

American Institute of Fishery Research Biologists

. . . BRIEFS . . .

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1986 Board of Control Meeting

The meeting was called to order by President MacCrimmon at 8:30 am, September 13, 1986, in Providence, RI. The following officers, members of the Board of Control, and guests were present:

Officers — President, H. R. MacCrimmon; President-Elect, J. Hunter; Treasurer (ex-officio) C. F. Cole.

Directors — Florida, E. D. Prince; Alaska, K Koski; Washington NW, R. Westley; New York-New Jersey, J. W. Rachlin; California-Central, B. Waters.

Non-voting Visitors — K. Warner, Membership Committee and our Liaison with the AFS Local Arrangements Committee; T. Kwain, Chairman, Thompson Award Committee.

President's Remarks: Hugh MacCrimmon made several introductory remarks. He commented that the organization has been held together during his tenure by the services of its ex-officio members. His greatest problem has been dealing with District lethargy and lack of activity. The biggest challenge to incoming President Hunter will be to move aside many of these impediments and create a more vital AIFRB. He announced the resignation of Herb Lawler as Secretary, a move resulting from a career change. He also advised that H. Tanner had resigned on June 30 as District Director and presumably also as Regional Director, leaving the Great Lakes, South Central District without leadership.

Treasurer's Report: C. F. Cole presented the Treasurer's Report commenting that the figures were not fully reviewed but suggested we are generally in good financial shape. The figures reflected the expenditures and income from September 1, 1985 to August 31, 1986; this will be the subject of a future BRIEFS article.

Report of BRIEFS Editor: The report by Oliver Cope was received and accepted. Six issues were published, printed and distributed on schedule. The standard format is now no more than 8 pages to permit first-class mailing. First-class mailing has helped keep our mailing list more current and insures rapid delivery. We expect a reduction in mailing costs when the 9-digit zip-coding for all members is completed. District reports are again disappointing. With the election of a West-Coast president there was some consideration for shifting printing and distribution from North Carolina. A study of costs still favor the Morehead City operations. Reintjes and Cope agreed to serve one more year.

Report of the Production Editor: John Reintjes' report urged that the Board consider the publication of a Directory of Members, last published in 1984 and now out of date. He also asked that the Board consider the advisability of printing a letterhead without current Board members along the left margin. It is more often out of date than in because of staggered election dates. He suggested, rather, that only elected and ex-officio officers be listed. He also asked that the Board to consider printing return address envelopes locally, where needed, to eliminate mail distribution costs.

Reintjes also reported upon the status of the Alaska Symposium book. Currently some 1,350 copies are on hand in Beaufort, NC. Approximately 10% of a sample taken from the shipment have had a section of pages missing and another section duplicated. We have made good on all flaws reported and are inspecting all copies mailed. The problems with the Alaska Symposium have occupied the Board for several years. John Reintjes has agreed to work one more year as Production Editor and to work toward the final disposition of the remaining Alaska Proceedings.

Other Business: Eric Prince's committee reported that it recommended that a \$5.00 dues increase be voted to cover the increase needed for the Treasurer's office and that it estimated a \$10.00 increase would be needed to cover the cost of the BRIEFS Editor and the Production Editor's offices. It surmised that a \$5.00 increase would not likely impact adversely on the membership but that a \$10.00 increase might. Therefore, it recommended that the dues for 1987 be increased by \$5.00. Westley felt that we still do not have a real and solid product that members are strongly behind. Hunter suggested that going up gradually seems fiscally sound and that in 2 years we might wish to make the next move. MacCrimmon suggested that if real demand for finances came beyond the \$5.00 we could survive on our assets for awhile. Rachlin suggested that the \$4,000 increase estimated by the \$5.00 is sufficient to solve the treasurer's issue at present. Prince moved, seconded by Koski, that the dues be increased by \$5.00. The motion was voted and approved unanimously.

Membership Committee Report: Sammy Ray's report was presented. A summary of activity includes: 23 new associates, 19 new members, and 1 new fellow. Of the 43 new members, 37 had paid dues. At the same time, Cole was required to drop 37 old members as delinquent in dues. The organization has not grown in total

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membership. A summary of activity from 1979 to 1986 suggests that memberships have declined since 1983 and 1984, when 70 joined each year.

Dr. Ray also provided a memorandum discussing problems he has encountered with the promotion process. He is concerned that many people seeking promotion consider the length of time to be the most important factor; the committee, on the other hand, is required to look at the other requirements. The term "distinguished", when applied to the rank of Fellow, requires careful evaluation and the use of tact in advising someone of rejection. Others are also offended at having to self-nominate, preferring to have been put forward by their colleagues. Ray's task will be greatly eased if each District would examine the ranking of its present members and encourage each needing correction to apply for consideration. Again, the apathy issue occurs when District Directors fail even to respond to correspondence from the Membership Chairman.

MacCrimmon said that he had asked Tom Jow to serve as Associate Chair for Recruiting. Correspondence had circulated suggesting that a recruiting function could be added to Deputy District Directors. Waters suggested that BRIEFS might be used to advise the membership of the promotion policy and that this might stimulate some to forward their credentials for possible upgrading.

Kendall Warner advised that he has been serving for the past 4 years on the Membership Committee and that they have reviewed well over 200 cases. MacCrimmon reminded the Board that the basic difference between AFS and AIFRB is that AFS's certification is your "qualification" to do the job but AIFRB is a measure of your success with that job. Koski asked about the difference implied by "research" in our title and that impact on recruiting. The problem of dealing with people coming into fisheries research from different backgrounds was also raised. Rachlin advised that our group recognizes "meritorious service" and that certification processes merely establish minimal qualifications for employment, at best.

Brochure Committee Report: Dr. Cope's report contained in his July 28 letter and attachment were accepted. MacCrimmon will send the revised Brochure to Sammy Ray and that the methods of attaining change in rank will be included in the copy.

Reports from Districts: Joe Rachlin reported that he had been appointed by Hugh MacCrimmon to serve as a replacement for Phyllis Cahn, now in Washington, DC.

Ron Westley reported that member interest in NW Washington had been on decline. He, Deputy Director, and Past Director had plotted a course of future action and either stimulate real interest or become frankly inactive; sent out a questionnaire, getting 75% response, and are now changing to meet members' requests; had been considerable dissatisfaction with a monthly seminar series which was attracting only a segment of the membership; had considered putting on Symposium such as "Columbia River Fisheries", but interest seemed to be more in areas of "professional standards", "ethics", and similar subjects. In the past, the member-

ship had centered upon faculty from the University of Washington and retired fisheries workers in the Seattle area. Younger members had been "forced" into membership by major professors and attracted by the "value on the wall" of the certificate. Perhaps there is a serious need for the "value-of-the-certificate"-alone type organization and we may be able to increase our value to a growing membership by that method alone.

Brian Waters of the Central California District said they had held three elections: Director, Vice-Director, and Secretary-Treasurer. They hold bi-monthly meetings, except in summer, and try for areas from San Francisco to Sacramento and often meet in Berkeley. There is competition from the California-Nevada AFS Chapter, which is very active. There are active AFS chapters at Humboldt and at Sacramento/Davis with which they also compete for attention. The AIFRB meetings usually attract from 15 to 35-40 people and usually have a guest speaker.

