NASA Bans Sex from Outer Space

Ithaca, New York. In an essay in *Lives of a Cell* Lewis Thomas addresses the question that has long intrigued science fiction writers and others, that of what should constitute our first message to an extraterrestrial civilization. Thomas argues that the best way of explaining what we are like to others in space is to send music: "I would vote for Bach, all of Bach, streamed out into space, over and over again. We would be bragging, of course, but . . . we can tell the harder truths later."

NASA's decision to include a message on the Voyager spacecraft being sent past the outer planets has required a real solution to the problem. Each craft carries a 12-inch phonograph record, made of copper for long life and carrying signals convertible not just to sound but also to pictures.

Thomas's counsel has been followed in part. The Voyager record carries 90 minutes of music, including a few snatches of Bach. But its message has been modulated by a factor Thomas didn't predict—the need to make the message acceptable to the intelligence of those sending it as well as of those receiving it.

The Voyagers, one dispatched last month, the other due for launch on 7 September, are expected to shoot out of the solar system and glide across the galaxy, unchanged and uneroded for a billion years. Their first chance of being intercepted will come in 40,000 years time, when one of the spacecraft passes within a light year of another star. NASA had accrued a lot of useful publicity from the simple plaque put aboard the Pioneer spacecraft sent past Jupiter in 1973 and 1974. Officials decided this January to put a message on the Voyagers as well. Radio astronomer Frank Drake of Cornell University in Ithaca, New York, was invited to decide what message the spacecraft should carry on their stellar odyssey.

It was Drake, together with Carl and Linda Sagan, who designed the Pioneer plaque. It portrays an unclothed man and woman standing beside a pulsar-based map of earth's position. The design evoked three types of public complaint, each entirely characterisitc: there were letters in the Los Angeles *Times* enquiring why taxpayers' money was being spent on sending smut to outer space; feminists objected that only the man's hand, not the woman's, was shown raised in greeting; and a number of people in England complained that the plaque had not been designed by a properly constituted international committee.

Drake decided that the Voyager message should carry more information than that aboard Pioneer, and chose to send a disc carrying pictures, sounds, and music. Amahl Shakhashiri, Valentin Boriakoff, and two others helped Drake choose the pictures. Other groups selected the music and sounds.

What do you tell an alien being when you have his attention? One piece of information Drake's group deemed would be useful was the fact that humans reproduce. They included a photograph of an unclothed man and woman and an anatomical diagram of the human genital system. Much thought was given to selecting the couple. Should they be just average, dumpy human beings? "If you are really trying to tell them what we are like, you don't send Raquel Welch and Robert Redford," Drake observes. Perhaps it should be Jimmy and Rosalyn, someone had suggested. To appease the Mrs. Grundy's, the group decided that the picture should be as unerotic as possible. Drake thought he had the solution: show a man with a woman who was slightly pregnant, with a diagram indicating the position of the fetus.

It didn't work. Mrs. Grundy is alive and well and lives in NASA's headquarters in Washington, D.C. "NASA pulled the nude picture. As for the drawing of the human sex organs, that too was axed," says Drake with a wince at the memory.

(A later call to NASA elicited that the picture selection had been "approved" by Herbert Rowe, NASA's associate administrator for external affairs, and Gerald J. Mossinghoff, deputy general counsel. Asked what there was in the censored pictures that seemed likely to offend alien sensibilities, Rowe replied, "There was one picture which we felt was not appropriate for inclusion. We felt that some people might get the wrong idea from the picture." Did he mean the aliens or people on earth? "We didn't think that as far as the aliens were concerned the picture was needed to tell the story," Rowe said. But a picture of naked humans would surely have helped, and the photograph was not erotic. "There are some who don't agree with that, and it's that which makes the ball game. There are some who believe that naked pregnant women are extremely erotic." But isn't the message intended for the aliens who may intercept it, not for terrestrial public opinion? "These are NASA spacecraft. This artifact [the message] was going to become the property of NASA and would be reflecting on NASA and the federal government. As senior executives of NASA we used our best judgment and we felt our judgment was proper," the NASA official explained.)

