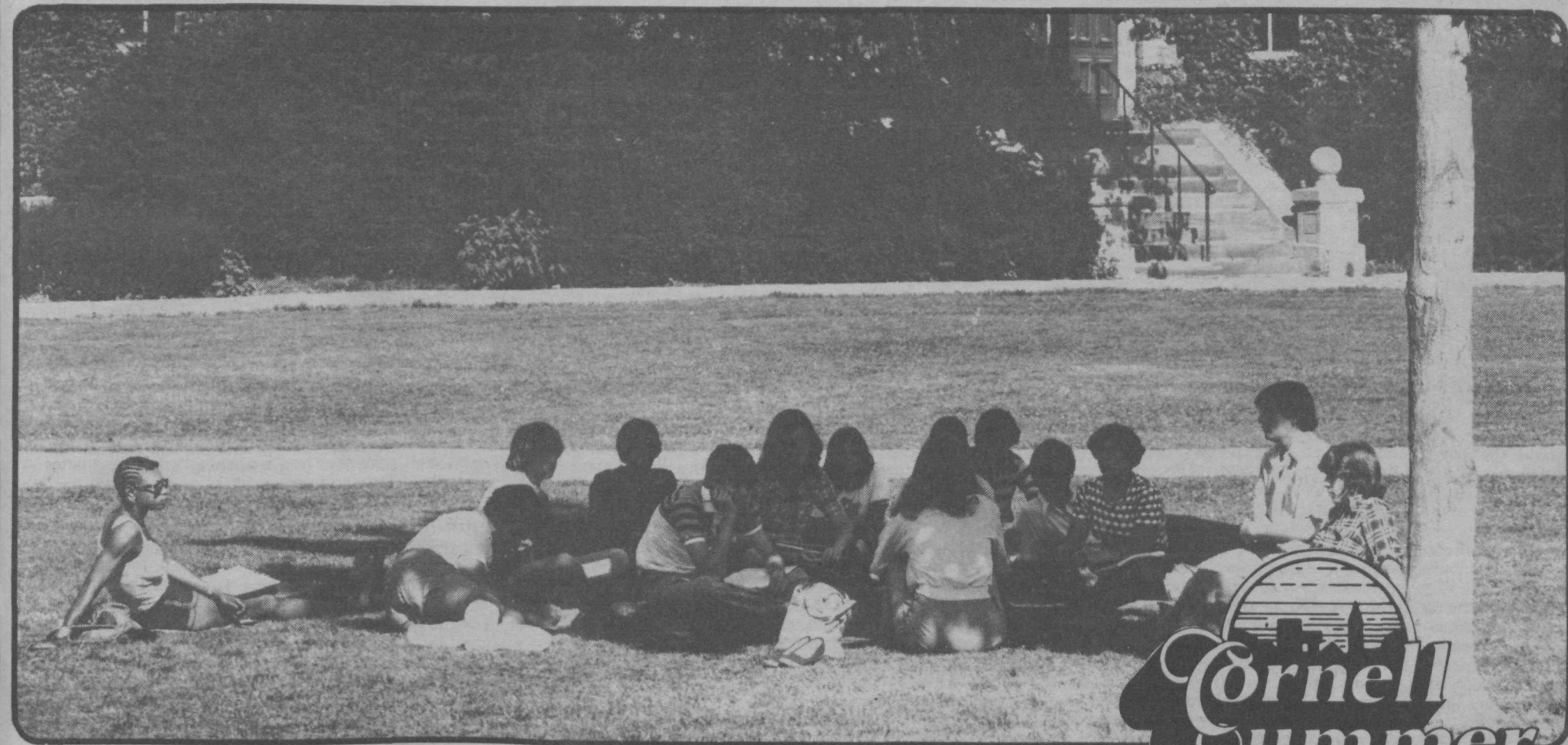


# Cornell Chronicle

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July 9, 1981



## Fink to Lecture on DNA *A Science That is Constantly Changing*

A science that is constantly changing, sometimes secretive and probably profitable will be discussed by a leader in the field when Cornell Professor of Biochemistry Gerald R. Fink speaks on "Recombinant DNA, 1981."

The third of six presentations in the 1981 Cornell Summer Lecture Series, Fink's talk is scheduled for 8:15 p.m. Wednesday, July 15 in Alice Statler Auditorium. The lecture is open to the public at no charge.

Also known as gene splicing, recombinant DNA (for deoxyribonucleic acid, the coded substance in each cell's chemical blueprint for life) is one of the techni-

ques available to genetic engineers. In less than 10 years, what had been a basic science of interest to relatively few researchers has become a technological pathway to a future potentially without starvation and with enough energy for everyone's needs, to a world that may be free of cancer, genetic disease and birth defects.

