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ABSTRACT

This booklet summarizes the principal conclusions of a four day conference held by the University of Hawaii's Curriculum Research and Development Group and Department of Curriculum and Instruction in order to examine the development of a marine curriculum for Hawaiian schools from kindergarten to 12th grade. A major conclusion of the conference was that new marine education opportunities would have to be developed as existing activities are insufficient in scope to serve the whole state nor can they be expanded to serve the entire state. The report includes sections on a rationale for a curriculum, basic considerations in curriculum design, social sciences in marine affairs, the humanities and marine affairs, the teacher and marine affairs, constraints and problems, and a check list for possible action. (SL)

MARINE AFFAIRS EDUCATION IN HAWAII'S FUTURE

Report of the Chairman, Harold L. Goodwin
Hawaii Marine Education Conference
University of Hawaii
February, 1975

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University of Hawaii
February 4-7, 1975

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INTRODUCTION

On February 4, 1975, a four-day Marine Education Conference was convened by the University of Hawaii's Curriculum Research and Development Group and the Department of Curriculum and Instruction of the College of Education. The conference purposes were to examine the many considerations in development of a marine curriculum for Hawaii schools from kindergarten to 12th grade (K-12) and to review critically the considerable preparatory work of the Curriculum Research and Development Group and its advisory body, the Hawaii Marine Education Council.

Eleven marine education and curriculum specialists from the mainland and elsewhere participated both as critical reviewers and as resource persons. Hawaii participants included university specialists and administrators, representatives of the Hawaii State Department of Education, local teachers, representatives of state agencies and departments, and private schools. A list of participants is appended.

This report distills and summarizes the principal conclusions of the conference, with particular emphasis on the reactions and conclusions of the mainland review group, as recorded by the chairman.

One major conclusion of the review group is important to the tone and specific comments in this report: it is quite clear that Hawaii has progressed far beyond most of the United States educational systems in its concepts of environmental and marine education, and to a limited extent, in the implementation of those concepts.

Specifically, activities already underway, althouth admittedly inadequate in size and scope, provide some excellently conceived, tested programs to serve students from elementary grades to the graduate level. The FAST, program[1] is outstanding. It provides a sound base on which to build, and many FAST elements are directly transferable to a marine affairs program. The Makahiki Kai,[2] Blue-Water Marine Laboratory,[3] and Marine Option[4] programs can be criticized principally because they cannot serve enough students. The Makahiki Kai program also may be somewhat over-structured in that not enough time or freedom is allowed for students to absorb or enjoy fully what they see.

The work of the Hawaii Marine Education Council has been excellent. The review team considered, in particular, the report, "Marine Education for Hawaii--A Prospectus" and endorsed both the concept and rationale.

In summary, Hawaii's existing marine education operational activities have been imaginative and productive, but insufficient in scope to serve the state's whole student population.[5] Nor can the existing programs, except for FAST, be expanded to serve the entire state; they are necessarily limited by pure logistics. What remains is to develop additional marine education opportunities, as proposed to the conference, so designed that marine affairs will be an integral part of environmental education--but, even more important, so that marine affairs will be brought to the proper level as an essential part of the total education of the student.

It should be made clear at the outset that the review group considered <u>marine affairs education</u> to be the proper framework for discussion.

"Marine education" too often is equated solely with "marine science." Marine affairs refers not only to marine biology, environmental concerns, or other natural sciences; it refers equally to social and economic relationships, legal and institutional interactions, influence on art and literature--in fact, the totality of human relationships with the ocean and its interface with the lands where people dwell.

1. THE NEED FOR EDUCATION IN MARINE AFFAIRS

1a. It is a truism that an informed citizenry is essential to proper, balanced decisions in matters affecting both the use and preservation of the environment. Environmental education has become important during the past decade, but still is restricted generally to natural science courses, without due regard for the importance of environmental concerns in socio-economic and cultural affairs. Nor is the marine environment (by which we mean the ocean and the coastal zone) given its proper place in studies of human affairs. The dominant role of the global sea in regional and planetary ecosystems usually is neglected, even in natural science studies. Social studies seldom, if ever, teach that the global nature of the world ocean is still prime in communication among nations, that the world's raw materials and goods move principally on the waters. Instead, education as a whole is couched in terms of land examples and concepts, creating an imbalance in both knowledge and understanding of the realities of the modern world.