Back at Ithaca, Drake showed the remaining pictures just as they will appear to an alien who finds and plays the Voyager disc. The pictures show the natural environment of earth, and how man uses it. The theme is the diversity of life and of human society. The people portrayed in the photographs come from all races and civilizations. There are no politicians, generals, or captains of industry; the handful of people presented as individuals include the gymnast Cathy Rigby, and four musicians, the Quartetto Italiano.

The first of the 115 photographs take the viewer through the solar system, coming to focus on earth. Then follow anatomical drawings of its principal species and pictures of human families. Next, the alien viewer is shown the natural environment of earth: he sees islands and seashores, deserts and valleys, the Snake River and the Grand Tetons. There is a stand of trees shrouded in hoarfrost, with an inset diagram of a water crystal to help the alien interpret the picture.

The Voyager record turns to wild animals, then shows a man on horseback. Drake worries the aliens will think it is a centaur. There is a picture of a group of chimpanzees being observed by Jane Goodall and others, each species doing its own thing. A beautiful multiexposure of Cathy Rigby somersaulting on a bar shows the elegance and coordination of the human frame. Then comes a mountaineer on a tall needle of rock so small at the top that he is standing on one foot, peering across the chasm beneath. "That shows how brave we are," says Drake. "No," says Shakhashiri. "It shows we are crazy."

The alien will learn that we pick

grapes, harvest cotton, and go to sea in fishing boats. Pictures of a supermarket and superhighway were shot locally (which has raised fears that the aliens, when they visit earth, will arrive at Ithaca). There are pictures of traffic jams, and a tracked vehicle stuck in an ice crevasse and its crew scratching their heads in dismay. The show ends with a spaceshot, a flight of geese across a clouded sunset, and lastly a violin, which heralds the second section on the message disc, the music section.

The group had been prepared to show evidence of the unhappier facts of human existence, such as war, crime, and suffering. "But everyone acted like a typical human family and wanted to put the best foot forward," says Drake. A beautiful picture of a nuclear explosion was "instinctively rejected." The only hint of war in the show is a picture of the Great Wall of China. The fact of death is indicated by a family picture designating the age of the individuals, from which the aliens are to infer that there is a limit placed upon the human life-span. To avoid any hint of favoritism, nothing is shown of man's religions. Nor is science illustrated, because aliens able to intercept the craft in space will presumably know it all already.

Following the 115 pictures are a set of greetings spoken in 55 different languages, and a message from U.N. Secretary General Kurt Waldheim. According to Drake, "NASA got worried because we had no American politicians, so at the last minute we put in a speech by Carter."

Briefing

A Tale of Two Cities

A year has passed since the Navy's basic oceanography research office, known as Code 480, moved from Washington, D.C., to Bay Saint Louis, a rural Mississippi town an hour north of New Orleans. The research group was one of several Navy offices related to oceanography which were being consolidated at Bay Saint Louis by the Navy's Oceanographer, Rear Admiral J. Edward Snyder, Jr., who wanted to build "the greatest ocean science center in the world" (*Science*, 20 June 1975). In short, the Navy told the research group, which was reluctant about the move, that they were going to a far, far better thing.

How has it worked out? Things haven't been easy.

Only three of the 13 professional staff members in the office chose to move to Bay Saint Louis. Recruiting to fill the vacancies has been difficult and slow.

Now up to nine, the current Code 480 staff was recently described by a friendly outsider as tired, losing money, and traveling so much that their work has slipped and that they are rarely long enough in scenic Bay Saint Louis to enjoy its attractions. Instead, the staffers fly to Washington as often as once a week. Their job, in addition to administering $25 million in research grants to major ocean science centers around the country, is to coordinate the Navy's interests with those of the other federal supporters of these centers—the National Science Foundation (NSF) and the National Oceanic and Atmospheric Administration (NOAA).

