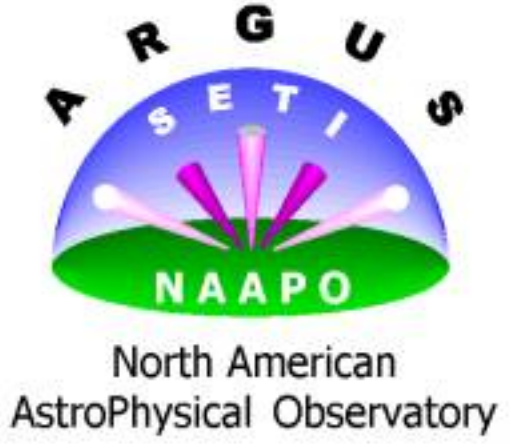

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The SEnTinel

By: Robert S. Dixon

Detecting Stellar Garbage Dumps

As our civilization continues to move into the "throwaway" era, the waste products of our technology become more and more troublesome. Chemicals and plastics are thrown away, only to crop up again elsewhere in some potentially dangerous form. We are running out of safe places to "throw" things.

The worst example of this problem is in dealing with atomic waste products. There are the materials left over from the operation of nuclear reactors. They are highly radioactive and last virtually forever. Currently, we store them in deep mines and at the bottom of the ocean, hoping perhaps that if we put them out of sight and forget about them they will just go away. But sooner or later they will return to haunt us in some unforeseen way. Even if they don't, our spiraling use of nuclear reactors will eventually produce so much waste that even hiding it may not help.

Dumping radioactive wastes into the sun could signal our presence throughout the galaxy.

It has been suggested that we throw these nuclear wastes into space somewhere. There are lots of places in the solar system where these wastes could be placed into stable orbits around the sun or planets. NASA did a study of this possibility in 1978 and found it to be feasible. Of course, this is just a more advanced form of hiding it where it can't be seen. As our journeys througout the solar system become more frequent, it would become increasingly bothersome to avoid certain "contaminated" zones where radioactive wastes were silently orbiting. And as long as they existed, they would be available for misuse by terrorists and other nefarious groups.

The best solution seems to be to throw them into the Sun. Then there is no question about their ever coming out again, and the Sun is so huge and hot that everything would be diluted and disintegrated to the point that we could forget about it forever. The energy required to send significant amounts of material to the Sun is

large, since you essentially have to accelarate backward, along the Earth's orbit, to nullify the Earth's velocity, before you can actually "fall" into the Sun. Nevertheless, it is possible and might eventually become mandatory. Perhaps the residual radiactivity in the waste material could even be harnessed to provide the energy needed to do the job. That would be particularly appealing — letting the garbage carry itself to the dump. Such a crude one-way rocket need not carry any shielding or be concered about fuel efficiency, and its navigational system only needs to be good enough to hit the Sun (and avoid Venus and Mercury on the way in!)

Now an interesting question arises. Suppose a civilization did dump its radioactive wastes into its star for a long time. Would this have any effect on the star that might be observable from a great distance? In other words, could we detect a civilization by finding its garbage dump. Intriguingly, the answer is yes.

Daniel Whitmire and David Wright of the University of Southwestern Louisiana have investigated this exact question and described their results in the April, 1980, issue of the journal Icarus. They find that if between one and ten percent of the Earth's supply of uranium were converted into waste products and thrown into a suitable star, it would produce clearly observable anomalies in the optical spectrum of that star. Specifically the emission lines of the rare element Praseodymium would become significantly stronger than normal. This effect would be detectable by optical telescopes from as far away as the star could be seen. Furthermore, the effect would last for a billion years after the dumping stopped, so it might be observed long after the civilization itself had perished. In that regard, this is the cheapest method yet devised for letting other civilizations know they are there, since the star does most of the work in sending out the message.

There are a few complications in choosing a suitable star, however. The star must be of a type that does not have a strong internal mixing action. It is critical that the atomic wastes thrown into the star remain near the surface, and not get diluted throughout the interior of the star. This restricts the choice of stars and rules out the Sun as a candidate. Nevertheless, stars of this type are very numerous, and are among those considered most likely to harbor life. Furthermore, a civilization could choose to throw its wastes into some suitable neighboring star, rather than into its own, to take advantage of this "free message" capability. The energy required to send wastes to nearby stars is, amazingly enough, less than that required to send

them to the Sun, but the time and navigational requirements are much greater.

Whitmire and Wright suggest that we should begin a search for these kinds of anomalies in all the suitable stars we know of. If any are found, then those stars should be subjected to intensive study at all wavelengths, particularly those commonly suggested for radio communications with other civilizations.

Private Space Probe

A newly formed non-profit organization is taking reservations for private messages to be sent into deep space sometime in 1982. The organization named EARTH/ SPACE INNOVATIONS will place the messages in a privately-financed spacecraft dubbed PROBE ONE. The idea is to send messages which might eventually be intercepted by life elsewhere and inform it about us.

Messages with photographs, or drawings, will be accepted on a first come first served basis over the next year. The information will be microfilmed and loaded aboard the spacecraft along with special microfilm reading equipment and translation materials.

What kind of messages will be sent? It is hoped that much of the material will be the result of classroom projects from schools, scouts, clubs and space buffs. Plans call for a spacecraft launch sometime in 1982 although the exact date and location have not been set. To send a message, or obtain additional information write: Earth/ Space Innovations, Van Etten, NY 14889.

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