1b. It has been said that "man is part of a natural system, the earth, and ultimately is subject to the limits of that system." The limits of the system on land already are in sight, in food production, in the supplies of raw materials including petroleum and natural gas, and in some critical minerals. A return to the sea is necessary for a variety of human needs. Population growth projections show clearly the need to look to the sea for minerals, water, energy, and food. Further, population pressure on the coastal zone is forcing seaward advancement for offshore

location of industrial facilities, transportation, power plants--and perhaps even human habitation in the more distant future. If the citizen of tomorrow is to understand and participate appropriately, both as an individual and as a member of society, in a world of such pressures, his education must include marine affairs.

1c. The demand for aquatic and coastal recreation, including pure aesthetic enjoyment, is increasing at a rate which exceeds population growth. Demand will continue to grow because marine recreation, in its simplest forms, is one of the least expensive kinds of recreation, is among the most pleasing aesthetically, and is also one of the least energy-dependent. Maximum enjoyment and safety in recreational use of the ocean is in direct proportion to an individual's understanding of the marine environment, and his aquatic skills. Basic skills and understanding for the majority of young people must be obtained through their schools. No matter how valuable and productive extracurricular programs may be (e.g. YMCA, Red Cross), they will continue to serve those who already are motivated, a very small percentage of the youth population.

1d. The oceans and coastlines have strong elements of wonder, mystery and adventure. Properly and wisely used, these elements can enhance the whole educational process, engaging the interest and enthusiasm of teacher and student alike, and providing dramatic relevance to a variety of subjects from the natural sciences to the social sciences and the humanities.

2. HAWAII AND MARINE AFFAIRS

2a. Hawaii is an ocean state. All of Hawaii is a coastal zone, the sea visible even from many upland areas. The majority of residents and visitors are less than a mile from salt water, and the shore and beaches--despite problems of access in some areas--belong to the public. The ocean is a pervading presence, determining the state's climate and providing those elements (even the basis of the "Aloha" culture) that bring tourists to Hawaii. Any decision on land in Hawaii affects the surrounding waters or is affected by them. Unless the citizens of Hawaii understand this essential fact and the reasons why it is so, properly balanced decisions will continue to be difficult or even impossible. Economic development, and maintenance of that intangible but real thing called "the quality of life," are not necessarily incompatible, but the educational process must produce Hawaiian citizens who understand how, when, and where compatibility can be achieved.

2b. The "Golden People" of Hawaii usually are thought of as Sea People. They are not. The majority have no marine skills, even such a basic skill as swimming, and little understanding of their ocean and coastline. Most of the people of Hawaii suffer a most unusual kind of cultural deprivation because they are not taught their great sea heritage.

2c. State Administration and Legislative leaders already recognize that Hawaii must make better use of its greatest resource--its ocean and coastal zone. Positive actions have been taken and others are being

considered. Statements by Hawaii's leaders on the importance of the state's marine environment have had positive impact, but it is a universal truth that adult citizens are difficult to reach, to educate, and to change. It follows, therefore, that the best hope of Hawaii and its present and future leaders is in the coming generations, those now in school or soon to enter, provided that the educational system is prepared to offer the needed marine affairs components as an integral part of the student's education.

3. RATIONALE FOR A MARINE AFFAIRS CURRICULUM

3a. Marine education throughout the United States and in Hawaii has been largely ad hoc, unformalized, dependent primarily on the energies and motivations of individual teachers. For the most part, they have been teachers of biology who, at their own initiative, introduced marine science, field experiences, or laboratory work into their schools. The efforts of this handful of enthusiastic pioneers, some of whom were members of the review group, have been prodigious, producing a great deal of useful but unstructured materials and a wealth of practical experience. Their efforts, while deserving high commendation, are not enough. The process of education obviously cannot depend on the initiative of scattered individuals. To accomplish the goals and objectives so well stated in "Marine Education for Hawaii--A Prospectus," it is necessary to bring structure into marine affairs education, to extend it beyond the natural sciences into the social sciences and humanities, and to equip the average teacher, not just the enthusiastic biologist, to be comfortable and competent with marine subjects.