After a 1980 U.S. Supreme Court decision permitted the patenting of human-made microorganisms, biotechnology firms attracted millions of dollars in investments as profit-seekers turned from pork bellies to plasmids. One possible product of recombinant DNA techniques, plant growth regulants, is

expected to find a \$10 billion worldwide market, and bacteria are being engineered to produce alcohol fuel from garbage and petroleum from oil shale.

Processes have been developed to manufacture human insulin, and the anti-virus substance, interferon, is under intense scrutiny for a wide variety of applications including cancer treatment. Gene splicing has been used to produce a vaccine against hoof and mouth disease, an advance that is expected to increase food supplies in developing countries. Closer to home, one of America's largest makers of potato chips is using cloning techniques to produce disease-resistant spuds.

Fink, who this year was awarded a lifetime American Cancer Society Research Professorship in Biochemistry, is best known for his pioneering research into the use of yeast as an alternative host (rather than bacteria) in recombinant DNA processes. Yeast transformation systems developed by Fink and his associates enable DNA molecules from other cells to be passed on to future generations of yeast. Researchers in the Boyce Thompson Institute recently announced they had employed Fink's transformation methods to move genetic information responsible for nitrogen fixation in certain bacteria to yeast

cells, an advance that is considered a critical step in "teaching" crop plants to produce their own nitrogen fertilizer from the atmosphere.

After receiving his Ph.D. from Yale University in 1965, Fink served as a postdoctoral fellow at the National Institutes of Health before joining the Cornell faculty in 1967. He is editor of "Gene" and "Molecular and General Genetics" and the author or co-author of more than 50 scientific papers. In April he was one of 60 persons elected to the National Academy of Sciences.

## Clues to Origins of Life on Earth *Sagan on Space Research*

Anticipation. Imagine sending a roll of film off to be developed and not getting the pictures back for years.

Planning for the "picture-taking" missions of the Voyager 1 and 2 spacecraft began long before their 1977 launchings as scientists working with the National Aeronautics and Space Administration decided what they wanted to see and where to aim the array of telemetry cameras and other sophisticated instruments. Then they sat back and waited. And waited.

Traveling first to Jupiter (1 billion-kilometer journeys that took one and a half years and paid off in superb pictures of the giant planet's Great Red Spot, its colorful moons and the discovery of the first active volcanoes known to exist beyond Earth), the Voyagers were instructed to pass by Saturn on their way out of the solar system. The results have been better — spectacularly better — than the mission

planners dared to hope. The 1980 Voyager 1 images of Saturn's intricate ring system and of its distinctive satellites excited a world that had grown blasé about space exploration.

Now, Voyager 2 is approaching Saturn on a different trajectory for its Aug. 24 close encounter. Among the scientists who will be on hand at the Jet Propulsion Laboratory in Pasadena, Calif., will be Carl Sagan, the David Duncan Professor of Astronomy and Space Sciences at Cornell, member of the Voyager science imaging team, and executive producer of the golden phonograph records, "Sounds of Earth," that are attached to both spacecraft. The message in a bottle in a cosmic ocean, as Sagan calls the recordings, may take a few million years to find a listener (because interstellar space is so empty, there is little chance the Voyagers will ever enter the planetary systems

of other stars), but the astronomer has reached a vast audience on Earth. An estimated 20 million persons watched the "Cosmos" programs, which will be telecast again this fall by PBS, and the book, "Cosmos," is in its ninth printing after more than 30 weeks on the best-seller lists.

Sagan, who also serves as the director of Cornell's Laboratory for Planetary Studies and the associate director of the Center for Radiophysics and Space Research, has been the recent recipient of numerous honors. Among them are the George Foster Peabody Award for excellence in television programming, a second NASA Medal for Distinguished Public Service, the Humanist of the Year Award and the Explorers' Club 75th Anniversary Award "for achievements in furthering the spirit of exploration."

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# Sagan: It's a Mystery

Continued from Page 1

In an interview for the Cornell Chronicle, Sagan told science writer Roger Segelken of the mysterious satellite, Iapetus, of his continuing interest in exobiology and of his reasons for writing a novel:

**CHRONICLE:** What research are you involved in and what are other researchers doing that interests you?

**SAGAN:** We're in the throes of the excitement of the Voyager 1 and 2 encounters with the Jupiter and Saturn systems. We're inundated with data, a hundred thousand photos of Jupiter and Saturn and their rings and two dozen or more satellites, none of which had ever before been seen close-up by the human species. I'm working on an analysis of a moon of Saturn called Iapetus, which is astonishing: it's almost 10 times darker on its leading than on its trailing side. One of the hypotheses we're working on is that the dark side of Iapetus, a satellite that is fundamentally icy, has picked up a coating of organic matter from somewhere. It's a mystery. We're trying to understand how Iapetus came into being, why it is the way it is, and why it is different from other worlds.

