

THE OCEANS, AN OVERVIEW REGARDING THE  
COMMERCIAL UTILIZATION OF SPACE

Robert E. Stevenson

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# MAPPING OF THE LAND FROM SPACE \*

Frederick J. Doyle +

In spite of 50 years of aerial photographic mapping, the job of mapping the world is far from complete, and the rate of obsolescence of existing maps nearly equals the production of new maps. The development of space-borne camera systems provides the best hope of accomplishing the world's mapping requirements expeditiously and economically.

A 12-inch focal length, 9 x 14½ inch format, vertical camera, supported by 24 inch focal length high resolution cameras would permit accomplishments of the following map needs:

- (1) Complete topographic mapping at all small and medium scales up to 1:250,000 for any area in the world.
- (2) Establishment of photogrammetric control adequate for map compilation at scales as large as 1:50,000 to 1:25,000.
- (3) Rapid mosaics and planimetric map revision at scales up to 1:25,000.

Spacecraft lifetimes adequate to give four looks at all areas will provide nearly complete coverage despite cloud cover.

On a cost per square mile basis, space photography is more economic than airplane photography, but this economy is attainable only when very large areas are photographed.

For complete paper, see microfiche AAS 67-106.

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\* Based on Preprint AAS 67-106

+ Chief Scientist, Raytheon Company, Autometric Operation

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The advent of orbiting space flights has given oceanographers the opportunity of making a breakthrough in the problem of "food from the sea". The over-view now possible of the vast ocean areas of the world allows the examination of waters heretofore unexplored and the evaluation of dynamic ocean features on a "real time" basis.

Of the photographs taken by Gemini astronauts, 658 show earth features which are of significance to the problems of ocean-atmosphere-land relationships. The photographs were taken with a Hasselblad 70 mm. camera, modified by NASA for use in the cramped quarters of the spacecraft. Both 38 mm. and 80 mm. focal length lens cones were used and the film was aerial Ektachrome. The amazing number of useful photographs taken with the rather simple equipment is a great tribute to the ingenuity of all of the astronauts, and is a clear harbinger of the data to come from more sophisticated systems.

Analyses of the 70 mm. photography of the oceanic and coastal areas make clear four conclusions:

1. There is a lot of unfamiliar geography between  $30^{\circ}\text{N.}$  and  $30^{\circ}\text{S.}$
2. Many ocean features can be seen which had been heretofore known only from

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\* Based on Preprint AAS 67-107

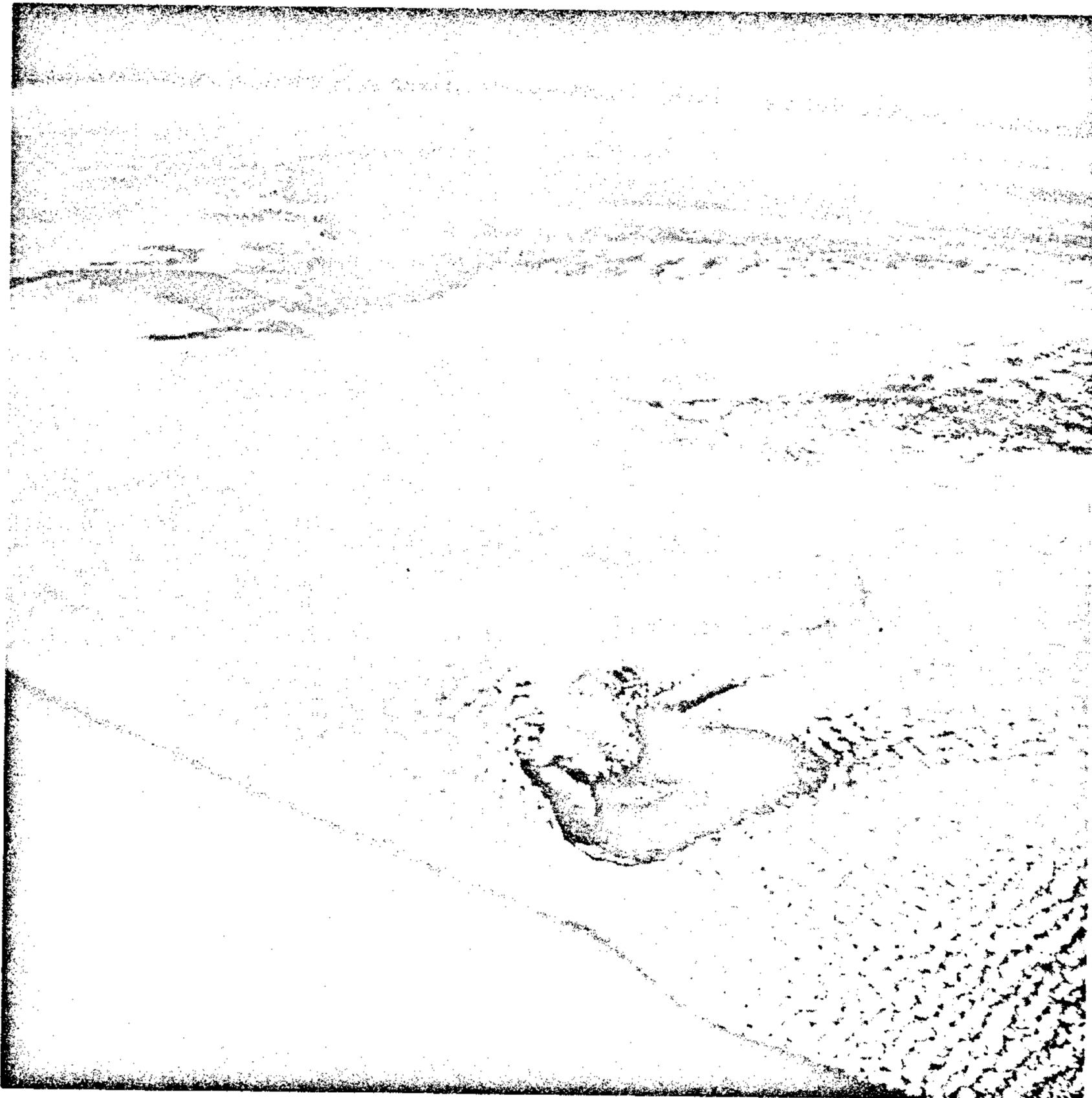
+ Research Oceanographer, Bureau of Commercial Fisheries, Galveston, Texas

