

Recommendations of R/V Alpha Helix Advisory Committee  
April 1975

The Alpha Helix Advisory Committee of UNOLS, during its meeting of April 18-19, 1975 considered, among other items, the special role of National Facilities within the framework of UNOLS. Three such National Facilities exist: Alvin, Eastward, and Alpha Helix. Alvin and Alpha Helix are operated by large-fleet institutions, WHOI and SIO. Eastward is essentially a one-ship operation of Duke University. All three institutions have special problems relating to the operation of a National Facility in that the major part of the ship time is preempted by research programs originating outside the host institution. The National Science Foundation has been given the responsibility of financing the operation of the National Facilities through the administering institutions.

It is recognized that all ships in the UNOLS fleet are programmed on a competitive basis for the benefit of the national effort. However, by virtue of concentration of scientific and technical skills, the programs of the large fleet operators do contain major efforts originating within the host institution. By contrast, with respect to Alpha Helix, programs are put together with relatively dispersed efforts, originating in inland institutions, that are not keyed to in-house ocean-going projects and which tend to be funded from sources that rarely realize the extent of the full costs necessary to keep the total operation going. The Alpha Helix Advisory Committee is particularly sensitive to the quality of biomedical research conducted on this ship irrespective of institutional origin. Some of the investigators receive their major scientific support from state universities and from agencies such as NIH.

Special problems arise in three areas: ship operation, program administration and ship's technicians support. NSF, with UNOLS coordination, provides funds for these purposes but in times of fiscal crunch these funds must necessarily be limited in order to keep the units of the total fleet in functional condition. With respect to total fleet operations, the host institutions do a fine job in keeping program administration centralized and in maintaining a pool of ship-board technicians well trained in maintaining equipment and in performing the specialized operations at sea. Funding can be built (admittedly with difficulty) into the larger grants associated with what we can call "straight oceanography". Alpha Helix programs, however, relate primarily to marine biological and medical research. Most such projects are funded in such a fashion that, while technicians may be provided by the granting agency for laboratory work, no reserve of support is available from these sources for operating costs, programming and ship technicians.

The Alpha Helix Committee recognizes that the problems noted above are part of the effort of UNOLS to provide basic support for the total oceanographic fleet operations. The Committee does, however, wish to emphasize that there is a notable quantitative difference between a National Facility operated by a fleet-operating host institution and vessels oriented toward projects of the host institution. In a one-ship operation (the Eastward) the problems of administration and technical service are highly visible; in the case of the

Alpha Helix, part of a fleet operation, the problems are less visible, but become the concern of the ship operation administration at SIO. Certainly support for program administration and ships technicians costs is harder to find in the local general research support pool.

The Alpha Helix Committee recommends four items for special attention:

1. That host institution, specifically SIO, continue to recognize the quantitative differences between "National Facility" and other ships and endeavor to continue to assure proper support of the National Facility, program operation and ship technicians.

2. That funding agencies for Alpha Helix research (NSF Division of Biological and Medical Research, NIH, etc.) be encouraged to recognize that funding of research projects should recognize in their budgets the absolute need to incorporate items relating to program administration, technical support and, in some instances, ship operation.

3. That the offices entrusted primarily with ship operations (Marine Facilities in NSF acting through UNOLS) recognize that some science very appropriate for Alpha Helix could well be supported scientifically by agencies other than NSF.

4. That officials of NSF, in budget preparation, recognize the unique problems involved in operating a biomedical research vessel which has been designated as a National Facility.

The Alpha Helix Committee as a unit and through individual contacts as deemed desirable will do all in its powers to achieve the objectives of the UNOLS operations and the proper role of the National Facilities within the system.

## Summary report for UNOLS of Alpha Helix cruises in 1974

Details of research programs conducted on R/V Alpha Helix are found in the Alpha Helix Research Program 1972-1974, edited by Walter Garey, Program Manager. The following is a brief summary of the research programs. The year 1974 was designated as one in which the Alpha Helix would be used in the eastern Pacific and would make one cruise to the Bering Sea.

During the period February 11 to April 8, a research team worked in Baja, California under the direction of Lowell P. Hager, University of Illinois. Collections were made of more than 1000 species of marine animals and algae; these were analyzed for organic halogen compounds. In the lipids of some 275 species significant amounts of organic halogens were found. Many (160) of the species containing organic halogens showed high antimicrobial activity. Many (at least 100) new compounds were identified. Species with organic halogens were found in most phyla, especially high amounts in sponges, entoprocts and red algae. This program opens a new area of marine biology and chemistry.

From April 28 to May 20, a cruise under the direction of M. W. Mullin of SIO continued investigations of the structure and dynamics of plankton in the subtropical central gyre of the North Pacific Ocean. Sampling was at a depth of 20 m between San Diego and Honolulu. Standing crops of phyto- and micro-zooplankton were obtained. On June 2-3, bacterial sampling was made by a deep sea sampler in the Aleutian trench.

During the period June 21 to July 20, a program on primary productivity and organic matter transfer was conducted in the Bering Sea under the direction of V. Alexander, University of Alaska. Studies of productivity and transfer to pelagic grazers were made in the near-ice zone. Unfortunately this cruise occurred later than the maximum phytoplankton bloom but extensive sampling was conducted. Analyses are still in progress. In addition, tagging of walrus and collection of two harbor seals for physiological studies were made near St. Lawrence Island.

From August 13 to September 19, a research program was directed by A. A. Benson of SIO. This involved 23 biologists and work was conducted in British Columbia. Emphasis was on the biology of Pacific salmon. Red blood cell membranes were studied, especially for control of unsaturated fatty acids and changes in gills during spawning were observed. Lipids are concentrated in red muscles during migration and blood lipids become reduced during this period. It was found that calcitonin increases efflux of  $Ca^{++}$  and  $PO_4^{=}$  through the gills. Lipid and enzyme alterations occur in heart muscle during migration and a new lipid was identified. Activity of brain ATPase was lower in migrating than in oceanic salmon. The general conclusion can be made that the changes during spawning migration are those of aging and study of the biochemistry give clues to mechanisms of aging.

During the return from Seattle to San Diego a research party directed by R. A. Rasmusson of Washington State University made continuous measurements of dissolved gases, particularly ozone and freon-11 as sea water contaminants. In addition, olfactory behavior of some marine birds was examined.

From October 28 to November 29, the *AlI* was in the Gulf of California for studies on phytoplankton photosynthesis, photorespiration and assimilation of organic solutes.

During November 30 to December 18, a cruise to the Clarion island, a little studied coral island, was directed by Dr. Benson. The objective was to study the role of wax-containing coral mucus in the food chain of a coral reef. Instead of mucus serving as a medium for energy transfer to small fishes, the reefs of Clarion attract only large fishes which can eat coral tissue directly. Methods were developed for separating zooxanthellae from the animal cells of the coral and it was shown that the plant cells incorporate more acetate, form low amounts of waxes and virtually no cholesterol, whereas the coral produces much wax ester and cholesterol! A number of interesting biochemical and biological conclusions resulted from the study of this remarkable reef.

In general, the year was a profitable one. Despite the fact that more cruises were directed by staff members from Scripps than in some former years, many universities were represented in the scientific parties.

During the calendar year 1974 some 19 scientific papers appeared, which were the result of research done previously on the *Alpha Helix*.