"Before, if NSF called and said let's have a meeting on this at 9 o'clock tomorrow morning I'd just hop a cab downtown," says one Bay Saint Louisan. "Now, it's a day-and-a-half-proposition. But I can cut it down by taking a plane from New Orleans that leaves at 3 [o'clock] in the morning." In addition, staffers visit the oceanography centers, located from Hawaii to Cape Cod. Although they estimate that they are on the road 60 to 80 percent of the time, they nonetheless seem cheerful about it. Says one, "I was in Point Barrow, Alaska, last month, fogged in for 10 days. And so I said to myself, 'you might as well call this home, since it's the longest you've been anywhere in a year.' "

Meanwhile, in Washington, most of the 10 deserters from the Code 480 ship have found other jobs, many of them at higher pay and higher civil service grades. The three of them who went to NSF and the two who went to NOAA have the satisfaction of continuing to do much the same work—namely to support and guide university oceanographic research—and they work for more influential agencies. NOAA and NSF together support 80 percent of the federal commitment to basic oceanography research; the Navy's share, which used to be much larger, has declined to about 20 percent.

Some of the dire predictions made by university deans, members of Congress, and by the Code 480 group themselves when the Navy first announced the Bay Saint Louis move seem to be coming true. With fewer people administering the money, most of them new to the staff, and everyone on the road all the time, something has to give. Less time is spent on site reviews and the Navy knows less and less about what NSF and NOAA are up to. "I'm deeply disturbed," says John Knauss, dean of oceanography at the University of Rhode Island. "I don't think the Navy's getting its money's worth with the new arrangement."

Walter Munk, of the Scripps Institution of Oceanography, says, "The Office of Naval Research [ONR, of which Code 480 was part before moving to Mississippi] used to be a very significant player in the oceanography program of the United States. The change in location has very much diminished ONR's role in planning for the national oceanography program."

In Bay Saint Louis, Munk says, Code 480 has had trouble attracting high quality staffers "not because Mississippi is far away but because anyone who is first-rate wants to be part of the national program."

How will the story end? Already, David Mann, the new assistant secretary of the Navy for research, engineering, and systems, has shown some awareness of the Code 480's problems by allowing the group, in July, to resume reporting directly to Admiral R. K. Geiger, the chief of naval research, the way it did in the old days, instead of reporting through the applied oceanography organization Snyder is building down in Mississippi. The change has fanned rumors that Code 480 will eventually move back to Washington because it would be a necessary first step if the Navy were to change its mind. But no one, in Bay Saint Louis or Washington, is commenting on whether this will happen.

Continuing Saga of the OTA

Ellis Mottur, science aide to Senator Edward M. Kennedy (D–Mass.) who is chairman of the board of directors of the Office of Technology Assessment (OTA), has withdrawn his name from consideration for the post of OTA director.

For years, Mottur has been at the focus of an on-again, off-again controversy

But NASA officials state that a word from Carter was planned from the beginning. In either case, the White House declined to have the President record his message, which is shown as the mute photograph of a printed text.

The spoken greetings are followed by a miscellany of terrestrial sounds, such as those made by whales, rain, mud pots, footsteps, heartbeats, blacksmiths, rockets, and pulsars. The music section of Voyager's record presents the aliens with a very varied concert. As in other sections, a real effort has been made to avoid emphasis on Western cultures at the expense of others. Only eight of the 27 musical items are Western classical music: they include selections from the second Brandenberg concerto, Bach's third partita for solo violin, an aria from *The Magic Flute,* and the first movement of Beethoven's 5th symphony. Other items are taken from Asian classical music, folk music, and the music of primitive peoples.

If the Voyager record is ever found by aliens, it will certainly intrigue them. For human viewers, the record is curiously moving; it compels the observer to look anew at many things taken for granted, and to see the richness of human societies and their natural surroundings.