K V. Koski of the Alaska District took office in November 1985. There are 125 members in the Alaska District, of which 20 are in British Columbia. Progressively there has been a 6-8 year decline in interest. In the past they have held 6-8 meetings per year, usually dinner/ luncheon/ or house meetings with speakers on political/administrative issues. The biologists have begun to lose interest in this bias. Norm Howse is the new Secretary-Treasurer. There is a problem in trying to keep Anchorage and Juneau groups tied together. The new members seem to want more research orientation to the seminars. The District had been approached to work as consultants on a study of urbanization of streams in the Juneau area.

Eric Prince of the Florida District says that they usually hold several seminars prior to holidays. If the audience perceives speaker will be "fun", attendance is good; if the speaker is "science", they won't. There has been a falling away of the older members, the established fisheries scientists, who no longer are supporting the District with their time. A joint AFS-AIFRB meeting was held and was very successful. Nothing has happened since February because of job commitments.

John Hunter reported on the California-South District. The highlight meeting was a symposium on gill-netting held at Marineland. It was a hot political issue and the District profited from it. These events usually get good participation both of members and others. Routine is to hold bi-monthly dinner meetings and the attendance varies with the speaker. The meetings are usually held midway between San Diego and Los Angeles, the two centers of membership in the District. He speculated that district enthusiasm centers around the blending and crossing of agency lines and the bringing together informally of power company scientists, legal departments, and agency officials.

Third Travel Raffle: Eric Prince announced that he had sent promotional materials on the travel raffle to over 50 major universities with fisheries programs. In 1986 we attracted 10 applicants from which we randomly selected 3 award recipients. This compares, in 1985, to 7 applicants and 4 awards. Eric was discouraged with its lack of build-up in numbers of applicants.

Rachlin suggested that the word "raffle" be eliminated and then make awards only to students who are presenting papers. Prince suggested that we change the name to Associate Member Travel Assistance Grant (AMTAG) and restrict it to any Associate Member who is presenting a scientific paper. This would allow us to encourage *any* Associate Member to apply but that an abstract of the paper to be presented must be included with the application. All winning abstracts would then be published in whole, or in part, in BRIEFS.

Thompson Award Report: Tony Kwain sent announcements of the award to all fish journals and to all fisheries departments in US and Canadian universities. He invited 6 scientists from various locations and disciplines to serve on the committee. In 1985, 16 papers were submitted and the paper was selected that had been published in *Estuaries* 1982 on temporary use of Oregon estuaries. The last year's award was announced in BRIEFS. In 1986, 11 papers were submitted. The committee selected a paper by Saunders and Powers on the prediction of rainbow trout spawning that appeared in the Transactions of the American Fisheries Society in 1985.

Award Committee Report: The report of the Committee chaired by Richard J. Myhre was received.

a. *Individual Outstanding Achievement Award:* It was adopted unanimously that William G. Gordon be cited for his outstanding service to the National Marine Fisheries Service as a fisheries research administrator.

b. *Group Outstanding Achievement Award:* The International Pacific Halibut Commission was voted unanimously as this year's recipient.

Symposium at Toronto AFS Meeting: It was voted that AIFRB participate up to 1 day on a Symposium on Communications at the American Fisheries Society meeting in Toronto in 1988, and that Eric Prince be appointed Co-chair, along with John Hunter, to be responsible for development of the Symposium and for finding an individual to lead the Symposium and for delivering a course of action. MacCrimmon volunteered to be the local liaison person for AIFRB-AFS for the 1988 meeting.

* * * * Editorial * * * *

Averaging the Way to Inadequate Information in a Varying World

Gary D. Sharp

Center for Climate-Ocean Resources Studies, Gainesville, FL

At the recent Benguela 86 Symposium one of the participants decided to make a very strange recantation. There was sufficient evidence, in his view, to suggest that there was no reason to do the causal research in fisheries-related marine ecology, once the conventional average fishery information or parameter estimates were available. You could be right more often using average expectations in your data than if you used any three random variables with combined explanatory capabilities of up to 75%. He then proceeded to exemplify his conclusions from his analyses.

This statement came as a surprise and disappointment as it came from an exceptionally talented mathematical

analyst, perhaps doubly since among the several dozen other presentations at this symposium there were also very memorable contributions that evidenced the value of understanding the causal sequences of climatic to oceanographic to ecological events and patterns characterizing the dynamic Benguela Current Ecosystem, in particular its reversion from one quasi stable state to another.

I suspect that, once stated, such a position will make it more difficult to induce such "enlightened" folk to recognize the logical errors that lead to these wrong conclusions. As Jorge Csirke and I concluded after our 1983 review of the Changes in Abundance and Species Composition of Neritic Fish Resources, fisheries stock assessment would be in a very different state if the North Sea were subject to El Niño events.

In retrospect, I think that any argument for use of simple averages is a strong signal that it is about time for such analysts to be removed to the back seat, or somewhere that will minimize data fatigue. Recent decades have been the heyday for the near-miss regression/correlation approach to modelling environmental affects on resources populations. There is a subtle philosophical twist attendant to the failure of these partial models to forecast *ad infinitum* the patterns of any populations responses to regimes outside the models' basis, or reference period.

There is no reason to expect that the low-level modelling that we have accomplished could forecast any but past responses, if the signals were strong enough to project from. Yet we assume average responses without querying the potential for any other dominant variables to emerge.

The most important realization that needs to be made is the following:

AN AVERAGE FISH DIES WITHIN ITS FIRST WEEK OF LIFE!

Where does this leave our mathematician? With a lot of surviving, not-so-average fish. In fact the average conditions of the ocean will not support most fish life at all. Therefore, there must be some alternative way to organize the science if we are ever to reach the objective of forecasting even the less subtle aspects of marine populations such as relative abundance or distribution. I think that the solution is for fisheries researchers to go back to the basic questions of elementary biology. What mechanisms do the various populations have, and at what developmental stages, that allow them to survive local environmental perturbations? What are the conditions to which these individuals are adapted, and finally, what perturbs these conditions in time and space?

We should no longer attribute meaning to the word "average" in the context of any marine population. There should be a sense of the basic fitness of individuals on local time and space scales, not of a median or population mean. In the context of marine environments, there is neither a mean expectation, nor a sequence of biological responses that have proven to be inviolable. Once we throw away our averaged or Atlas concepts we can experience dynamic changes, be they merely subtle diel processes, lunar responses, onward to greater time and energy scales.

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Any given time period as short as man's expected lifetime or less may not offer as great a spectrum of perturbations and responses as have been experienced by a particular population or ecosystem, particularly climate regimes. For example, the general heating trend that has been experienced in the eastern Pacific Ocean since the late 1960's, which culminated with the 1982-83 El Niño, not only returned the physical environment to a previous "normal" state for the epoch that ended some 5,000 years ago, but many species that had somehow managed to retain "footholds" within the more recent habitat, that thrived in the other warmer state, bloomed, and replaced the more recent faunas for a short period. Where is the utility of the average concept in this context?

Progress over the last two decades toward an integrated, ecologically based fisheries monitoring and management regime has resulted from the near kaleidoscopic variability of the marine environment in response to usual decadal and epochal scale climate variabilities—global and local phenomena that could not be ignored.

Why has our mathematician given in? In the Benguela Current, recorded exploitation patterns of the fisheries have provided only short and incomplete information about these cyclic and aperiodic processes. The stability of the anchovy production since the collapse of the sardine population in that system may be completely artefactual, yet it lulls those interested only in the analyses of fisheries production into a sense of security which is likely to be short-lived.