We're also working on the atmosphere of Titan, which is a much larger moon of Saturn and is the only moon in the solar system to have an atmosphere. The atmosphere and the clouds are filled with organic molecules. Why are the clouds of Titan dark in the northern hemisphere and bright in the southern? What is the source of the reddish cloud color? What is the connection between the chemistry of the clouds and the chemistry of the atmospheric constituents? In our laboratory, Dr. Bishun Khare and I are mixing the main constituents of the atmosphere of Titan — primarily nitrogen and methane — and supplying an energy source in the form of an electrical discharge to see what we make. In addition to a variety of simple organic gas phase molecules, we make a reddish-brown, powdery material, which is a good candidate for the clouds of Titan. Our objective is to compare what we make in the laboratory with what we see on Titan. Here's a moon with an atmosphere denser than that of the Earth — the atmospheric pressure is 1.6 times more than on Earth — and yet the gravity is so low, you would figure the atmosphere would trickle away to space. It doesn't, in part because the temperatures are so low and in part because the atmosphere is very heavy. The temperature is so low at the surface — 92 degrees above absolute zero — that stuff that falls to the surface tends to be preserved. It doesn't fall to pieces in a short period of time as organic molecules do on Earth. Titan may be a kind of

repository of complex organic chemistry that has been going on for four and a half billion years of solar system history, and it may very well be that clues to the origins of life on Earth are sitting there on the surface of Titan.

**CHRONICLE:** Is the work with the simulated atmospheres of Titan considered part of the field of exobiology?

**SAGAN:** It's more the field of planetary organic chemistry, but they merge: life on Earth is made up of organic chemistry, it's a manifestation of what organic molecules do, so anything you can learn about the kinds of organic chemistry beyond the Earth is potentially relevant to the search for life elsewhere. It's even possible that there is life on some of these other objects, although at this point there is not a smidgen of evidence for it. Or for that matter, against it.

**CHRONICLE:** Are you still involved, actively, in the study of exobiology?

**SAGAN:** Our opportunities come only rarely. Viking is the first — and so far the only — direct attempt to look for life on another planet. We have looked photographically, but because the resolution is so poor (we can only see things substantially bigger than a kilometer) the manifestations of life on other worlds would have to be on a very impressive scale for us to detect them. The only case where we've landed on a planet which has any chance of having life was Viking on Mars, and there not a hint of any kind of life was found. There are fewer organic molecules in a gram of Martian soil than in a gram of lunar soil, and the reason for that is by no means well understood.

The other main approach, besides sending spacecraft to other planets, is to use radio telescopes to look for possible signals from civilizations on planets of other stars. I'm trying to convince the powers that be to organize a systematic and continuing search. There have been anecdotal searches — a little bit of time stolen from whatever the main project of the radio telescope is — and in other cases, an approved search program. But in all cases, only for a limited number of stars. What is clearly needed is a systematic search.

**CHRONICLE:** The spacecraft that are working now were sent up years ago. With the exception of the Space Shuttle, there isn't a whole lot in the works. Why is that?

**SAGAN:** The two are connected. There isn't a whole lot in the works precisely because the Space Shuttle has drained a huge amount of money away from space science. On the



Photo by Edwardo Castaneda

CARL SAGAN

other hand, it's a convenient vehicle for doing many things and now that it is more or less in working order, it provides the opportunity for significant space science — if only money is made available to use it for that purpose.

**CHRONICLE:** You're optimistic, then, that you and other space scientists can work alongside the military interests in the Space Shuttle?

**SAGAN:** There is no alternative. Despite the phrasing of the National Space Act of 1958, which specifies that NASA shall be the civilian space agency, the two have now become muddled with the same launch vehicle being used for both military and civilian payloads. But space science is being done on missions which, I assume, are purely scientific. In fact, the Air Force is constructing its own launch facility at Vandenberg Air Force Base for the Shuttle and presumably will launch its most sensitive missions from there. What I'm more concerned about is whether the government — and particularly this administration — will have the same

Continued on Page 3

## Morrison Give \$25,000

### Keeton Professorship is Recipient

A matching gift of \$25,000 has been donated in support of the William T. Keeton Professorship in Biological Sciences.

The gift was made by Robert S. Morison, professor emeritus and first director of the Division of Biological Sciences, and his wife, Beninga. The gift, to be given over

the next three years, must be matched by other gifts.

The professorship honors Keeton, the Liberty Hyde Bailey Professor of Biology, an internationally known authority on bird orientation and migration, and author of a widely used biology textbook.