Unity of approach and structure, development of classroom materials, and teacher education and training, require a curriculum suitable to the goals and objectives.

3b. The alternative to a marine affairs curriculum, as a planned, integral part of environmental education, is to continue the present inadequate status quo. This means that a relative handful of students, those fortunate enough to have one of the few prepared and inspired teachers, will learn some part of what an informed citizen should know of marine affairs. For the majority, we will continue to neglect that part of the environment which makes earth a water planet and which conditions all human affairs--and more particularly has profound effect on the future of Hawaii and its people.

4. BASIC CONSIDERATIONS IN CURRICULUM DESIGN

Although the following considerations in designing a marine affairs curriculum were stated or implicit in the documents supplied to the conference participants, the extent of discussion indicates the desirability of restating them in this report. It is not an exhaustive list of all possible or even all important considerations; it represents those the conferees, and the review group in particular, chose for emphasis during the discussions.

4a. Marine Affairs should be taught in perspective, in proper relationship to the total world of the student's studies, and in context of the whole

4b. The curriculum should stress concepts and fundamentals more than the kinds of facts or particulars suitable primarily for rote learning. In selecting cases and examples, care should be taken to avoid the atypical or anomalous (except for purposes of contrast).

4c. Curriculum materials should be so designed that they fit naturally and easily into existing courses without undue disruption of the basic course purpose, and without excessive additional classroom load on the teacher.

4d. The sense of excitement and wonder inherent in the marine world should be preserved; further, it should be wisely but fully exploited to engage the interest and enthusiasm of both student and teacher.

4e. Marine cases and examples must be authentic, relating to marine affairs as they actually are. For example, the atypical and frequently spurious world of Jacques Cousteau lacks authenticity, whereas the world of the Hawaiian tuna fisherman is a real and pertinent one, with social, economic, humanitarian, and cultural elements as well as scientific and technical considerations. Furthermore, there are occasional elements of real drama and adventure as the fisherman earns his living on the capricious and often dangerous sea.

4f. In the teaching of marine science, biology is not enough. The marine environment cannot be understood without physics, chemistry, math, and geology. Further, the sciences should be taught in pragmatic, real world terms (e.g. how beach sand transport takes place and how it is

perturbed by human constructions; the chemistry of biological oxygen demands in areas with low flushing rates, etc.).

4g. For some curriculum elements, as in the case of swimming or on-the-water experiences, specialists will be needed. It is neither reasonable nor realistic to expect the average teacher to acquire all necessary skills and background.

4h. Even with specialists available for some skill and experience activities, the principal burden of teaching marine affairs necessarily falls on the teacher. Curriculum plans, therefore, must place special emphasis on teacher education and training with provision for continuous supportive interaction with teachers.

4i. The curriculum should be based on hard, pragmatic assessment of what actually can be accomplished by the majority of students. The assessment should include a realistic appraisal of teacher capability and the probable improvement in that capability after training in the curriculum. Parental concurrence, if not actual support, should be another factor in the assessment. Finally, the assessment should be made in terms of the average, not the exceptional, teacher and student.

4j. Curriculum design should be based on "whole" concepts. This means that cases and examples should be developed against a background of all principal interactions and mutual interdependencies, even though only selected elements are included. For example, the Hawaiian tuna fishery as

a whole "system," includes the biology and behavior of the species, its ecological relationships and population dynamics, the technology of catching and processing, marketing and economics, fisheries law, home economics, the role of the fisherman in society, ethnic and cultural considerations, and the extensive literature based on fishing. It is at once apparent that such factors as classroom necessities and limitations, the age and preparation of the student, teacher training, course content, and time availability prevent full treatment of even this relatively simple case. Nor is full treatment at the point of teaching necessarily desirable. But unless curriculum design is based on such whole systems, it will be difficult to treat in the proper perspective those elements selected for use. Further, by basing curriculum design on whole systems, elements can be selected that are appropriate to each grade and subject. For some fully developed marine affairs concepts or systems, the curriculum can be so planned that the student is exposed to the full spectrum of considerations over a period of several grades, with each consideration taught in the proper time and context. This method will ensure balance and perspective.