While it is plausible that averages could provide adequate protection in a system which experiences only subtle perturbations, I doubt that the Benguela or any other Eastern Boundary Current would qualify.

Fisheries management should be about tessellations; careful analysis of not only man's harvests, but also the causal physical-climatic-oceanic processes, near and remote, that initiate ecological perturbations.

Emanating from this cascade of physical and biological signals are the unique experiences of surviving individuals, not the deadly averages.

William G. Gordon Receives the Outstanding Achievement Award for 1986

AIFRB selected William G. Gordon as the recipient of its Outstanding Achievement Award for Individuals for 1986. Mr. Gordon is Special Advisor to the Administrator, National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, Washington, D.C. His duties include representing the Administrator on fishery and habitat issues, coordinating NOAA fishery activities, and assisting the Assistant Administrator for Fisheries in developing coordinated programs with other federal agencies and with the Governments of Canada and Mexico.

Until recently, he held the position of Assistant Administrator for Fisheries and directed the National Marine Fisheries Service (NMFS), a natural resource agency employing nearly 2,500 fisheries scientists, managers, administrators, technicians, and other personnel. He aggressively pursued programs aimed at development of the U.S. commercial fishing industry, provided leadership in developing and implementing a marine recreation fisheries policy, directed a national marine fisheries management program in cooperation with the Regional Fishery Management Councils resulting in, among other things, expansion of the fishing vessel observer system and increased enforcement of fishing regulations. He provided leadership in developing a national habitat conservation policy, and strengthened the scientific, biological, and technical research capabilities of NMFS.

Mr. Gordon received a B.S. in Zoology at Mt. Union College in Alliance, Ohio in 1953 and a M.S. in Fisheries from the University of Michigan at Ann Arbor, Michigan in 1957. His fisheries career began with the Fish and Wildlife Service in 1955. He transferred to exploratory fishing and fishing gear research in 1958, became Deputy Regional Director of the Northeast Region in 1970, and was appointed Regional Director in 1975. He became Director of the Office of Fisheries Management in Washington, D.C. in 1979 and Assistant Administrator for Fisheries, NOAA, in 1981. He has authored over 30 papers and addressed numerous groups on U.S. fisheries affairs. He has served as an advisor at negotiating sessions between the U.S. and foreign nations and as a consultant to the Food and Agriculture Organization of the United Nations on fisheries management, development, and science issues. He was presented the Coastal Society Award of Distinction for 1986.

1987 AIFRB Outstanding Achievement Award

One of the objectives of AIFRB is to maintain high professional standards; the Outstanding Achievement Award for individuals and the Group Award of Excellence for groups or agencies serve this purpose by recognizing achievement and competence in fisheries science. During 1986 fifteen individuals and six groups were nominated for the Awards. AIFRB members are again invited to participate by submitting nominations for the 1987 Awards. Criteria for these awards are similar: significant publications, exceptional service, outstanding teaching or training of students, important discoveries or inventions, and major contributions to the advancement of Fishery Science.

AIFRB members should submit nominations for these awards to R. J. Myhre, 18920 Sound View Place, Edmonds, WA 98020 by July 1, 1987 and should include a brief summary of noteworthy qualifications of the nominee. Selections for the two awards will be made by the Board of Control at its Annual Meeting.

Deadlines for BRIEFS

BRIEFS is published six times a year. The Editor solicits material for each issue, but needs to receive items a little in advance of forwarding copy to the printer. The following schedule may be helpful to contributors as they prepare to submit articles for BRIEFS:

Issue	Deadline for Submission
February	January 15
April	March 15
June	May 15
August	July 15
October	September 15
December	November 15

District Revitalization Effort

Director Ron Westley of AIFRB's Northwest Washington District, in an effort to stimulate revitalization of his District, earlier this year appointed a committee (Percy Washington, William Royce, M. Pedersen, and John Isakson) to study the problem and make recommendations. On October 14, 1986 the committee submitted a report and made provision for the membership to comment on the conclusions.

The NW Washington District report is printed here in the hope that members in other Districts will glean some ideas for breathing new life into their District activities.

REVITALIZATION COMMITTEE REPORT

History — Director Ron Westley contacted Committee members individually and held the first meeting on September 22. The Committee met again on October 6 and October 9 to discuss the given goal of making recommendations to revitalize the NW Washington District. The report which follows is the unanimous opinion of this committee. There is no minority report. The committee was small enough to operate without a formal structure.

The Problem — Interest in NW Washington District meetings have waned in recent years. This committee assignment was to make recommendations to Director Westley and the members at the scheduled October 14 meeting where both this written report and an oral presentation are programmed for District members. The committee was not charged with assessing the past. We were to look at a short and long term future. Since this District is one of the more active in AIFRB, the committee hopes that District members will respond to these recommendations to possibly lead all of AIFRB into some light.

General Philosophy — One overriding theme in the specific recommendations that follow is that we remember we are a District that represents a local area and that we need to focus our efforts on our local issues. While many issues like salaries of biologists, supply and demand of biologists, curriculum, etc. were initially discussed as potential topics, the committee feels these are generally more national or regional in scope and perhaps should not be top priority to be covered by a District of AIFRB. Therefore, the specific recommendations that follow attempt to focus on local and topical issues.

The second overriding theme in these recommendations is that we must attract more interest and promote activities that will benefit professionals in the field of fisheries. We are currently stagnant and an urgent need exists for new direction which will stimulate interest in AIFRB. We must also remember that fisheries are human activities. A social-professional environment is best suited for issue discussion and a blending with associated sciences that tie fisheries into the whole of human activities needs to be a greater focus in AIFRB.

GENERAL RECOMMENDATIONS:

1. The District should appoint a program committee in the spring of each year which will work through the summer to put program directions together. We recommend the committee involve 5 to 7 persons with a good mix of members from the public and private sectors. Note: This spring tactic can not be completed for the upcoming program period. Therefore, we recommend that a committee be convened as soon as possible to build specific programs for the winter-spring period from the general comments made in this report.

2. Continuity of programs from year to year is another key to the success of this District. The District should apply to the national organization to modify how the Director and Vice-Director are programmed to manage the group. We suggest that the Director's tenure be reduced to a year and the Vice-Director be, in fact, a Director-Elect for the following year in a pattern like AFS. This will give a new Director the experience of the prior year to learn the process and be ready to possibly continue successful programs. Since our District no longer has a Vice-Director (who resigned for personal reasons), we could hold an election for a replacement who would be a Vice-Director and Director-Elect in the remainder of this 86-87 term. In the Spring of 1987 and henceforth, we would vote for a Vice-Director on an annual basis to assist that year's Director and become the Director the following year.

3. We recommend that some meetings be completed in Seattle and others in Olympia as has been done in the past. The recommended change is to attempt a mix of the standard meeting strategy with half- to all-day meetings (Saturday?) with several speakers along a common theme. Even for those traditional weekday, evening meetings, a recommendation is made that, for 2 or 3 consecutive meetings, different speakers could present related subjects on a common theme. For larger programs, the NOAA conference room (Sand Point) needs to be explored, especially for weekend events.

4. The District activities need to have a social-professional atmosphere to be successful. While we can not have eight "Ken Chew specials" a year, we may be able to have a better food and drink setup for some of these all- or half-day sessions on a weekend. The annual meeting with Southwest Washington and Oregon is recommended. We may even have to charge a few dollars at the gate to pay for this type of social reinforcement.

