



North American AstroPhysical Observatory (NAAPO)



Cosmic Search: Issue 3

(Volume 1 Number 3; Summer 1979)

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Miscellaneous Items

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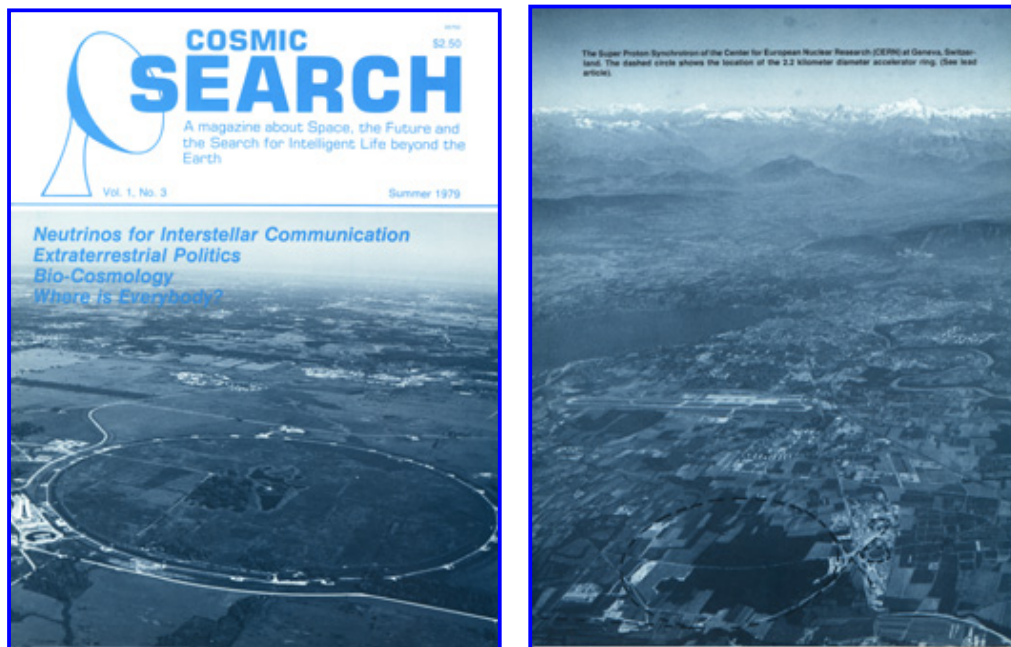
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Application to mail at second-class postage rates is pending at Delaware, Ohio, and at additional mailing offices.

Summer issue

This third issue of COSMIC SEARCH is a summer issue. The fourth issue is planned for September. Since there will be fewer than six issues for 1979, subscriptions will be automatically extended so that subscribers will still receive 6 issues for a one year subscription and 12 issues for a two year subscription.

The Covers (front and back):



The Covers: The Fermilab near Batavia, Illinois, with the 2 kilometer diameter synchrotron accelerator (front cover) and the 2.2 kilometer diameter Super Proton Synchrotron of the Center for European Nuclear Research (CERN) at Geneva, Switzerland (back cover). Both have the capability for generating large numbers of neutrinos as discussed in this issue's article by Pasachoff and Kutner.

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With the editors—

With the support of our distinguished Editorial Board, we have set a high goal, to produce a popular yet authoritative, responsible new magazine dealing with a very important, exciting idea. We are striving for a magazine of an educational-scientific type that is easily understood and fun to read. We believe that the first issues approach these aims and the excellent material we have for coming issues should help us to do even better.

The magazine now has about three thousand subscriptions but we really need several times as many to put the magazine on a self-sustaining basis. You can help by urging others to subscribe, extending your own subscription or by making a donation (see "Donors Needed" in next column [\[below\]](#)).

As you know, the magazine is published by Cosmic-Quest, Inc. a non-profit, educational-scientific corporation which a small group of us organized to promote SETI endeavors, With the exception of Janet Stevens, Subscription Manager, a part-time hourly employee, we and the rest of the staff are unpaid volunteers with full-time responsibilities not related to the magazine. It has not been easy for such a small group to publish a magazine like COSMIC SEARCH but what we lack in size we make up for in dedication and hard work.

We greatly appreciate the many letters of comment and encouragement we have received. Please keep them coming.

—Mirjana R. Gearhart, John Kraus and Robert S. Dixon

Donors Needed

Donations are needed to help **COSMIC SEARCH** continue. Donations may be made as follows:

Planetary: \$30 per year

Stellar: \$100 per year

Galactic: \$500 per year

Cosmic: \$1000 per year

Payments should be made to Cosmic-Quest, Inc., Box 293, Delaware, Ohio, 43015.