Keeton, who died last summer at the age of 47, also taught the under-

graduate introductory course in biology for 20 years, and in 1966 was cited by students as Professor of Merit.

Trustees of the university established the endowment, which will be

awarded to a faculty member of the Division of Biological Sciences who displays the same combination of scholarship, research and teaching characteristics as Keeton.

Donations can be made to the

William T. Keeton Professorship in Biological Sciences through Glenn O. MacMillen, assistant to the dean, State College of Agriculture and Life Sciences, Roberts Hall, Cornell University, Ithaca, N.Y. 14853.

## Cornell Chronicle

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It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age or handicap. The university is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

## Jobs

The following job openings are new this week. For information on vacant positions listed in previous issues of the Chronicle, contact Personnel Staffing Services, 130 Day Hall. Cornell is an affirmative action employer.

**Administrative/Professional**  
Sr. Research Support Specialist, CP6 (Cntr. for Env. Res.)  
Stu. Dev. Spec. IV, CP5 (Admissions)  
Research Support Spec. III, CP5 (Cntr. for Env. Res.)  
Health Assoc. II, CP4 (Univ. Health Services)  
Assistant Dean CP4 (Arts & Sciences)  
Appl. Programmer, CP3 (Computer Services, Geneva)  
Res. Support Spec. CP3 (Animal Science)  
Res. Support Aide, CP2 (Entomology)  
Clerical  
Admin. Aide, GR23 (Vice Pres. Campus Affairs)  
Accounts Coordinator, GR22 (Ag. Economics)  
Admin. Aide, GR19 (College Public Affairs)  
Office Assistant, GR17 (Arts & Sciences Admissions)

Secretary, GR17 (Ag. Economics)  
Secretary, GR17 (Psychology)  
Library Aide, GR18 (University Library, Law)  
Secretary, GR18 (Neurobiology and Behavior)  
Secretary, GR16 (Animal Science)  
Administrative Aide, GR21 (University Counsel)  
Word Processing Operator, GR18 (B&PA) (3)  
Admin. Aide, GR24 (Dean's Office)  
Secretary, GR18 (B&PA)  
Secretary, GR18 (Veterinary Microbiology)  
Secretary, GR18 (Graduate School)

**Service/Maintenance**  
Relief Plant Operator, U207 (Utilities)  
Head Custodian, SO17 (Statler Inn)  
Material Handler, GR18 (Cornell Dining)  
Food Service Worker, SO17 (Cornell Dining)  
Custodian, SO16 (Residence Life)

**Part-time**  
Secretary, GR18 (Science, Tech. & Society)  
Res. Aide, GR23 (Rural Sociology)

**Temporary**  
Temp. Animal Tech. T-4 (Equine Drug Testing & Res. Prog.)  
Temp. Secretary, T-2 (Consumer Economics & Housing)

**Technical**  
Computer Production Controller, GR22 (Finance & Bus.)  
Tech., GR21 (Veterinary Microbiology)

**Academic**  
Radiologist (Clinical Sciences, College of Vet. Med.)  
Spanish Lecturer/Teaching Assoc. (M.L.&L. Arts & Sci.)  
Extension Assoc. II, CA4 (Ag. Economics)

The Job Opportunities list is mailed to all Cornell departments. In addition, it is posted in the following places: Day Hall Information Desk, second floor lobby; at the Circulation and Reference Desks of all university libraries; in the Map and Newspaper Section, Olin Library; all college and technical libraries; Roberts Hall Post Office substation and in the Upper Activities corridor, Willard Straight Hall.



# Paterson to Give Organ Recital

## Second Concert in Summer Series

Organ music of Buxtehude, Bach and their contemporaries will be performed in a solo recital by Donald R.M. Paterson at 8:15 p.m. Monday, July 13, in Anabel Taylor Hall. Tickets for the concert, the second in the university's current Summer Session series, will be on sale at the door.

Paterson will open his program with Passacaglia in D minor by the 17th century composer Dietrich Buxtehude, followed by the Chorale Partita "Freu' dich sehr, O meine Seele" by Johann Pachelbel, the Prelude and Fugue in C Major by Georg Bohm and Concerto del Sigr. Meck by Johann Walther. He will also play the Voluntary No. 1 in D Major by William Boyce, Erbarm dich mein, O Herre Gott by Johann Hanff and will end the program with the Prelude and Fugue in A minor, BWV 543 by J.S. Bach.

An associate professor in Cornell's Department of Music, Paterson is the official University Or-

ganist and Sage Chapel Choirmaster. Before coming to Ithaca in 1964, he taught at Stephens College and Culver Military Academy. He is a graduate of Williams College and holds an advanced degree from the University of Michigan. He has studied with Doris Voester, Robert Owens, Robert Barrow and Robert Noehren.