4k. The concept of wholeness, or a systems approach to curriculum development is the essential rationale for CASE, "Contextual Approaches in Secondary Education."[6/] The review group spent considerable time in discussion of CASE, and particularly on the semantic implications of the names given to the three realms: scientific realm, humanistic realm, and socio-technical realm. There was little disagreement with the concept, but a general consensus that new terminology is needed to define the realms more clearly. For example, one proposed change was this:

Scientific realm	=	Basic knowledge
Sociotechnical realm	=	Application of that knowledge
Humanistic realm	=	Effects of application on society and individuals

In essence, the "realms" attempt to divide the total system, (e.g. the tuna fisherman example) into broad, principal components for ease of management, planning and teaching. The semantic arguments, however, were a quibble; the CASE concept is valid and needs to be further developed. It has the distinct advantage that it can achieve curriculum objectives through evolution and does not require revolution.

CASE is multidisciplinary and holistic, and there is little by way of a body of experience or fully-formed theory to direct its application; on the other hand, there is ample experience in instituting multidisciplinary education programs that do not work, and a few examples of programs that have succeeded. With previous failures and successes in mind as development progresses, CASE can be refined into a working model and applied empirically, with due caution, testing for results at each step. It has the further advantage that, unlike some notable curriculum failures, there are no built-in rigidities. With understanding of the CASE concept by both administrators and practitioners, with patience, and with dedication and enthusiasm, CASE has the potential of developing into a truly innovative and eminently practical approach to modern education. The issue of the moment is marine affairs education, but the implications of CASE extend beyond environmental concerns, and even beyond secondary education, into the total educational process. It is essential, however, that flexibility be an inherent element of the CASE approach.

5. THE SOCIAL SCIENCES IN MARINE AFFAIRS

5a. The time is particularly appropriate for the insertion of marine affairs into social studies. The most serious problems of world society relate in some fashion to the oceans, and often the relationship is direct. In energy, for example, the major hope of the United States to develop new sources of petroleum and natural gas is to find and exploit undersea resources. The nation depends on other countries for over 20 of the most critical minerals, and the alternative to the kind of blackmail and inflated prices of which the oil producing nations have been guilty is to develop oceanic mineral sources; e.g. the manganese deposits off Hawaii. As the world food shortage grows more acute, an important source of additional protein will be aquatic resources, both through aquaculture and innovative methods of improving natural productivity with new products developed by food scientists and technologists. The continuing debate over the law of the sea, and the prospect of a 200 mile economic zone--and, in the case of Hawaii--the Archipelago Concept, lend immediacy to social studies.

5b. The principal constraint on teaching the social aspects of marine affairs is the paucity of suitable material. Existing textbooks are inadequate. A priority, therefore, is the development of curriculum materials that use marine cases and examples to illuminate the basic concepts and principles taught in social studies. The "whole" approach previously discussed provides a basis. In an ideal sequence, a student would have obtained at least minimal understanding of some of the science and technology involved in a given case in a previous science class.

In fact, because social studies receive more intensive treatment in the upper grades, a student exposed to the whole marine curriculum, starting in elementary school, will be well prepared to relate the particular social studies case to his prior knowledge. It must be understood that the end use of scientific and technical education, except for specialists, is to understand and use the facts of environmental and marine science as they apply to the real world, in which human affairs--in all of their social science implications--are dominant. There is no aspect of marine affairs without social, economic, geographical, political, or cultural implications.

5c. Of equal, and perhaps even greater importance in planning the social studies aspects of a marine affairs curriculum is the general unfamiliarity of teachers with how the marine world impacts on the socio-economic structure. Teacher education and training are vitally important. The social studies teacher must be comfortable with the subject matter. This means providing to the teacher essential background, as well as the teaching materials, in the most easily assimilated form. Participation of social studies teachers in curriculum planning and development is a prime requisite.

5d. A distinct advantage of the CASE approach is that social studies aspects would receive proper weight starting with the conceptual stage, and would be dominant for some examples or case histories.