You may designate \$12 of the amount for a six issue subscription making the remainder hopefully eligible for tax-deductible status as explained below. **Galactic and Cosmic** Donor-Subscribers will receive the magazine via first-class mail. We wish to list donors by name and city in **COSMIC SEARCH** unless you request otherwise.

Note re tax: **COSMIC SEARCH** is published by Cosmic-Quest, incorporated as a non-profit, educational-scientific organization under the laws of the State of Ohio. An application for tax-exempt status has been filed with the U.S. Internal

Revenue Service (IRS) but until an IRS ruling has been received we cannot advise you that your contribution is tax deductible. However, we hope to be able to report on the matter in **COSMIC SEARCH** before you file your tax returns for the year.

Coming in COSMIC SEARCH

- "The Possibilities of SETI from Space" by **Roy Basler**
- "Cosmic Languages" by **Hans Freudenthal**
- "A Hymn to Life in the Universe" by **Don Lago**
- "Strategies of Searching for Extraterrestrial Civilizations" by **Nikolai Kardashev**
- "Quest Beyond the Stars: Are We Alone?" by **Jesco von Puttkamer**
- "The Grand Analogy: History of the Idea of Extraterrestrial Life" by **Trudy Bell**
- "Space Travel and Life" by **E. J. Öpik**
- "Chief Entities" by **I. J. Good**
- "Not as We Know It" by **Isaac Asimov**
- **FORUM:**
 - Interview with scientist-philosopher **John Archibald Wheeler** on "Albert Einstein, Nils Bohr, Teaching and the Relationship of Art and Science"
 - Interview with NASA's SETI Director **John Billingham** on "SETI"
- **ABCs of Space** will explain in simple terms:
 - Three Degrees (The Big Bang Background)
 - Doppler Shifts (Wavelengths are relative. The red shift)
 - Radio Telescopes (What do they hear?)
- More **SEnTinel** news reports, "Off the Shelf" books and other special features.

Glossary

Anthropocentric:

Man-centered.

Astronomical Unit:

A unit of length equal to the distance of the earth from the sun, about 150 million kilometers.

Bandwidth:

The wavelength or frequency range to which a receiver responds. Bandwidths can be described as narrow or wide, according to their range.

Big Bang:

The beginning event in the Universe. The explosion of this primordial fireball some 15 billion years ago caused the initial outward expansion of gas and dust which formed the universe.

Blackbody radiation:

Hypothetically radiation which is perfect; that is, all incident radiation is absorbed and re-emitted.

CETI:

An acronym for Communication with Extra-Terrestrial Intelligence.

Doppler Shift:

The resulting frequency change caused by the relative motion along a line of sight between two observers.

Dyson Sphere:

Shells built around stars by advanced civilizations. These objects are hypothesized by Princeton astronomer Freeman Dyson. These spheres might be detected by our astronomies as infrared sources.

Electron-volt:

The energy acquired by an electron moving through a potential difference of one volt.

Exobiology:

The study of extraterrestrial life forms.

Galaxy:

A large system of stars. Our galaxy, the Milky Way, is a spiral galaxy containing some 100,000 million stars, 100,000 light years in diameter and 10,000 light years thick.

Gigahertz:

A unit of frequency equal to 1,000 million hertz.

Hertz:

A unit of frequency equal to one cycle per second.

Hydrogen:

The most abundant element in the universe. It radiates naturally at a wavelength of 21 centimeters.

Infrared radiation:

Radiation whose emitted wavelengths are longer (redder) than those seen by the human eye, but shorter than radio wavelengths.

Kelvin degrees:

Absolute temperature measured in the celsius scale. Ten degrees kelvin equals ten degrees celsius above absolute zero.

Lagrangian points:

Five points (designated L1, L2, L3, L4, and L5) in the plane of orbit of two mutually orbiting bodies where a third body, of relatively small mass, can remain in equilibrium with respect to the other two bodies.

Light Year:

The distance traveled by light in one year, about 10 trillion kilometers.

Light (speed of):

In empty space: 300,000 kilometers per second.

Maser:

A sensitive amplifying device employing energy jumps of atomic particles.

Megahertz:

A unit of frequency equal to one million hertz.

Microwave radiation:

Radiation in the short-wave radio spectrum having a wavelength range between 1 and 30 centimeters.

Muon:

An elementary atomic particle of mass intermediate between an electron and a proton.

Nanosecond:

One billionth of a second.