During several summers he studied harpsichord with Gustav Leonhardt and theory and organ under Mlle Nadia Boulanger at the American Conservatory in Fontainebleau, France.

In addition to the many recitals he has given in New England, the Midwest, the South and on the Ithaca campus, Paterson has played concerts for regional conventions of the American Guild of Organists and for national conventions of the Organ Historical Society. He is a former associate editor of the quarterly journal of the society and served as president of the organiza-

tion for several years and as a member of the national council.

While on leave during the past spring semester, Paterson toured in several European countries, giving recitals on noted historical organs in Denmark, Belgium and England. Following a recital in Svendborg, Denmark, a reviewer wrote: "Paterson's very convincing registration, his playing, his choice of tempo, yes, everything added up to the picture of an organist who understood how to perform in a very pure form without exaggerating his effects...the total absence of shallow virtuosity and the feeling of deliberation and security we had made the music very pleasant and lovely to listen to."

As the third event in the summer series, Howard Karp will play a solo piano recital in Alice Statler Auditorium at 8:15 p.m. Monday, July 20.



DONALD R.M. PATERSON

# Sagan: Untapped Enthusiasm For Space

Continued from Page 2

devotion to the exploration of the solar system that previous administrations have had. That's not at all clear.

**CHRONICLE:** How much value is there in manned exploration of space?

**SAGAN:** Per dollar, not much. But on the other hand, if we were sending men to the moon anyway as we were doing in the late 60s and early 70s, I'm all for them doing as much science as possible.

**CHRONICLE:** Do you think that having people involved, as opposed to sending a very smart machine up there, is important in keeping up the interest here on Earth?

**SAGAN:** There's no question that most people can identify more with a human being than with a robot. But imagine a smart roving vehicle on Mars that lands on a safe but dull place (which is what Viking necessarily had to do) and travels one or two or three kilometers every day to its own horizon. You look around and you see the most interesting object in your field of view and later that day you're at it. You're poking at it, turning it over, sniffing it, tasting it. And that information is all going back to Earth. Every day a new landscape, everyday the sense of another little line segment on a big map of Mars. I think such a mission could sustain enormous public interest for a very long period of time. It's a sense of exploration that we never had with Apollo and we're not likely to have, at least in the near future, with any conceivable manned mission. The reason is that concern for the safety of the astronauts takes priority, and that means

that by and large they can't do anything interesting. We're willing to take more risks with a smart robot. We can go to interesting places and do exciting kinds of exploration.

**CHRONICLE:** What are the alternatives to space exploration sponsored by governments?

**SAGAN:** Contemplating your navel. We're talking about missions that cost hundreds of millions of dollars. While it is true that amount is trivial compared to a single weapons system for the Department of Defense, it is much more than could be mustered by public subscription or by selling tickets to a movie made by the space vehicle or anything like that. One idea which would be very helpful is to have people check off on their income tax form a dollar or two for the exploration of the solar system, analogous to the box we check off for campaign contributions. I don't know if that's feasible and I worry that many organizations will argue that they also should have little boxes on the tax form. But that's the only way I can imagine it could be done without direct government support.

**CHRONICLE:** What is the role of organizations such as your Planetary Society?

**SAGAN:** When I and a lot of my colleagues talked to people in the government — people in the legislative or executive branches, very high up — we got this funny story. They'd say to us, "We understand why it's important to explore the planets. We understand that it pumps an important technology and that we learn about the Earth by comparing it with other planets. We recognize there is a kind of pride in our accomplishments. We understand its great historical significance, that a thousand years from now the exploration of the solar system will be remembered. Too bad that only you and I understand this, that other people don't share our interests. Too bad that it's unpopular to explore the universe." Well, my strong impression is that it is not politically unpopular at all, that people are enormously interested in this. You can see it from the popularity of science fiction movies, books, the spate of new science magazines, television programs (of which "Cosmos" is an example but not the only one), and in the proliferation, now, of space interest groups like the Planetary Society. We decided that if there were a non-profit tax-exempt, public membership organization devoted to these objectives — the exploration of the solar system and the search for extraterrestrial life — such an organization would be by itself a strong counter to the argument that nobody is interested. Right now we are, by far, the largest space interest group in the world. We've been soliciting members for less than a year and we have 70,000 members from every state and every continent. We've been told we're the fastest growing organization in the country over the last decade. This surely means there is a vast untapped enthusiasm for space exploration. "Cosmos" in a major way was involved with exploration of the solar system and the search for extraterrestrial life, and it turned out to be the most widely watched series in the history of American public television. Again, that means people are interested. We are hoping that the Planetary Society will, partly by its existence and partly by some of the programs that will be announced shortly, be able

to spur on some significant future exploratory programs.

