenditure of substantial efforts. The consequences of



such a discovery would greatly add to the total of human knowledge.

3. The technological and scientific resources of our planet are already large enough to permit us to begin investigations directed towards the search for extraterrestrial intelligence. As a rule, such studies should provide important scientific results even when specific searches for extraterrestrial intelligence do not succeed. At present these investigations can be carried out effectively in the various countries by their own scientific institutions. Even at this early stage, however, it would be useful to discuss and coordinate specific programs of research and to exchange scientific information. In the future it would be desirable to combine the efforts of investigators in various countries to achieve the experimental and observational objectives. It seems to us appropriate that the search for extraterrestrial intelligence should be made by representatives of the whole of Mankind.

4. Various modes of search for extraterrestrial intelligence were discussed in detail at the Conference. The realization of the most elaborate of these proposals would require considerable time and effort and an expenditure of funds comparable to the funds devoted to space and nuclear research. Useful searches can, however, also be initiated at a very modest scale.

5. The Conference participants consider highly valuable present and forthcoming space vehicle experiments directed towards searching for life on the other planets of our solar

system. They recommend the continuation and strengthening of work in such areas as prebiological organic chemistry, searches for extrasolar planetary systems, and evolutionary biology, which bear sharply on the problem.

6. The Conference recommends the initiation of specific new investigations directed towards modes of search for signals. A list of some possible investigations is appended.

7. To coordinate national programs of research and to promote progress in this field, the Conference suggests the establishment by appropriate means of an international working group. For the time being, the following interim working group is proposed: F. Drake, USA; N.S. Kardashev, USSR; P. Morrison, USA; B. Oliver, USA; R. Pešek, Czechoslovakia; C. Sagan, USA; I.S. Shklovsky, USSR; G.M. Tovmassyan, USSR; and V.S. Troitsky, USSR.

8. The Conference participants urge the full and open publication of research results on these problems, and as a step in this direction plan simultaneous publication in Russian and in English of the Proceedings of the present Conference.

9. The interim working group is instructed to consider, when necessary, convening broadly-based or more specialized meetings of scientists working on CETI.

10. The Conference participants express their warm appreciation for the splendid hospitality extended to them

by the Armenian Academy of Sciences.

/Signed/

The Organizing Committees of  
the U.S. and U.S.S.R. delega-  
tions, for the Conference  
participants (list appended).

## LIST OF POSSIBLE RESEARCH DIRECTIONS

It would be useful to concentrate efforts in two directions, both of which seem promising:

- I. Searches for civilizations at a technical level comparable with our own.
- II. Searches for civilizations at a technological level greatly surpassing our own.

A wide circle of specialists, from astrophysicists to historians, should participate in the planning of this research.

Accordingly, we recommend:

1. A search for signals and for evidence of astro-engineering activities in the radiation of a few hundred chosen nearby stars and of a limited number of other selected objects, covering the wavelength range from visible to decimeter waves, using the largest existing astronomical instruments.

2. A search for signals from powerful sources within galaxies of the local group, including searches for strong impulsive signals.

3. Exploration of the region of minimum noise in the submillimeter band, in order to determine its suitability for observing extraterrestrial civilizations.

The following studies are desirable:

4. The design, among others, of powerful new astronomical instruments with roughly the following parameters:

- (a) A decimeter wave radiotelescope with effective area

$$\gtrsim 1 \text{ km}^2.$$

- (b) A millimeter wave telescope with effective area  $\gtrsim 10^4 \text{ m}^2$ .
- (c) A submillimeter wave telescope with effective area  $\gtrsim 10^3 \text{ m}^2$ .
- (d) An infrared telescope with effective area  $\gtrsim 10^2 \text{ m}^2$ .

All of the instruments described above have the capability of providing important data in subjects quite separate from CETI.

5. The definition of a system for keeping the entire sky under constant surveillance, which could lead to a search of wider scope than those listed under 1. and 2.