5. Recognition of achievement in fisheries could be expanded into the District by giving awards in various forms one or more times each year. Media coverage could enhance the significance of this activity and

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District Revitalization Effort cont.

generate public awareness of our value to the profession and society as a whole.

6. For an applied science like fisheries, the District needs to hear more non-fisheries people, such as user groups, politicians, related sciences, etc. that are intertwined in various ways with this field. We need more interchange with associated sciences (water chemistry, hydrography, oceanography, sanitary engineering, toxicology, etc. including such expertise from agencies like the Department of Natural Resources and Ecology). The type of program Ron Westley had in Olympia on the image of biologists from the eyes of politicians, news people, fishermen, etc. is a good example. This same subject could even use more discussion.

7. Topical, local issues that need a forum for discussion should be emphasized. Panels are encouraged to obtain varying opinions, debate, and a more complete professional view of such issues that are often multi-dimensional if they are controversial. Maybe a few people will have to yell at one another. Who knows? Should issues proceed to the point where a professional opinion from AIFRB is warranted, the District should stand up and be counted. A past example was the Boldt sessions and the document prepared for the Supreme Court. We should avoid duplicating the existing University, NMFS, and other agency seminars that often are narrowly focussed and, instead, complement these efforts with broader views, to possibly provide a forum for debate if warranted by the subject.

8. Meeting attendance by students in fisheries should be encouraged by faculty members without the hard sell to join. People will join without pressure if we complete interesting activities. The general public should be invited to some meetings where we feel that they or AIFRB will benefit by their participation. We need to encourage a forum for scholarly debate open to the public as well as to members.

9. Contact with outside groups to put on programs of common interest is strongly recommended. Commercial fishermen, sportsmen, tribal, and environmental organizations are the types of groups we could consider.

10. Meetings per year may need to be reduced to every other month or? if the decision is made to go to the half- or all-day weekend sessions. We do hold numerous meetings each year when you compare AIFRB with AFS regional and national meetings (one each per year) and PFB (once a year).

SPECIFIC TOPIC SUGGESTIONS:

1. **PUGET SOUND** — This is a hot local issue that could use a forum for detailed discussion. Let us hear from the Puget Sound Water Quality Authority leader and staff. Let us see Dr. Malins and his data and draw our opinions. Let us hear from the many scientists in the area who are pro and con on this issue of Metro having to go to secondary treatment. There are enough facets on this one issue to fill several years of AIFRB activity if we want to hit it that hard. We do not recommend such prolonged coverage as we all burn-out even on hot topics.

2. **EVERETT HOME PORT** — The environmental ramifications to water quality, shellfish and finfish

from the large dredge/fill actions and other activities required by the Navy and the Port of Everett for the home port could provide related topics of local importance for several meetings. AIFRB could provide a professional forum to look at the data available from public and private investigators and possibly generate a position paper to assist the ongoing permitting process.

3. **COLUMBIA RIVER** — This stream is not totally in our District's area, but it is a very controversial fisheries arena. Should we get a report from BPA staff on what they have spent and accomplished as well as hope to accomplish in the next 6 to 8 years? Should we hear from some economists on the cost/benefit of multiple hundred dollar salmon? Would not a forum of persons debating the pros and cons of this activity be of interest to the membership? Should we look at the professional stature of work completed in this program and its relevance to the charge of BPA?

4. UNIFIED RESOURCE MANAGEMENT/

AGENCY PERFORMANCE — An overview of the bureaucracy in organizations attempting to manage fisheries resources could be enlightening. How well have the agencies performed from their view as contrasted by a user group or two? Utilities versus the agencies would be an interesting subject if people will talk and not fear retribution. An open, frank discussion of the professionalism in studies completed and the public and private use (professional and non-professional) of that information may interest members.

5. PROFESSIONAL DEVELOPMENT AND

PERFORMANCE ASSESSMENT — With the bylaws in mind, should the District membership or a designated committee make the effort to discuss this very sensitive issue and to possibly work towards a process of professional evaluation in fisheries? Could we institute some mechanisms to foster the professional development of members and carry out some annual recognition of individuals' notable accomplishments in the District? Do we also assess unprofessional behavior? If some process could be established in the District, AIFRB membership and endorsement could have significant value for hiring and promotion.

6. ROLES OF PROFESSIONAL BIOLOGISTS IN

DECISION-MAKING PROCEDURES — Could a panel appraise the membership of how much science really matters in government decision-making locally. While this is hard to face, detailed studies in some decision-making arenas may be expensive window dressing that has little influence on decisions rendered.

7. **PROFESSIONAL ETHICS** — A discussion of the ethics in the fisheries field locally could be interesting. State, federal, and private biologists all have opinions of one another. The Western AFS session on this was interesting, to say the least. Could AIFRB provide a forum to get this sensitive issue out in the open and likely remove some myths and misunderstandings that in part prevent better cooperation among these biologists? An independent assessment of a data base that has been argued for and against a position by opposing biologists would be very enlightening. We often feel we have black and white answers until we go to court and see the gray world we really live in.

8. FISH VERSUS THE PROCESS — An open discussion of the pros and cons of the fish resource magnitude in time with the ongoing complex management process could be enlightening. Are we, as some state, going to have large groups of biologists arguing allocations, seasons, etc. long after some fish stocks have become economically extinct and declined to levels so low as to not be worth arguing about.

CONCLUSION: The renaissance of this District is in the membership's hands. All this committee can do is recommend. Interesting social-professional activities that the membership want to participate in will make this work. All members need to provide input and participate.

Seabird-Tuna Relationships

Like fishermen, fishery scientists can learn much about tuna by studying seabirds. Since 1976 biologists of the Pelagic Division, Southwest Fisheries Center, National Marine Fisheries Service, have been recording seabird observations in the eastern and central tropical Pacific. This work, begun on the 1976-1980 dolphin surveys, implicitly recognizes the biological entity of seabird-tuna-dolphin associations.

The studies have revealed a large-scale dichotomy in the apex, pelagic community that appears to involve feeding tactics: multispecies flocks that feed with yellowfin tuna, mainly in tropical waters north of the equator, are apparently sharply separated from virtually single-species flocks that occur largely south of the equator and that feed with skipjack or other small tunas. Boobies (*Sula* spp.) are the most abundant of the birds in the multispecies flocks, and, like most other species in the flocks, are facultative commensals with the tuna they follow. Overall, about 50% of these tuna schools were found to be with dolphins, primarily the spotted dolphin (*Stenella attenuata*) but also to a lesser extent spinner and common dolphins (*S. longirostris* and *Delphinus delphis*). Most other cetaceans in the eastern Pacific (some 20 kinds) were found to seldom associate with either tuna or birds. In the single-species flocks to the south, the sooty tern (*Sterna fuscata*), essentially an obligate commensal on tuna, predominates. Those flocks, and associated tuna, are seldom with dolphins. This dichotomy in community organization is a conspicuous biological feature of the eastern tropical Pacific, and indicates the existence of different, large-scale feeding regimes.