**CHRONICLE:** You're a non-profit organization. Is there any possibility that the profit motive may someday bring other people or larger organizations into space for commercial development?

**SAGAN:** The freightage is very expensive. There conceivably could be profit motivations for activities in near-Earth orbit, but certainly in the next decade or two I don't see any prospect for even going as far as the moon much less Jupiter or Saturn in an activity that would pay for itself in any commercial sense. It's done for the science, for the spirit of adventure, the urge to explore, for historical significance, but there are also practical benefits. If you explore another world which has taken a different turn from the Earth, you begin to understand what else is possible. If you're concerned with climatic change, for example, or with the effects of pollution on the atmosphere, or if you're searching for minerals or predicting earthquakes or understanding the nature of volcanoes or even concerned with the origin of life, there is a huge amount to be learned on other planets. But these things aren't instantly converted to ready cash. The timescale for their practical significance is middle term, in decades. American industry is not likely — in my view, and I hope I'm wrong — to put significant amounts of money into exploring the planets. Since industry can't do it and since private subscription can't do it (with the exception of the check on the income tax), that means the government. And if the United States doesn't do it, other nations will — although perhaps not as well and perhaps not as soon. The Soviet Union has a vigorous program for exploration of the solar system. The European Space Agency is about to launch their first solar system missions. Japan has announced its longer term interest. The human species will clearly continue doing this sort of thing, provided we don't destroy ourselves, but I hope the United States will continue in this activity for which it has been the world leader since the first successful planetary mission, Mariner 2, in 1962.

**CHRONICLE:** How good a job are we doing in this country in teaching science, in conveying the excitement and adventure and importance of it all?

**SAGAN:** Not nearly good enough. The level of teaching of science in high school is vastly inferior to that in Japan or Germany or the Soviet Union, and likewise for mathematics. It's connected with the general decline in literacy, since science does involve thinking — being able to read and understand what you read and being able to think for yourself — and with the general decline in the ability to do mathematics. In part, I think scientists themselves are to blame because we're not doing as good a job teaching as we should. For example, in the U.S.S.R. the top scientists write the elementary and high school textbooks. Also, the media, in their pursuit of tiny profit increments over the competition, have not been willing to do anything of any difficulty for fear of losing one percent of the audience. One of our objectives in "Cosmos" has been to show that real science



Photo Courtesy of NASA  
IAPETUS

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## Brief Reports

### Renaissance Program Scheduled for Tuesday

Once again, the Summer Session Program is pleased to present drama, poetry and music from Shakespeare's England. This year's performances will be at 11 a.m. Tuesday, July 14, in Kaufmann Auditorium, Goldwin Smith Hall, and at 7:30 that evening in Donlon Adult Lounge, Donlon Hall. Both performances are free and open to the public.

Songs of Dowland, Gibbons and Ferrabosco will be on the program, along with poems by Donne and Shakespeare as well as Scenes from Richard II, Henry IV (i), and A Midsummer Night's Dream.

Fred Ahl, Joan Fefferi and David Keller will be readers. Music will be provided by Kathy Bishop (viola da gamba), Guy Wills (harpsichord) and Robert Farrell (baritone).

For further information, call Robert Farrell, 256-7434.

### Seed Growers Here For 'Field Day'

More than 100 seed growers, dealers, and distributors from throughout the New York and surrounding states will be on campus this month to catch up on the latest research developments resulting from the university's plant breeding programs.

The occasion is a day-long "Cornell Seed Growers' Field Day" scheduled for tomorrow. The outdoor event will feature discussions of new varieties of field crops, including wheat, oats, barley, alfalfa, red clover and birdsfoot trefoil.

Tours of the university's field crops research plots where these crops are being tested have been planned. Among alfalfa varieties to be shown are Cornell's newest alfalfa named "Oneida" which has high resistance to a debilitating fungal disease called "phytophthora."

Cornell's two new wheat varieties will be shown, also, along with several new strains being evaluated for possible commercial use. "Purcell" is the newest Cornell wheat, ready for distribution to seed growers this fall. "Houser," also from Cornell, went into large-scale production for the first time last year. Both are exceptionally high-yielding varieties.

Other attractions include a new oat variety called "Ogle" from Illinois which, specialists say, does

well under New York conditions. A new birdsfoot trefoil named "Norcen," a variety released jointly by Cornell and six other universities in the Midwest, will be discussed.

The field day is sponsored by the New York State College of Agriculture and Life Sciences and Cornell Cooperative Extension. William Pardee, professor and chairman of Cornell's department of plant breeding and biometry is the program chairman.