Nucleon:

A proton or a neutron, especially in the nucleus of an atom.

Radio Astronomy:

The science of making astronomical observations using instruments sensitive to radio wavelengths.

Redshift:

A shift toward the longer wavelengths of the optical spectrum due to recessional velocity (the Doppler effect).

SETI:

An acronym for Search for Extra-Terrestrial Intelligence.

Ultra-violet radiation:

Radiation whose emitted wavelengths are shorter (more violet) than those to which the eye is sensitive, but longer than x-rays.

COSMIC SEARCH AWARDS

For best papers on SETI

- Category 1. Undergraduate students
- Category 2. Graduate students
- Category 3. Anyone else under 30 years of age

Papers may be on any aspect of the Search for Extra-Terrestrial Intelligence (SETI). Papers must be double-spaced typewritten with one inch margins on 8 1/2 by 11 inch bond paper and less than 2000 words in length. Any illustrations must be clearly executed.

Authors of best papers will be given a **SEARCH AWARD** of \$100 and the paper will be published in **COSMIC SEARCH**. Authors should include their full address and telephone number. Authors should enclose a self-addressed stamped envelope if they wish to have their manuscripts returned. Manuscripts accepted and published are copyrighted and become the property of **COSMIC SEARCH** magazine.

Manuscripts may be submitted at any time. Their review is a continuous, on-going process. Each article received is reviewed by a special committee and if judged worthy, either in its original form or after revisions, will be given a **SEARCH AWARD**. The opinion of the committee is final.

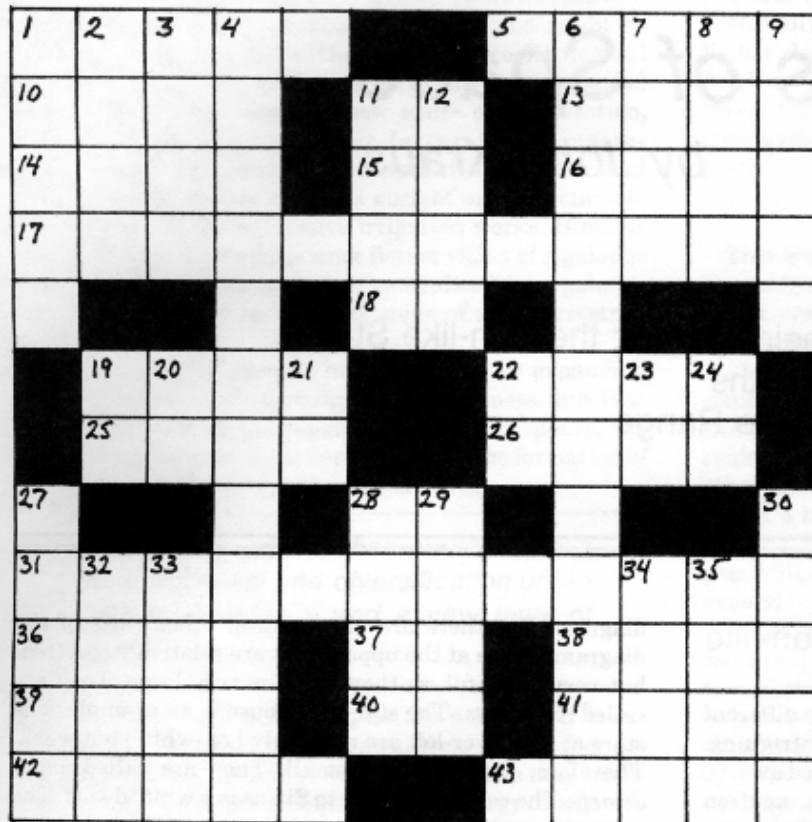
A contestant may submit and have under review only one manuscript at a time and be eligible for only one **SEARCH AWARD** in one category. However, it is possible for one person to achieve **SEARCH AWARDS** sequentially in each of the three categories.

Address **SEARCH AWARD** Committee, Radio Observatory, P.O. Box 293, Delaware, Ohio 43015.

SEARCH PUZZLE

[Click on images below to obtain larger versions. In your browser you may need to uncheck the preference that says something like "Resize large images to fit in window" to avoid seeing a scaled image that appears smaller than the image below.]