One implication from these species relationships is that ecologically successful species of sparsely productive, tropical seas will be those species capable of following or feeding with tunas—which by their annual fishery yields are evidently very successful in that habitat. Boobies, especially the red-footed and masked species (*S. sula* and *dactylatra*) are the most abundant of birds in tropical waters north of the equator, and are characteristic of flocks that feed with yellowfin tuna. The spotted dolphin is the most abundant cetacean in the eastern Pacific, and it too is closely associated with yellowfin. Sooty terns are the most abundant bird

species south of the equator (and also in the central Pacific), and have a strong, commensal feeding relationship with skipjack or other small tunas there.

Differences in availability of tunas appear related to differences in productivity, and how tunas accordingly feed, as indicated by bird behavior. South of the equator, food is not apparently in large patches; the tuna there are fast moving, and their feeding bouts are brief. Only sooty terns seem to be very successful in following these tuna. In contrast, tuna on the purse seine grounds north of the equator feed on relatively long-lasting aggregations of surface prey, in association with several other, similarly feeding species of seabirds and dolphins. And where both "schoolfish" and longline tuna fishing are important (and "porpoise fishing" is not), as in some areas west of Panama and Costa Rica, the bird-tuna association is very variable, suggesting that the tuna there feed variously between surface and subsurface layers (presumably, birds do not build up flocks over schools not feeding long at the surface). Finally, the summer immigration of southern hemisphere Juan Fernandez and white-necked petrels (*Pterodroma externa* subsp.) onto the extensive yellowfin fishing grounds west of Clipperton Island indicates a reliable seasonal increase of production—and of surface-feeding tuna over which these birds flock. This is also indicated by the seasonal increase of fishing effort and catches there. The feeding of these petrels with tuna was not expected, as they are of a family of birds that are typically surface gleaners.

Future research will include analyses of areal changes in flock species diversity, in the degree to which flocks associate with tunas (as an indicator of tuna behavior and availability), studies of seasonal movements of flocks and flock behavior, and of the relationship of flock size to tuna-school tonnage.

David W. Au
Southwest Fisheries Center
U.S. National Marine
Fisheries Service
La Jolla, CA

Announcements and New Publications

Louisiana Aquaculture Conference

On May 1-2, 1987, the *First Louisiana Aquaculture Conference and Trade Show* will take place at the Hilton Hotel, Baton Rouge, LA, in conjunction with the *Aquaculture Field Day and Trade Show* to be held at the Louisiana Agricultural Experiment Station's Ben Hur Research Farm, LSU, Baton Rouge, LA.

Information is available from Dr. Gary Jensen or Mr. Larry de la Bretonne, Louisiana Cooperative Extension Service, LSU, 202G Knapp Hall, Baton Rouge, LA 70803. (504) 388-2152.

Wildbranch Writing Workshop

This workshop, to be held at Sterling College, Craftsbury Common, Vermont on June 21-27, 1987, will be a week-long experience of informal classes, lectures, discussion groups, and readings designed to introduce the craft and techniques of fine writing to professionals

cont. on page 8

Announcements and New Publications cont.

in the fields of forestry and wildlife management, environmental, biological, and conservation studies, though others are encouraged to apply.

Professional writers distinguished in their fields will teach the art of writing fiction, natural history, and environmental essays and articles. Workshop classes are to be held on the campus of Sterling College overlooking the forested landscape in north-central Vermont, a 1½-hour drive from Burlington and a 3½-hour drive from Boston.

Most rooms are double-occupancy dormitory style, and most workshop participants will have a roommate. A limited number of single rooms are available. Bathroom facilities are shared. All meals are served in the Sterling Dining Hall. Smoking is allowed only in designated areas.

For those who prefer private accommodations or dining out, there are several local inns.

Tuition: \$525 includes all field trip transportation, classes, lectures and activities. Meals and housing: \$150 for the entire session.

A non-refundable deposit of \$50 is expected within two weeks of admission to the program. Full payment of \$675 must be made by registration time, June 21. Fees are non-refundable.

For information, write or call David Brown, Director, Wildbranch Writing Workshop, Sterling College, Craftsbury Common, VT 05827. (802) 586-7711.

Conference—Artificial Habitats for Fisheries

The *Fourth International Conference on Artificial Habitats for Fisheries* will take place on November 2-6, 1987, at the Knight Center/Hyatt Regency Hotel, Miami, FL. Several fishery agencies will sponsor this event, whose theme is Functions, Benefits, and Uses of Artificial Reefs, Fish Aggregation Devices, and Related Technology. The technical sessions will cover ecology, economics, engineering and design, artisanal fisheries, fishery management, mitigation, and other fishery habitat enhancement. Special sessions will address rigs-

to-reef, legal and policy issues, and assessment and monitoring. Information on paper submission, attendance at the conference, and other details are available from William Seaman, Florida Sea Grant, University of Florida, Gainesville, FL 32611.

Skipjack Conference Proceedings

Proceedings of the ICCAT Conference on the International Skipjack Year Program is a hard-cover book edited by P.E.K. Symons, P.M. Miyake, and G.T. Sakagawa. It is 388 pages long and contains 45 papers and abstracts of papers (19 in English, 19 in French, and 7 in Spanish). Most of them are concerned only with the Atlantic Ocean, but a few are based upon Pacific or global studies. The book can be obtained by sending an international money order for \$15.00 to ICCAT, Principe de Vergara 17, 28801, Madrid, Spain. ✓

Membership Report

Inquiries regarding membership should be directed to Dr. Sammy Ray, Membership Chairperson, Texas A & M University at Galveston, Building 311, Fort Crockett, Galveston, Texas 77550.

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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

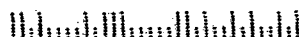
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*American Institute of Fishery
Research Biologists*

Route 4 Box 85 • Morehead City, NC 28557



FIRST CLASS



American Institute of Fishery Research Biologists

... BRIEFS ...

VOL. 16, NO. 2

APRIL 1987

Financial Report

Dr. Charles F. Cole, AIFRB Treasurer, submitted a financial report to the Board of Control at the annual meeting in Rhode Island on September 13, 1986. The membership will be pleased to know from the following report that Treasurer Cole has been extremely diligent in his stewardship of the Institute's funds and in his reporting of our fiscal affairs.

OPERATIONS

	Budgeted	Expended
Travel	\$4,000.00	\$3,791.30
BRIEFS, printing	4,000.00	2,183.10
BRIEFS, postage	1,200.00	2,066.11
Office Management to OSU	deferred	deferred
Offices, supplies	1,100.00	1,807.22
Offices, postage	800.00	1,321.58
Awards	1,750.00	1,600.00
Computer (OSU)	500.00	478.38
Bank Charges	80.00	122.49
Telephone	100.00	50.86
Expense advances	500.00	200.00
Preparation of IRS 990	500.00	-nc-
Alaska Book expenses	-0-	1,026.54
Miscellaneous	-0-	769.29
TOTAL	\$14,530.00	\$15,416.87

I. LIQUID ASSETS

Checkbook balance	1,817.06
Bache Cash Account	0.47
MoneyMart Assets	890.00
TOTAL	2,707.53

II. ASSETS FUND

AmCapGovSecFd 292.316 sh. x \$11.910	3,481.48
Pru-Bache Equity Fd. 204.097 sh. x \$9.93	2,026.68
Pru-Bache Govt. Sec. Inter. 829.557 sh. x \$11.06	9,174.90
Pru-Bache Incomevertible + Fd. 452.406 sh. x \$11.58	5,238.86
Pru-Bache Util. Fd. 213.904 sh. x \$16.68	3,606.42
CD Commonwealth S&L FSLIC 7.350% due 9/16/86	2,000.00
CD American S&L FSLIC 8.000% due 6/11/87	2,000.00
CD American S&L FSLIC 8.200% due 12/18/87	2,000.00
TOTAL	29,528.34