### Local Homes Sought For Japanese Visitors

Stays in local homes are being sought for 12 Japanese scholars who will be at Cornell for a six-week English language and cultural orientation between July 31 and Aug. 28.

Participants will stay in Cornell dormitories, but short-term homestays are also planned. The following periods are available: July 31-Aug. 1; Aug. 8-9; Aug. 14-15 and Aug. 21-28.

"We have had some people sign up already, but we are looking for more who can take a visitor for any portion of the stay here," said Eleanor Jorden, the Mary Donlon Alger Professor of Linguistics at Cornell.

For further details, contact Jorden either at 321 Morrill Hall or 256-6457.

The visitors, all specialists in various phases of American studies, will be here for this program, the first of its kind for a Japanese academic group. It is supported by the U.S.-Japan Friendship Commission.

The intensive workshop is in preparation for the scholars' stays as visiting researchers and professors during the 1981-82 year at Harvard, Yale, Princeton, Columbia, MIT, Pennsylvania and North Carolina.

### OPEN MEETINGS

Two open sessions are scheduled during meetings of Cornell's Board of Trustees Executive Committee on Tuesday, July 14, in New York City.

The Buildings and Properties Committee will meet in open session at 9 a.m. Tuesday, July 14, in

The Office of Sponsored Programs, 123 Day Hall, 6-5014, wishes to emphasize that the information in this column is intended for post-doctoral research unless otherwise indicated

#### NATIONAL ENDOWMENT FOR THE HUMANITIES

Special Project Grants\*

Deadline - July 15

The Office of Special Projects supports projects that do not fit into any of the Endowment's current programs, that fall between two divisions, or which are in new areas of humanistic activity.

For more information, contact (202) 724-0398.

#### NATIONAL ENDOWMENT FOR THE HUMANITIES

Program Development Grants\*

Deadline July 15

A limited number of grants is available to professional, civic service-oriented or job-related voluntary organizations to develop programs in the humanities which are of interest and concern to their adult members. Program Development Grants are also available to consortia of civic, educational and cultural institutions to examine humanistic issues of concern to citizens of a wider area, be it regional or metropolitan, and to groups which are evolving new ways of reaching audiences as yet unfamiliar with traditional humanities activities. July 15, 1981 is for projects beginning after December 15, 1981.

Contact: (202) 724-0398

#### NATIONAL SCIENCE FOUNDATION

Ethics and Values in Science and Technology\*

Deadline - August 3, 1981

Grants are available for projects which seek to explore, analyze and help resolve the conduct of science and technology. Contact: (202) 282-7770

#### HENRY A. MURRAY RESEARCH CENTER OF RADCLIFFE COLLEGE

Radcliffe Research Support Program

Deadline - September 15, 1981

Radcliffe College has announced a program of small grants to support postdoctoral research on women. Eligible projects must draw upon resources at the Arthur and Elizabeth Schlesinger Library on the History of

M-109 Vanderwerker Room, Memorial Sloan-Kettering Cancer Center, 1275 York Ave.

The Executive Committee of the Board of Trustees will meet in open session at 2 p.m. Tuesday, July 14, in Room A-126, William Hale Harkness Building, 1300 York Ave.

The State Education Department is currently processing requests for short-term training programs. Requests will be handled on an ongoing basis to the extent that funds remain available for each fiscal year.

For additional information on the Women in America and at the Henry A. Murray Research Center of Radcliffe College. Funded by a grant from the Andrew W. Mellon Foundation to Radcliffe College, this Research Support Program will make awards to cover such costs as travel to and lodging in Cambridge, copying and microfilming, computer time, and other expenses related to research on women. Additional deadlines are the 15th of December of 1981 and the 15th of February and April, 1982.

#### AMERICAN PHILOSOPHICAL SOCIETY

Postdoctoral Research Grants and Grants-in-Aid

Deadline - August 1, 1981

Grants averaging \$1,000 for basic research in all fields of knowledge to persons holding the doctorate or having equivalent scientific or scholarly experience.

Contact: (202) 627-0706.

\*These programs may be significantly cut.

#### SHORT-TERM TRAINING PROGRAMS/ECONOMIC DEVELOPMENT

The New York State Board of Regents are concerned with the difficult problems facing the State's economy.