theory and a few scattered data.

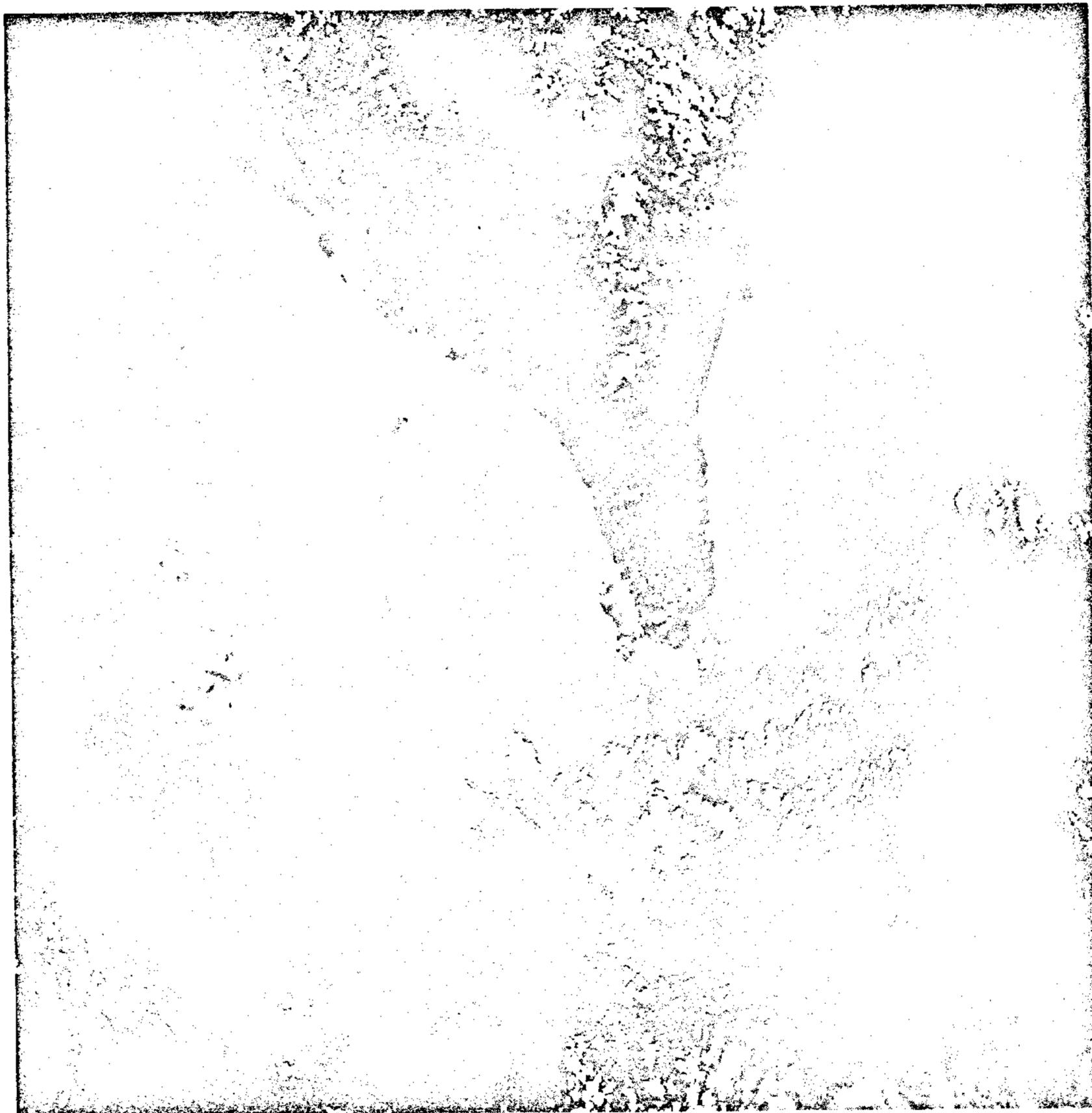
3. There are many structures in the surface layers of the sea which had not been known to exist that now can be seen from the vantage point of space.
4. We have much to learn about the oceans and seas of the world.