SEARCH PUZZLE*



Across

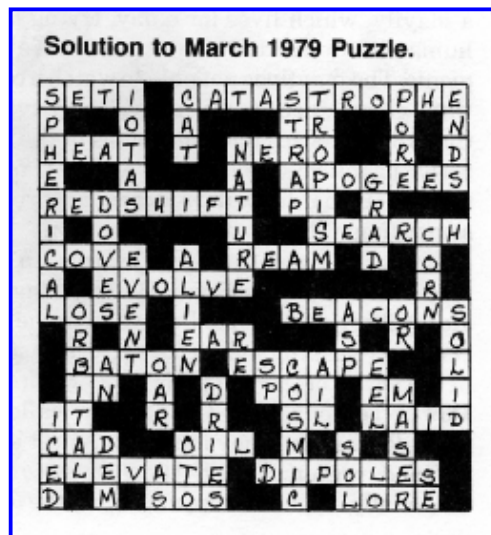
1. Small run-down house
5. Tropical bird
10. Horse contest
11. One
13. Choice singing role (pl.)
14. Iowa city
15. Scale note
16. Weekday
17. New magazine
18. Map abbreviation
19. European mountains
22. _____ a fly
25. Satellite
26. Records
28. Parent
31. Against separation
36. Carbon residue
37. Greek letter
38. Precious metal
39. Bye-bye (familiar)
40. Magazine person (abbr.)
41. Unicorn fish
42. To emit light (past tense)
43. Catches

Down

1. Extraterrestrial region
2. _____ sapiens
3. Malt beverages
4. Old magazine
6. A space-age toy
7. Court (Fr.)
8. _____ Guinness
9. _____ -washy
11. Circle parts
12. Aerie
19. Morning
20. Exclamation
21. Tin (symbol)
22. State (abbr.)
23. Close by
24. College helper (abbr.)
27. Sailboat part (pl.)
28. Sherlock Holmes trademark
29. Enthusiastic
30. S. American mountains
32. Whale hitch-hiker
33. Dorothy's dog
34. Girl's name
35. Few (prefix)

*Contributed by Robert Lackey

Answer to puzzle in next issue.



Miscellaneous Quotes

The following quotes are not directly associated with any article. They are listed here in the order in which they appear in the magazine; page numbers are given. Uncredited quotes should be credited to the Editors of **COSMIC SEARCH** magazine.

Quote on page 9

"The invariable mark of wisdom is to see the miraculous in the common."

Ralph Waldo Emerson

Quotes on page 41

The Curvature of Space

An astronomer named Mace
 Peered so far into space,
 He was amazed to see
 What sure seemed to be
 The back of astronomer Mace.
 — Sedgewick Seti

"Are life and mind irrelevant to the structure of the universe — or are they central to it?" **John Archibald Wheeler** in the *American Scientist*.

Quote on page 48

Summertime Wisdom

by Ken Cottrell

In the season of winter a wise man came
 With words quite convincing, our cause to defame.
 "Prideful vanity! The most endless quest!
 Why not let the heavens rest
 From your hopeless, irrelevant probing?"

Some of your number in anguish have said,
'Where one question's answered ten others are bred.'
Why not direct your talents instead
To pursuits which are not so confusing?

Astronomers are mortal. They cannot discern
The model on which infinities turn.
When will arrogant mankind learn
That God resists such striving?

Are you not aware of the homeless and poor?
Has it escaped your attention that we face the last war?
Why go on considering fanciful theory-worlds more
When you know that this real one could be dying?"

Then a summertime wise man chanced by our door
With words more convincing than the wise man before.
"Press on good explorers of the cosmic main.
Never heed the voices of scorn and disdain
While pristine Edens go hopelessly begging.

No question posed will you fail to resolve
From the primal explosion to how planets evolve.
By your unyielding efforts all mysteries dissolve.
The veil of 'forever' is rising.

The unitive power of your glorious art
Transcends the walls which hold nations apart.
We shall know that brotherhood decreed by the heart,
Our souls released for true loving.

By your findings the earth is illumined with grace
Subtly inspiring our fear-ravaged race
To shatter this prison of time and of space,
To attain a new order of being."

Miscellaneous Photos

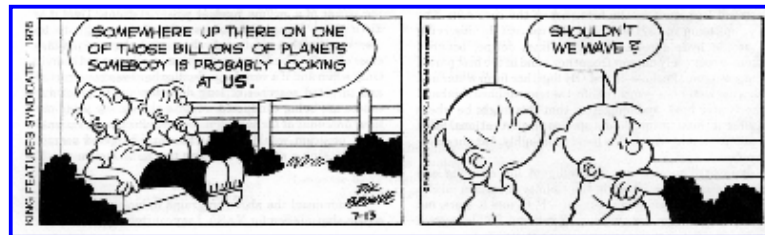
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Photo on Outside Back Cover



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