6. THE HUMANITIES AND MARINE AFFAIRS

6a. The humanities have a natural affinity with marine affairs, particularly where the arts and literature are concerned. There is also a wealth of material for the study of history, although commonly it is not well used. Curriculum planning and development, therefore, are somewhat easier for the humanities, consisting for many cases of simply identifying and making available to teachers material which already exists. The following items describe the kinds of material which may be suitable, and which are available at comparatively low cost. The intent is not to produce a "shopping list," but only to illustrate a small sample of materials.

6b. For the study of the history of the United States, a number of excellent maritime histories exist; some are highly readable, some are in paperback editions, in addition to hard bindings. The works of Samuel Eliot Morrison may be cited. For immediate applicability to Hawaii, such titles as "The Pacific Ocean" and "The Port of Honolulu" may be available for reissuance in less expensive form. Oliver's excellent work on the Pacific Islands is good reading, and combines anthropology with history. Such books are in addition to some excellent recent works produced in Hawaii.

6c. The literature of the oceans abounds in fine works, some of them adventure classics. Dana's "Two Years Before the Mast" is available in paperback and still illuminates the early days of California when Hawaiians went to the mainland to work in the hide trade. The list of suitable books is long and well known.

6d. The sea always has inspired poets. Use of poetry in a marine affairs curriculum is merely a matter of choice, either from anthologies or whole books of poetry about the sea. Masefield's sea poetry, for instance, is available in a single volume. Bascom's "Great Sea Poetry" is a small anthology. Hawaiian meles abound in sea themes. Even humorous verse of the kind enjoyed by smaller children is available in sea themes; e.g. Lear's Jumblies, who went to sea in a sieve, or Carroll's "Hunting of the Snark."

6e. Similarly, the sea and art have a strong and ancient affinity. For any art form there are sea examples, and those of recognized artists are available in inexpensive prints from most state and national art galleries, including the National Gallery in Washington.

6f. Finally, for the language arts, the sea has been the prime means of cultural diffusion and the spread of language, both through war and trade. Studying sea terms in everyday use, particularly those whose sea origins are forgotten, would illuminate history and culture as well as language.

6g. In the CASE concept, the "humanistic realm" does not equate with "humanities" as commonly used in education, but is much broader and deeper, relating to the totality of human capability and experience. However, no inconsistency is implied; "the humanities," in the usual sense, are a primary means of expression and communication of the totality envisioned in the CASE concept.

7. THE TEACHER AND MARINE AFFAIRS

7a. In previous sections, the importance of the teacher has been stressed in several contexts. It is difficult to overstate this importance. Ultimately, the burden falls on the classroom teacher, who already is carrying a difficult and demanding administrative and teaching load. For any curriculum plan to work, therefore, support for the teacher is primary.

7b. Teachers already in service are short of both time and resources. Innovative approaches to teacher training are perhaps even more critical than innovation in curriculum design. In the beginning, imaginative approaches are needed to engage the teacher's interest and enthusiasm, even before the start of actual orientation and training. What may be needed is a preliminary approach to provide background in an easily assimilated way, combining entertainment with information through mass media techniques. ETV offers a productive means of providing background in combination with entertainment and can serve both teachers and students. Special publications in periodical or newsletter form could serve the purpose and provide a means of continuing communication. In any event, advance preparation can create a receptive frame of mind while starting to build a base of background information that will make teacher training activities easier and more productive.

7c. The proposed Master of Education degree with a related field in marine studies is a necessary and desirable step in teacher education. The proposed plan raises the question of what a teacher must know to teach marine affairs successfully at the secondary level. It seems clear that

a secondary level teacher does not need to know the level of specific detail required of, for example, an MS or PhD candidate in Zoology. Six-hundred level courses, in most cases, would appear to be excessively burdensome, and without real utility at the secondary level. Comment during the conference on the proposed plan was directed to choices among required and elective courses, with strong views expressed that those listed as elective were the important ones and should be required, with some of the higher level science courses left as electives. There was further comment to the effect that a productive graduate level course for secondary school teachers requires courses that are not available--overviews or introductions to some marine areas. The difficulty lies in planning a graduate program around courses designed for other majors of a more specialized nature. Ideally, a master's program in secondary education with the related field of marine studies should be geared to what the secondary teacher needs to know, not simply what is available. While such an approach may require new course development, and may infringe on the territorial rights of various departments, the long range requires that the essential purpose be kept in mind: to equip the teacher with the background and knowledge for more effective teaching, not to work as a researcher or a professional in a different field.