Sept. 1
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INCOME	Budget	August 31
Deposits to date		
from dues (119%)	11,900.00	14,399.66
from Alaska Book	4,000.00	2,861.70
TOTAL	15,900.00	17,261.36

A solution was found to the bond problem nagging the Board for the past 6 years. In the 1975-80 period, money was invested in public utility bonds with very long holding periods; during the early 1980s because of high inflation, the value of these bonds declined to nearly 60% of face value. Suddenly in January through March 1986, the bond market improved and the bonds rose to within 5 points of par. By mid-May all had been sold in accordance with Board-approved policy. Money from the bond sales in April and May was then stored in P-B Money Mart Asset, the money market account. On June 11, AIFRB purchased three \$2,000 CDs of durations from 3 to 12 months and at rates from 7.35 to 8.20%. \$10,000 was then invested in three Prudential Bache mutual funds: \$2,000 in P-B Equity Fund, a common stock fund; \$3,000 in P-B Equity Fund, a fund which invests primarily in common and preferred stocks of utilities; and \$5,000 in P-B Inconvertible + Fund which seeks high current income and capital appreciation by investing in convertible securities. Only the Equity Fund is a moderate risk. The Bache funds were chosen primarily to keep our assets in one location and because there is no up-front investment charge. AIFRB can also move money between these (and several other) funds without being charged up-front commission charges on each move as long as we do not move them either into the Intermediate Fund or into the MMA fund. If AIFRB needs money from these Assets to pay current expenses, we will be charged a withdrawal charge. However, we can fund-switch at no cost to AIFRB until time of withdrawal. Any cash withdrawal within the first year will cost 5% but that rate declines a point a year. Five of the six utility bonds were sold on April 24 and 25 and the Bell Canada bond on May 21. The amounts received are summarized as follows:

Description	Maturity Value	Mat. Date	Net Value at Sale
Bell Canada bond 9.000%	4,000.00	2008	3,820.00
Ches Potomac Tel 9.250%	1,000.00	2015	1,000.00
Comm Edison 7.500%	3,000.00	2001	2,479.02
Comm Edison 8.125%	5,000.00	2007	4,500.00
Illinois Bell 8.125%	2,000.00	2016	1,820.00
Pacific G & E 8.125%	5,000.00	2009	4,587.50
TOTAL	20,000.00		18,206.52

At the meeting, C. F. Cole discussed the Draft of In-

cont. on page 2

Financial Report cont.

vestment Guidelines for the Treasurer of AIFRB (September 10, 1986 version).

The Final Policy Statement is:

INVESTMENT GUIDELINES FOR TREASURER OF AIFRB

It shall be AIFRB policy that:

1. The Treasurer, with the concurrence of the President, is authorized to invest Asset Funds in ways most likely to preserve them while seeking capital appreciation as well as current income of a level that does not unduly jeopardize them. We have used the Prudential Bache MoneyMart Assets instead of CDs or a savings account because of higher interest returns, but money funds are now paying only 6.0-6.2% interest. The P-B Government Intermediate Term Fund was chosen as an alternative but it has been difficult to get funds back easily. However, it still has a good rate of return and is a reasonable longer-term alternative. It is a no-load (either in or out) mutual fund that must keep at least 80% of its assets in US government paper. This fund is currently paying 9.00%; we can get out at any time and our funds are at only a slightly higher risk. Either such a mutual fund or MMA will be used to 'park' money received early in the year from dues and will subsequently be withdrawn gradually to meet yearly expenses.
The Treasurer shall follow similar practices whether dealing with funds needed later in the year for operations or with the Assets Funds. The Treasurer shall consult with and be guided by the advice of a broker while operating under these guidelines. However, the Treasurer shall be allowed freedom to buy or sell assets to preserve funds. From time to time Special Project Funds may become available and can be co-mingled with general AIFRB funds in order to maximize return. The Alaska Symposium funds were treated as Special Project funds and were held for several years before being used to meet cost of publication. They were co-mingled and invested under a philosophy of minimizing risk and maximizing return to AIFRB. This philosophy will usually limit their investment to NSLIC-insured S&L CDs, investment grade bonds, US government paper and to certain mutual funds with similar goals.
2. When it appears prudent, the Treasurer, with concurrence of the President, may invest our Asset Funds in other mutual funds such as the American Capital Government Securities Fund (a load fund) and can reinvest the dividends if that practice appears to be in the best interest of AIFRB. Asset Funds should be diversified holdings including mutual funds such as balanced funds and growth funds.
3. It shall not be considered to be in the best long-term interest of AIFRB to borrow routinely against our Asset Funds to offset deficits in the operating budget better solved either by spending less or by increasing dues. It shall be Board policy that borrow-

ing against Asset Funds for special projects can only be authorized by full Board action and, when it occurs, such borrowing shall be treated as a "first mortgage." Its repayment to our Asset Funds shall be of first priority.

(revised 9/10/86 and accepted as Policy by Board action: September 12, 1986).

AIFRB Brochure

Attached to this issue of BRIEFS is a copy of the latest revision of the AIFRB brochure describing the organization, its role, and qualifications for membership. Members are urged to give copies of the brochure to prospective members and other interested fishery people. Additional copies of the brochure are available from John Reintjes, Route 4, Box 85, Morehead City, NC 28557, and District Directors and members are encouraged to secure copies for distribution in the fishery community.

* * * * Editorial * * * *

The Rediscovery of the Free Lunch and Spontaneous Generation: Is Artificial Reef Construction Out of Control?¹

James A. Bohnsack, Ph.D.

Florida District, AIFRB

Artificial reef (AR) deployment has generated considerable public enthusiasm because it is one of few management options that may increase natural resources. However, AR popularity is based, in part, on questionable premises of a free lunch and spontaneous generation. Built to improve the environment, ARs attract fish and create fishing opportunities while simultaneously serving as solid waste disposal sites (the free lunch). Frequently fish can be caught within hours or days after dumping materials (spontaneous generation). This instant reward is a behavioral reinforcement resulting in perceptions that almost any material will be successful and that scientific research is, at best, an unproductive academic exercise and not worth funding. Thus, AR deployment has accelerated, while monitoring and research efforts have remained minuscule and critical questions remain unanswered.

Most AR programs in the U.S. are poorly or haphazardly funded, and in the best of American traditions depend on voluntary community involvement with donated labor and surplus "materials of opportunity." Emphasis is on minimizing short-term expenses. Thus, ARs have often been built of discarded tires, concrete rubble, culvert, dismantled bridges, derelict vessels, oil rigs, and other available objects. Little has been done in

¹The views expressed are only those of the author and do not reflect policy of AIFRB.

the U.S. to examine the benefits of using more expensive, high-tech reefs, as used in Japan and Taiwan.

Ostensibly built for improving fisheries, many ARs are in danger of becoming little more than disguised solid waste disposal programs, tax write-offs, or public relations gimmicks to promote some group or cause. The main purpose of some reefs apparently has been to serve as monuments for deceased individuals, sponsoring organizations, or companies who donated materials.