To help achieve this goal, the State Educational Department has instituted a process to respond quickly to the manpower training needs of business and industry. Vocational Education Act (VEA) funds have been set aside for unanticipated and critical training needs which cannot be accommodated either with existing resources or through the regular VEA funding process. Each training program provided with these funds will be tailored to meet the individual needs of the company which requests the program. The Department will work with an educational agency to develop programs which will prevent time loss in a company's location decision, reduce startup time and initial cost to the company, and insure productivity. This approach will permit the State Education Department to remain flexible and responsive to the State's economic needs. Specifically, the State Education Department is looking for proposals which will address one of the following economic development goals:

—Skill-training programs for companies which want to locate in New York State.

—Skill-training programs for New York State companies which want to expand their current operations.

—Retraining and upgrading for companies and industries to keep pace with technological and other changes in the labor market.

The State Education Department is currently processing requests for short-term training programs. Requests will be handled on an ongoing basis to the extent that funds remain available for each fiscal year.

For additional information on the

### Theologian to Speak At Sage Chapel

Ingrid Olsen-Tjensvold, the newly-appointed assistant director of Cornell United Religious Work, will speak at the 11 a.m. Summer Session Sage Chapel Service on Sunday, July 12. Her topic will be "Blessed Are the Cheesemakers."

Olsen-Tjensvold graduated cum laude in social anthropology from Radcliffe College and received her Ph.D. in theology and culture from the Department of Religion at Syracuse University. Her primary theological interest is in religion and the environment.

Music will be provided by the Summer Sage Chapel Choir under the direction of Donald R.M. Paterson, university organist and Sage Chapel choirmaster. Organ accompanist is graduate student Stephen May. Olsen-Tjensvold is coordinator of the summer session services.

process and application procedures for these funds, please contact: Mr. David Gillette, Associate, New York State Education Department, Bureau of Occupational Education Program Development, 99 Washington Avenue, Albany, New York 12230; telephone: (518) 474-4802

#### COMMUNITY EDUCATION TRAINING

The Department of Education has announced a closing date of July 27th for applications under the Department's Community Education Program.

\$500,000 is available for grants to institutes of higher education to provide training to persons who are or will be engaged in community education programs.

Application forms may be obtained by writing to: Community Education Program, U.S. Department of Education, Room 5622, Regional Office Building 3, 400 Maryland Avenue, S.W., Washington, D.C. 20202.

#### NATIONAL INSTITUTE OF HANDICAPPED RESEARCH

The National Institute of Handicapped Research (NIHR) has announced a receipt date of August 10th for applications for new research projects in FY81.

The purpose of the awards is planning and conducting research, demonstration and related activities which bear directly on the development of methods, procedures and devices to assist in the provision of vocational and other rehabilitation services to handicapped individuals, especially those with the most severe handicaps.

Approximately \$750,000 is available for this proposal cycle.

Additional information on the specific program areas and how to obtain application forms may be obtained in the Office of Sponsored Programs.

## Sagan: No Way Back

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can be conveyed to a mass audience. I hope we will see this reflected in the commercial networks.

The proliferation of science magazines like Science 81, Discover, Omni, The New York Times Tuesday science section and the refurbished Science Digest is a sign that people who are interested in making money recognize that they can do so and at the same time communicate some science. There is a sign that things are turning around, but there is an awful lot of work to be done.

I don't think it is too dramatic to say that the future of our civilization depends on our ability to understand and to benignly apply science. There is no way out of our present difficulties without science and technology, even though I certainly grant that some of those difficulties have been brought on by the misapplication of science and technology. Still, you can't get away from the fact that agricultural technology provides the difference between eating and

starving for more than a billion people. If you say, "I don't want to go into high technology agriculture," you're condemning a billion people to starve. There is simply no way back.

We have to use and expand science and technology in the most humane, compassionate way. A society which is built on science and technology and which doesn't understand science and technology is clearly preparing for its own demise. I consider it very important to teach science and technology, not just to prepare the next generation of scientists and technologists, but also so that the average person can make intelligent decisions. This is a democracy. How can we decide what to do concerning science and technology if we don't understand these subjects?

CHRONICLE: You are writing a novel, called "Contact," that is to be made into a motion picture. Your respect for quality science fiction is well known and so is your esteem for knowledgeable science fiction writers. Yet, for someone

less secure in their scientific credentials than yourself, writing a novel about Earthlings' attempts to make contact with alien beings would be considered something of a risky departure. You're taking that risk. Why?

SAGAN: I consider it a brief foray into science fiction. It's simply another way to get across what science is about, that scientists are people and not ethical cripples locked away in ivory towers and dressed in long white lab coats. I'm concerned to make science something that people feel comfortable with and also something which is very exciting. Here's just another opportunity to do it.

Also, I hope that by showing what a real search for extraterrestrial intelligence would be like might make people interested enough to actually get the money together for such a search. Those are my two objectives. It's not that I always wanted to write a novel — in fact, I don't think I have — but here's a chance to accomplish some good, via that route.