7d. An important part of teacher preparation for the future is to begin the teacher's education at the undergraduate level. A plan is needed to offer electives, or even a minor in marine affairs for the undergraduate education major. If the premise is accepted that today's approach to marine affairs necessarily is make-shift, based on reorienting adults and experienced

professionals to the extent possible to serve the student, then leaving the make-shift era requires new generations of teachers who are prepared as an integral part of their education as teachers. Reorienting and retraining adults is notoriously difficult, and, at best, can be only partly successful. Success ultimately will be achieved with a new breed of teachers who are "brought up" to be comfortable with marine affairs, and to accept them as a necessary and desirable part of total education.

8. CONSTRAINTS AND PROBLEMS

8a. Introduction of a marine affairs curriculum requires very substantial support from all levels of state and county government, from all components of the educational system, from all private organizations with marine and environmental interests, and, at minimum, concurrence from parents. Such massive support presupposes a kind of cooperation that does not exist. In many cases the cooperation needs to be expressed in the use of facilities, particularly those of state and county agencies and departments. Each agency and department has its own mission, a budget it usually considers to be inadequate, and a corps of personnel it considers to be overworked and underpaid. In some cases, although by no means as many as claimed, the agencies are indeed underbudgeted and overworked. But any agency looks upon requests for cooperation as posing some degree of conflict or interference with its prime mission. The degree of resistance to such cooperation ultimately depends on the interest of the people of the agency in cooperating. There is no easy solution to this problem short of

administrative directive, with legislative support, which states clearly that environmental and marine affairs education is every agency's mission and that cause must be shown for every case where an agency feels it is unable to cooperate to the extent its facilities and personnel are necessary to the educational process. If cause is shown, relief could be granted through appropriations or legislative or administrative action. Such a directive would be unpopular, to put it mildly, but by no means impossible if administration and legislative leaders are taken at their words on the importance of the environment and education.

8b. Textbooks in general use are inadequate or non-existent, in terms of achieving marine objectives, or if books do exist in a few cases, they are far too expensive. Some suitable texts are available, of course, for specific components of a curriculum; a few marine history, literature and poetry books have been cited. On the whole, however, existing materials are more useful for supplemental reading and independent studies than as classroom tools. As a general premise, a new curriculum presupposes development of new classroom materials. If a textbook is required and the curriculum element is used state-wide and has uses outside the state, a private publisher may see sufficient profit to publish the text. Otherwise, the materials must be produced from program funds, with a budget required for the purpose. Expense for materials may therefore be a significant constraint. With gradual introduction, as is possible under the CASE concept, the expense can be spread over a long period.

8c. The idea of introducing students to the marine environment through skill acquisition such as swimming, or through field experiences is

an important one which faces serious obstacles. In addition to sufficient, properly designed swimming pools and competent instructors, there is also the problem of liability. Parental attitudes may also pose a serious handicap unless the parents can be satisfied with safety measures. The liability and parental attitude problems also carry over to field experience. To accept curriculum plans for developing aquatic skills and field experiences for students will be an act of understanding and courage on the part of administrators and legislators. Part of that understanding must be that water safety is not an absolute, that accidents happen in the most carefully supervised programs, but that accidents do not invalidate the program.

A related constraint is a logistic one. Students must be moved to skill training and experience sites. This not only means transportation available when needed (and planned for) but cooperation from school principals and other teachers, because time away from school cuts into other classes or activities. Full communication from the planning stage onward is an obvious requirement, using all available channels from PTA meetings to teacher institutes and seminars with the full backing and cooperation of the Department of Education.

8d. A new curriculum means innovation, and innovation always is resisted. The essential conservatism of both individuals and institutions should not be regarded as an obstacle, but as a natural constraint which can be overcome if it can be shown that the innovation is constructive, better than existing practices, necessary, and not threatening. The best tools for overcoming this natural constraint are patience, and full, continuing, redundant communication.