Although multiple objectives are desirable, they can easily get out of control. A circus atmosphere prevails in some areas. In Florida reefs have consisted of railroad boxcars, gasoline tanks, toilets, pink concrete dinosaurs, and even a working 1967 Rolls-Royce Silver Shadow. One company sank discarded microcomputer hard disks as an advertising gimmick and one hotel sank an airplane (soon thereafter destroyed by a ship's anchor). Sinkings of derelict vessels are made into media and social events which seem to emphasize publicity more than measurable fishery benefits. Spectacular pyrotechnic displays of explosives and fireballs have become *de rigueur*. One sinking featured dive bombing attacks (with dummy bombs) by military jets. Many of these reefs are of questionable value and in fact may have future detrimental impacts.

AR policy is currently established by individuals with little fisheries experience or training and is often based on meager anecdotal information or whim. Professional scientific input into site selection, design, or management is often limited to finding someone who will tell permittees what they want to hear (there is no shortage of self-appointed "experts"). Many programs have questionable objectives of maximizing the amount of material deposited or area covered. Presumably material will be dumped until no more materials or room are available.

ARs are rarely part of a comprehensive fisheries program. Thus, ARs are often included in such diverse agencies as Parks and Recreation, Public Works, and Environmental Resources Management. Despite good intentions, most of these programs lack experienced personnel trained in fisheries management. Some agencies have conflicting objectives such as solid waste removal or improved public relations.

Regulatory agencies are often charged with very specific concerns, such as preventing navigational hazards, interference with traditional fishing, pollution, and direct damage to productive live-bottom areas. Compared to these concerns, biological impacts and fishery management are incidental considerations. No significant requirements exist for monitoring or evaluation. In many cases confusion exists about particular local, state, and federal agency responsibilities.

Because of widespread public support for ARs, dumping continues, despite numerous researchers advising caution and warning about potential pitfalls. Besides a literature bias against reporting failures, research often has been superficial, self-serving, or of poor quality. Monitoring, research, and evaluation of ARs are often considered unimportant or of secondary importance for management. Thus, data are not being systematically collected showing which reefs are successful, which are not, and how reefs are being used. In Florida, state fun-

ding of AR projects is restricted to cleaning and transporting materials; use of funds for research, monitoring, or buying materials is prohibited! Saltonstall-Kennedy proposal guidelines have also specifically discouraged AR research.

Little direct scientific evidence exists to properly guide building efforts and show long-term beneficial or detrimental impacts of artificial reefs. Critical questions remain unanswered: What is the relative importance of different AR designs in redistributing existing fishes versus actually producing new fish biomass? Can ARs result in overfishing by concentrating fishes that normally would be dispersed over a wide area? The speed with which large fishes colonize ARs implies concentration is most important. Are assumptions about habitat or food web limitations justified? How many and what kind of reefs are desirable? Clearly, regional research is required to determine optimum AR size, configuration, placement, density, numbers, depth, and materials for maximum benefits.

The enthusiasm for ARs could draw attention away from possibly more beneficial fishery management actions such as enhancing or preserving existing estuaries and other natural habitats. Most ARs in the U.S. are targeted toward attracting adult fishes for sportfishing but neglect enhancement of larval and juvenile recruitment, survival, and growth. Results from other approaches may be more effective although less dramatic and delayed.

As fisheries managers and scientists, we should be asking who should be responsible for building reefs and determining AR policy (amateurs or professionals?). What are the long-term versus short-term economic, social, and biological tradeoffs of different AR strategies? I am concerned about current U.S. practices of relying on "materials of opportunity," especially considering that Japan rejected this approach and has spent over \$100 million annually since 1976 for reef construction and research. The short-term cost savings of present programs could be outweighed by potential detrimental influences of misplaced and poorly designed ARs. If Japanese researchers are correct, it might be possible to build reefs with specific design features that will attract particular species with economic or ecological importance rather than merely attracting a random assemblage of fishes.

Fisheries biologists and managers must articulate important questions and demand sufficient funding to provide answers on an ecologically relevant scale. We must incorporate ARs into comprehensive fishery management programs based on solid scientific foundations. The success of ARs should be measured by improved fish abundance, catch, or other user benefits instead of on the number of reefs built, the amount of materials deposited, or the amount of press coverage. In some areas no new reefs should be built until the impacts of existing reefs can be determined. Perhaps evaluation and monitoring should be required on every new reef. The problems are complex and the research will be difficult and expensive, but is a necessity before we inadvertently do irreparable damage to our natural resources by continued deployment of waste materials.

Ed. note: Rebuttals to or comments on editorials should be submitted to the AIFRB Editor.

Recipient of First Regional AIFRB Best Paper Award

The regional AIFRB Best Paper Award program initiated by President John Hunter has been successfully applied by the Central California District. Following the program guidelines described in the December 1986 issue of BRIEFS, the District selected the 1987 Annual Conference of the California-Nevada Chapter of the American Fisheries Society for implementation of the award. Criteria for the selection included: single author, emphasis on fisheries research, originality, significance of the research as a contribution to fisheries knowledge, and the quality of the presentation. Candidate papers for the award were selected in advance by reviewing abstracts submitted for all conference presentations. Candidate papers were reviewed and scored relative to the criteria by a selection committee of AIFRB members.

The winner of the award was James S. Brennan for his presentation, "Age Determination and Validation Studies of White Sturgeon (*Acipenser transmontanus*).” The work he presented was viewed to represent a quality, thorough, research study which broke ground in some new areas, and the results of which represent a significant contribution to the knowledge of the species and the future management of its fishery. An abstract of his presentation will appear in the next issue of BRIEFS.



Brian Waters (left), Director of the Central California District, presents the Best Paper Award to James Brennan.

A Bargain — Free Symposium Books

Copies of the AIFRB publication, *Fish and Wildlife Relationships in Old-Growth Forests*, are being offered to the AIFRB membership and non-members for the cost of postage. This 1984 book is the proceedings of a symposium held in Juneau, Alaska, and contains, in its 431 pages, 50 papers on fishery, wildlife, geology, forestry, invertebrate, ecology, and other topics.

For your copy, send \$2 (\$3 for Canadian and other non-U.S. addresses) to John Reintjes, Route 4, Box 85, Morehead City, NC 28557. This is a bargain!

Announcements and New Publications

Larval Fish Conference

The 11th Annual Larval Fish Conference will take place on June 1-3, 1987 at Michigan Technological University, Houghton, Michigan. This conference will be sponsored by the University, the Great Lakes Fishery Commission, and the Michigan Department of Natural Resources.

Sessions will cover lakes and oceans—two worlds for fish recruitment, papers on North American lake sturgeon, and papers on lost and not found populations and verification. Workshops, displays, poster sessions, and movies will be other features of the conference. University housing and local motels will accommodate participants. The \$55 registration fee includes a lunch/picnic, a banquet, and conference materials.

Additional information is available from Bursar, Michigan Technological University, Houghton, MI 49931.

