

nization will be the answer for more if not all civilizations.

Michael Hart of Systems and Applied Sciences Corp., in Maryland defended the positive point of view by referring to the unwarranted assumption that extraterrestrials will not be interested in colonizing and exploring. "Why should the human race be an exception?" A comment from the audience pointed out that this "exceptional" human race went only to the moon. "People may wish the money had been spent on something else," says this interlocutor. "We have talked about a mission to Mars, but so far no clearance. People who are aggressive are also stingy."

These remarks set the tone for an extended discussion. Frank Drake of the National Astronomy and Ionosphere Center at Cornell University, one of the pioneers of SETI activities, remarked "We do not do everything that's possible. The moon landings were not cost effective. Colonies may not be cost effective. How do you create the best quality of life for individuals?"

Figuring the cost of a good life from the energy consumption per head of the United States in 1974 (because it was the highest in the world), Drake concluded that it would take a good life for a million people to send one person to a star (and it would take 1,500 years). "Biology and physics conspire to make colonization impossible."

Michael Papagiannis of Boston University gave a somewhat more optimistic view. "Life has a tendency to expand to fill available space like a gas. Man is now achieving conquest of alien environments by intellect: air, water, underwater, space." Papagiannis's thesis is that a colonizing civilization would not land on planets but would build artificial colonies using alien planets only for obtaining material resources.

As to the cost effectiveness arguments, which are based on population pressure, he says he thinks we would do it not only for *lebensraum* (living space), but for reasons of glory or curiosity. If there are such colonizing civilizations, they may even have colonized our solar system and be sitting behind a screen of rocks in the asteroid belt watching us, not yet decided what to do.

If Papagiannis's hypothetical nearby aliens are not communicating for whatever reasons of their own, the others may have good technological reasons. V. L. Troitsky of the Soviet Union points out that the technical requirements for such a telescope are formidable. He calculates that an antenna capable of broadcasting a beam signal to a distance of 10,000 light-years would have to be 15,000 kilometers in radius and need a power of 2×10^{18} watts. The size is based on the temperature of the antenna not exceeding 300°K so as to preserve the integrity of the interplanetary and interstellar medium. (This represents the farthest-out environmental impact statement yet.)

If we were to sit down and do such a thing, we would have to build it at the orbit of Pluto to satisfy the size, waste requirements imposed by heat and slopover of radio frequency energy (nearer the earth it might fry us). The project would be technically possible, but who would so extend themselves to contact a civilization that might even be hostile? "It is unlikely that any civilization would try any such construction. It's doomed to fail," Troitsky says.

To all of this Von Hoerner responds with a suggestion of his own regarding what he meant by intelligent life on earth. Pointing out what the world spends on the arms

race, he suggests that application of this money to space exploration and to improvements in the quality of technology, which the pessimists discount in advance, might make both communication and interstellar travel on our part possible. Provided we were willing to spend three generations on the trip, propulsion by nuclear fusion might make it.

And then we might discover we need not sophisticated radio searches but a loyal wookiee, two handsome young men and a beautiful princess with a sharp tongue, not to mention a certain android with a curious resemblance to an old-fashioned jukebox. □

A sniff a day keeps pregnancy away

At the recent international Miles symposium on protein hormones, Andrew V. Schally of the Veterans Administration in New Orleans pointed out that analogs of LRH (luteinizing hormone-releasing hormone) hold great potential as new forms of birth control. If anyone was in a position to make such a prediction, it was Schally. He received a Nobel prize in medicine in 1977 for purifying, characterizing and synthesizing LRH and for other pioneering research in hypothalamic hormones (SN: 7/17/71, p. 37; 10/22/77, p. 260).

Indeed, it looks as if Schally's forecast may be coming true, according to a report in the Aug. 4 LANCET by Christer Bergquist and co-workers at University Hospital in Uppsala, Sweden. Daily sniffs of a particular LRH analog (a chemical similar but not identical to LRH) is a highly effective form of birth control for women and it causes no serious side effects, at least on a short-term basis.

LRH acts via pituitary and steroid sex hormones to trigger ovulation in women. Although scientists developed LRH analogs with an eye to using them to correct female infertility, Schally and other researchers reported last year that these analogs, paradoxically, have just the opposite effect. They switch off fertility, that is, antagonize the actions of LRH in the pituitary gland. These analogs have also been found to exert pharmacological activity via some unexpected routes of administration — the nose, the vagina and even the rectum. So Bergquist and his colleagues set up an experiment to determine whether sniffs of one potent LRH analog might prove to be an effective female contraceptive.

Twenty-seven regularly menstruating women, ages 21 through 37 years, volunteered for the study. They took LRH daily by nasal spray for three to six months, for a total of 89 treatment months. Ovulation was inhibited in all but two of the 89 treatment months, and these two were due to initial technical problems with the nasal spray, not to LRH analog inefficacy. None of the subjects became pregnant or developed serious side effects while using the

spray. After they discontinued the spray, their ovulatory and menstrual cycles returned.

Still to be answered is whether long-term use of the analog is free from serious side effects. However, the Uppsala scientists foresee that it will present fewer problems than do steroid sex hormone-based oral contraceptives. "A lot of women who can't use the birth control pills for one reason or another will be able to use the spray instead," Bergquist anticipates. Meanwhile, women in the study have found LRH analog nasal spray a highly convenient means of contraception and would like to keep using it.

DSDP: Confusion in the ooze

Things are never as simple as they seem. No sooner had the scientists from Leg 66 of the Deep Sea Drilling Project (SN: 7/28/79, p. 71) toasted to their success on confirming a simple model of converging tectonic plates than the team from Leg 67 hauled on board evidence that makes things decidedly more complicated.

To recap: The "accretionary wedge model" says that when an oceanic plate, for example, slides beneath a continental plate, the sediments carried along on top of it are scraped off and plastered against the continental plate. Proof of the pudding for this model would be a reversed age sequence of sediments at the plate junction; the oldest sediments should be nearest the continent and the youngest, just having been scraped off, should be nearest the trench that forms at the junction. Leg 66 triumphantly pulled up the plum — a series of drill cores taken off the coast of Mexico near Acapulco — that appeared to show just that. Leg 67's results, however, seem to muddy the picture somewhat.

Like the previous leg, Leg 67 was exploring the junction where the oceanic Cocos Plate, which carries part of the crust of the Pacific Ocean, slides under the Caribbean Plate. According to co-chief scientist Ro-