Four photographs are presented here. For the complete paper, see microfiche AAS 67-107.

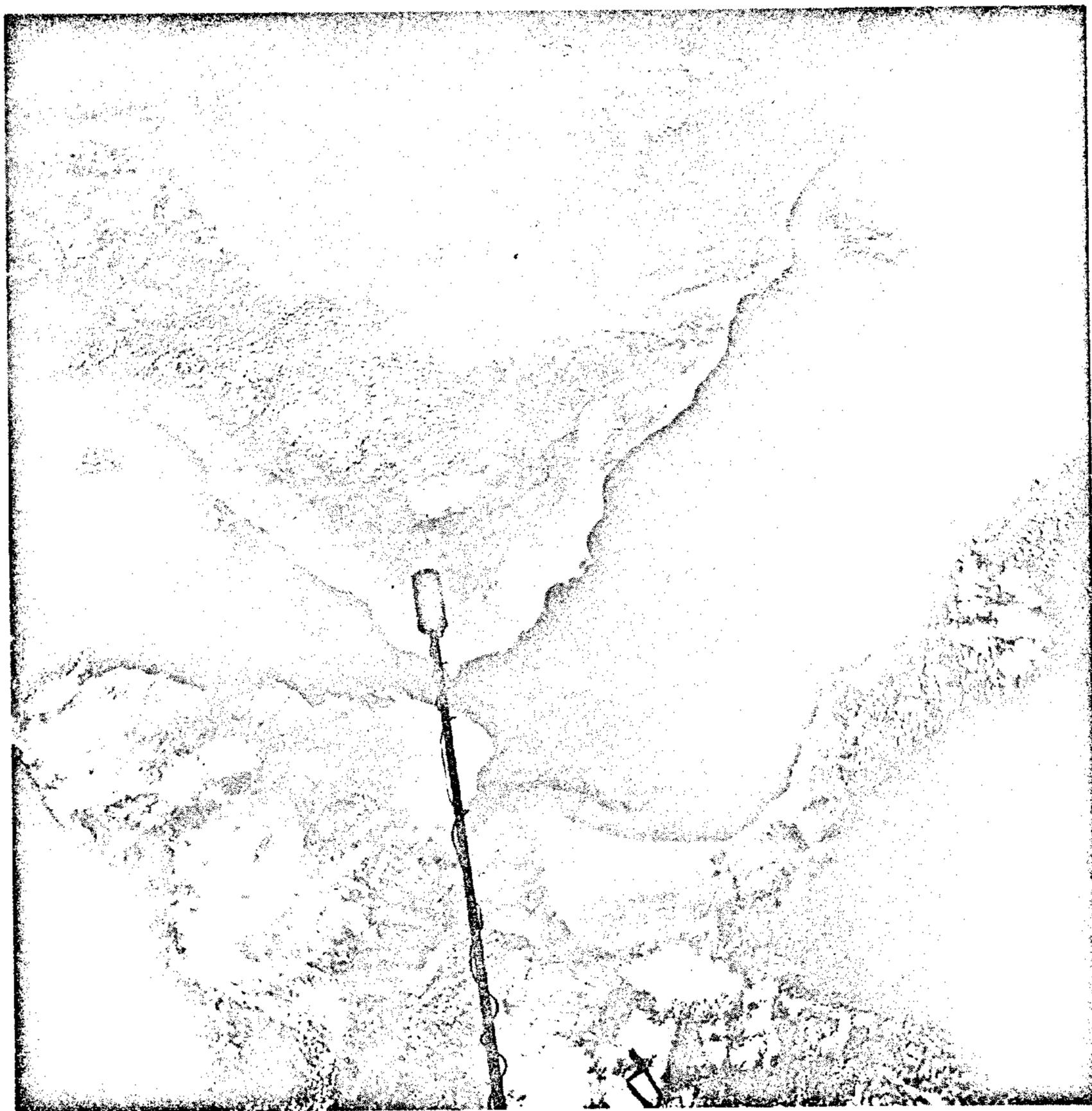
All Figures Scanned  
From Faded Xeroxes



Photograph of Guadalupe Island, Baja, California, Mexico,  
and Vizcaino Bay taken August 21, 1965 from Gemini V.



Photograph of Southern Taiwan taken July 20, 1967  
from Gemini X.



Photograph of Ethiopia, Somali, French Somaliland, Saudi Arabia, Yemen, South Arabia, the Red Sea, and the Gulf of Aden, taken September 14, 1966 from Gemini XI.



Photograph of India, Ceylon, Laccadive Islands, and the Bay of Bengal taken September 14, 1966 from Gemini XI.