

the earth's resources. To do this we need to measure their totals, and the depletion and the contamination that man's activities produce.

"A satellite is at a vantage point at which comprehensive mapping and accurate measurements over really broad areas are possible for the first time.

"The earth's resources are in the four states of land, sea, the atmosphere and the magnetosphere.

"On the land, we can inquire into how effectively observations from space can help us find ores, fuels, and mineral deposits.

"I have here a picture taken from the Gemini of Central Australia, which was an important aid in finding an oil deposit (figure 1).

"We can pursue the possibility of aiding agriculture and forestry with repeated measurements of changes in the states of forests, of range land, and cultivated areas. Agricultural specialists have found that the infrared camera is an excellent analytical tool for determining the plant and the soil temperatures and assessing the energy budget of the earth surface.

"We can determine how well observations from space can provide useful information about such things as land uses in human populations. I have here perhaps one of the most densely populated areas of the earth, the Nile Delta, Figure 2 which goes back to man's earliest history, in which one can study in detail the concentrations of these populations as taken from the Gemini.

"With respect to the earth's water, much information of value related to hydrology can be obtained. The fresh water supply and the extent of pollution. We use this photograph on the cover of our annual report for the Southwest Center for Advanced Study (figure 3).

"It was taken in infrared and it shows the waters of the Cascade range very clearly; as you can see here, the peaks, which are clearly outlined, the faults and the structure which would aid in hydrological study.

"In particular, about 5/6 of our planet surface is covered by the sea. Complete coverage of the oceans from its surface, of course, is very difficult. The ocean-



FIGURE 1