9. A CHECK LIST OF POSSIBLE ACTIONS

9a. Refine, clarify, and further develop the CASE concept.

9b. Develop one or more examples of holistic approach to marine affairs as exemplars, preferably choosing systems for which some background exists among average adults, and which have clear relevance in Hawaii.

9c. Develop preliminary, tentative outlines of plans for aquatic skill instruction and use them as a basis for discussion with appropriate agencies, institutions, and persons, using the feedback so obtained for plan refinement.

9d. Prepare a list of missions of the various state and county agencies with marine interests, facilities, or capabilities and initiate discussions appropriate to each agency on how the new curriculum can be structured to help forward the mission of the agency. (At minimum, each agency needs the support of an informed public.)

9e. Expand the Marine Education Council to represent the total constituency involved in marine affairs. Involve the Council and its committees in curriculum and design construction, and enlist the aid of the Council in solving problems and removing constraints, after the Council has aided in the definition of those problems and constraints.

9f. Establish experimental projects, with close monitoring by the Council. In reporting to the Council, let teachers and students be the spokesmen.

9g. Enlist the help of teachers through summer institutes or other means in selecting available materials which they, the teachers, would like to introduce into their own classes. Provide a means through which the teachers who use such materials can report to other teachers on their experiences and student reactions.

9h. Extract pertinent materials from FAST, build them into more holistic examples with different emphases (e.g. emphasize the social studies elements) and arrange with individual cooperating teachers to "try them out" in classroom situations.

FOOTNOTES

1/ The FAST (Foundational Approaches in Science Teaching) program is a three-year sequential program for intermediate schools developed by the Curriculum Research and Development Group, University of Hawaii. The FAST program is inquiry-oriented, emphasizing field and laboratory work. The FAST materials are interdisciplinary, including foundational inquiry in the physical science and ecology. For additional information, write to Dr. Francis M. Pottenger, Director, FAST Project, University Laboratory School, 1776 University Avenue, Honolulu, Hawaii 96822.

2/ Makahiki Kai is an annual three-day "festival of the oceans" featuring displays and activities for elementary school children in Hawaii. Makahiki Kai 1975 depicted the relation of Hawaii and her people to the ocean that surrounds the island state within the framework of history and culture. The Makahiki Kai has been coordinated by the Sea Grant College Program, University of Hawaii, in cooperation with state, federal, and county agencies and departments, the various marine-related departments of the University of Hawaii, and many business firms in the private sector. For more information, contact Mrs. Rose Pfund, Information Specialist, Sea Grant College Program, Spalding 255, University of Hawaii, Honolulu, Hawaii 96822.

3/ The Blue-Water Marine Laboratory is a marine educational experience centered around a four-hour cruise aboard the research schooner Machias. It is an opportunity for students to become aware and to gain understanding of their Hawaiian marine environment through direct involvemement in a wide variety of activities at sea. The Blue-Water Marine Lab is a University of Hawaii Program sponsored by Sea Grant College Program, the Hawaii State Office of Marine Affairs, the Hawaii State Department of Education and private foundations. For further information, contact Mr. Douglas Pendleton, Coordinator, Blue-Water Marine Lab, Spalding 255, University of Hawaii, Honolulu, Hawaii 96822.

4/ The Marine Options Program involves undergraduate students at the University of Hawaii from any major field of study in courses and practical marine field activities leading to the granting of a non-degree certificate indicating proficiency in a marine area upon graduation. Each student completes twelve hours in marine-related courses and gains proficiency in a marine skill which is applied to a marine project. Sea Grant College Program support has been significant in aiding program growth and development. For information, send inquiries to Mr. John McMahon, Assistant for Curriculum Development, Office of Marine Programs, Holmes Hall 401, University of Hawaii, Honolulu, Hawaii 96822.

5/ "A partial listing of Marine Education Programs" is available upon request to Mrs. Barbara Klemm, Associate Director, Marine Studies Curriculum Project, University Laboratory School, 1776 University Avenue, Honolulu, Hawaii 96822.