Just at the last moment, a few hours before the Voyager record had to be engraved, NASA officials realized that the message being sent into the depths of time and space was incomplete. An urgent call went to Cornell: Add the names of all the congressmen on the House and Senate space science committees.—NICHOLAS WADE

Briefing

about whether Kennedy is using the 154-man, $8.3-million-dollar-a-year office for partisan political purposes. Kennedy helped establish the office, largely as a result of the activism of Mottur who shepherded the legislation through Congress by persuading reluctant, often nonscientifically oriented, congressmen that they needed a source of information on complex issues like the supersonic transport or the antiballistic missile.

But from the beginning, Mottur's activities have led to charges that Kennedy cared less about giving congressmen science advice than for building a "shadow cabinet" with which to spar with the then Republican White House.

The controversy flared up again in May, when the ranking Republican on the OTA board of directors, Representative Marjorie S. Holt (R–Md.) resigned, citing Kennedy's alleged partisanship as the reason.

And a week earlier, Emilio Q. Daddario, the office's first director who was partway through a 6-year term of office, suddenly resigned, amid rumors that Kennedy was unhappy with his administration of the OTA. So Mottur became a rumored as a logical candidate for the job.

While all of this has been going on, the amount of unfavorable publicity Kennedy has received has grown. So, in an open letter to his boss, Mottur has withdrawn, saying that his candidacy "would exacerbate the charges of partisanship."

Meanwhile, a goldfish bowl–style procedure—designed to dispel charges of cronyism—is under way to find a new director. Some 4000 organizations were asked to submit names, which has resulted in a list of 215 formal candidates. The list reads like a "who's who" of people active in science policy circles, such as Joseph Coates, an outspoken, imaginative OTA staffer, his wife, Vary Coates, who is with the George Washington University Program of Policy Studies in Science and Technology, and Harvey Brooks, one of the gray heads of government science advising. The OTA's advisory council will turn a shortened list of candidates over to Kennedy's board in September for a final selection.

The Tale of SRI's Golden Fleece

Senator William Proxmire's (D–Wis.) habit of handing out "golden fleece" awards for research reports with stupid sounding titles has angered a good many researchers, who counter that despite their obscure titles and subjects, the projects often deal with relevant, even important, problems.

But occasionally the sponsors of these infamous projects, instead of rushing to their defense, merely turn the other cheek. Such was the case when Proxmire recently gave a "golden fleece" award for a study by SRI International (formerly Stanford Research Institute) about how U.S. transportation networks would be affected with the onset of another "Ice Age." The study was sponsored to the tune of $225,000 by the Department of Transportation.

Besides the ice age or variable weather scenario (called, in the text, "Foul Weather Future"), the study considered how transportation would be affected if the country became a dictatorship (called "Disciplined Society Future") or if it became a hippie culture (called "Transformation Future"). But it seemed to Proxmire that a government that can barely decide transportation policy under current conditions hardly needed a study of such wild future possibilities. And, after Proxmire's blast, Transportation secretary Brock Adams, through a spokesman, agreed that the study seemed to him needless and that he could not imagine why his predecessor had commissioned such a thing.

But for the record, and for Senator Proxmire, it seems that the report did have a rational origin at least. Ever since the department was founded in the mid-1960's, successive secretaries of transportation have striven to produce a national policy that would confer order on the confused tangle of interstate truck, rail, and highway policies, and those governing commercial shipping. So did President Ford's transportation secretary, William T. Coleman, who personally took a hand in issuing a comprehensive report that discussed U.S. transportation needs through the year 2000. The SRI study was intended as a follow-up, to look out to the year 2025.

The SRI researchers argue that the scenarios for the extreme future are not meant to be predictions, but, rather, methods of examining near-term policies. For instance, they argue, they could find no future scenario in which the United States could afford to buy and build some of the high-technology, high-speed ground systems, such as magnetic levitation systems, which are now receiving federal research support. As for the "Foul Weather" scenario, they say that there is a chance the climate will get steadily colder, and that this should be borne in mind when the government considers major new systems in the Northeast. But however soothing such arguments may be to the ears of their fellow researchers, the SRI workers' cries of relevance will probably not be heard by Proxmire, whose busy staff has by now gone on to other things, and other fleecings.

—Deborah Shapley