New AVI Fishery Books

Principles and Practices of Pond Aquaculture, edited by J. E. Lannan, R. O. Smitherman, and G. Tchobanoglous, covers the physical, chemical and biological processes occurring in pond systems and the interactions among them. Fish culture is discussed in relation to the design, management, and operation of pond culture systems. CONTENTS: PART I — PRINCIPLES OF POND AQUACULTURE: Includes Biological Principles of Pond Culture covering bacteria and nutrient cycling, sediment, and benthos, phytoplankton and macrophytes, zooplankton, fish and fish/plankton interactions; PART II — POND CULTURE PRACTICES: Includes Stocking Practices in Pond Fish Culture; Fertilization Practices in Warmwater Fish Ponds; Feeds and Feeding Practices in Warmwater Fish Ponds; Water Quality Management Practices; Diseases, Competitors, Pests, Predators, and Public Health Considerations; Pond Culture Practices; PART III — MODELLING OF POND CULTURE SYSTEMS: Includes Hydromechanical and Water Quality Responses of Aquaculture and Water Quality Responses of Aquaculture Ponds; Mathematical Models Pertinent to Fish Production and Tropical Pond Aquaculture; Index.

The 252-page book sells for \$25 from the AVI Publishing Co., 250 Post Road E., Westport, CT 06881, and is available from the American Fisheries Society at a 5% discount.

Genetics for Fish Hatchery Managers, by Douglas Tave, is specifically written for the fish farmer or aquaculturist who needs a basic guide to applying genetic information to breeding and hatchery management. The author provides the fundamental material on genetics in non-technical language with emphasis on applications of ideas and concepts. The book is a practical manual and does not attempt to cover fish genetics in an all-inclusive manner. References are cited to illustrate various ideas and provide an entry into the literature on genetics and breeding.

The accessibility of the concepts and applications of

genetics as presented in this book is especially important to the fish farmer in terms of profitable hatchery management. The author specifically demonstrates how understanding basic genetics is directly linked to increased productivity and quality. This book is designed to be used directly by fish farmers, extension agents, students and anyone in the business of producing fish.

This volume has 299 pages and can be bought from AVI for \$39; the American Fisheries Society offers it at a 5% discount.

Age and Growth of Fish

Robert C. Summerfelt (AIFRB Fellow) was the managing editor and Gordon E. Hall the technical editor of a 1987 hardcover book on age and growth of fish. This fact-filled volume contains 40 chapters stemming from the 1985 International Symposium on Age and Growth of Fish, sponsored by the Sport Fishery Research Foundation, the Iowa Conservation Commission, and Iowa State University and attended by 164 biologists, mathematicians, and marine and freshwater fishery specialists from 12 countries.

It contains research findings as well as methods and procedures for determining age and growth of fish developed since the last symposium, in 1973, and considers their implications for future advancements in resource management and evaluation of exploited fish populations. Covered are all aspects of contemporary age and growth research on freshwater, marine, and anadromous fish of temperate and tropical latitudes. More than 200 tables, black-and-white photographs, charts, graphs, and line illustrations along with end-of-chapter references, a glossary of terms, and both subject and taxonomic indexes complete this one-of-a-kind, invaluable sourcebook.

The contents cover history, problems, and current status; characterization of growth; variability, error, and bias; validation; methods; larval and juvenile fish; and applied studies.

The book can be ordered for \$34.95 from Iowa State University Press, 2121 South State Ave., Ames, Iowa 50010.

Aquatic Contaminant Report

Funded by a grant from AFTMA's Environmental Quality Committee, the Sport Fishing Institute of Washington, DC, has prepared a study, *Aquatic Contaminants: A Threat to the Sport Fishing Industry*. The report supplies background information and provides state-by-state analyses of contaminant impact on sport fisheries. It includes a listing of key state and federal agencies with contaminant-control program responsibilities. The study also summarizes all major environmental laws pertaining to contaminant control and management.

According to the study, 38 states have either consumption advisories or sport fishing restrictions or closures currently in effect. Minnesota leads all states with 198 consumption advisories, 146 attributable to mercury. Wisconsin has 73, with 60 due to mercury and 12 to PCBs, followed by New York with 29 and Michigan with 27. Other states exhibiting moderate im-

pacts from contaminant advisories include Indiana (16), Missouri (15), Illinois (8), and California (7).

Aquatic Contaminants: A Threat to the Sport Fishing Industry is available from AFTMA Center, 2625 Clearbrook Drive, Arlington Heights, Illinois 60005.

In Memoriam

Luis R. Rivas

Dr. Luis Rivas, Resident Adjunct Professor of Ichthyology at the Nova University Oceanographic Center, passed away on June 8, 1986 after a brief illness. He had been at the Center since 1981. His distinguished academic career spanned nearly 50 years of scientific activities related to the morphology, ecology, and taxonomy of fishes.

Dr. Rivas was born in Key West, Florida in 1916. He completed his B.S. in Cuba in the 1930's and continued graduate studies in Canada and the U.S. He received the Ph.D. degree from George Washington University in 1953. He was the recipient of several Guggenheim Fellowships and held faculty positions initially in Havana and later at the University of Miami (1947-68). He was a fisheries biologist at the U.S. National Marine Fisheries Service in both Panama City-Pascagoula (1971-74) and Miami (1974-81).

Dr. Rivas belonged to many scientific societies and was the author of a numerous scholarly publications in both scientific journals and the popular literature. His studies in fisheries covered the world's oceans with major emphasis in the Caribbean Sea, its bordering territories in Central and South America, and the islands of the Greater Antilles. Dr. Rivas's honors included a medalist award from the Florida Academy of Sciences, editorship of the American Society of Ichthyologists and Herpetologists, Fisheries Advisor to Peru, and Fellow of the AIFRB.

A friend and associate of Ernest Hemingway, he was the technical advisor for the motion picture "The Old Man and The Sea" which was based on Hemingway's classic novel. Dr. Rivas had a lifelong interest in billfish and sport fishing activities as participant, judge, consultant, and contest organizer. One of his many research contributions involved the definitive taxonomy of the snook, one of the most popular of game fish.

Dr. Rivas had a strong interest in student education and great enthusiasm for all aspects of academic life. His passing deprives the Oceanographic Center and the greater academic community of a respected scientist, valued colleague, and close friend.

Frances N. Clark

One of the California Department of Fish and Game's true pioneers and a world-class authority on marine fisheries died in February 1987 and was buried at sea, "her beloved sea". Dr. Frances N. Clark, former director of the Department's fisheries laboratory and the first female Department marine biologist, died at the age of 92. She was an AIFRB Fellow.

Dr. Clark began her career in biology mounting fish

cont. on page 6

In Memoriam cont.

scales at Stanford University, from which she later received her doctorate. She joined the staff of the California Department of Fish and Game in 1921, working as a scientific assistant for \$.75 an hour, and in 1941 was appointed director of its Terminal Island laboratory, where she did most of her work.

Through her work with the Department, principally on sardines, Dr. Clark became known as one of the world's foremost authorities on marine fisheries. Her many publications, commencing with a doctoral thesis on the life history of the grunion, are well known to fisheries workers. Most of her papers deal with the life history, dynamics, and conservation of the California sardine. Under her leadership the laboratory continued its biological and statistical programs and widened its activities to include several new research projects, among them the anchovy, yellowtail, surfperch, and kelp bass studies and an expanded high seas tuna program.

Perhaps the finest testimonial to Dr. Clark's leadership abilities as a scientist and administrator is the roster of well-known fisheries workers who received their training under her guidance and who are now serving the public throughout the Department and in other agencies.

Dr. Clark remained very active until her death. She and her sister, Lora Hubbs, traveled to Yugoslavia, Scamons Lagoon, and Mexico just last year.

Membership Report

NEW ASSOCIATES

- Chang Hwa-Chang NY
- Dr. Antonios Pappantoniou NY

NEW MEMBERS

- Dr. Richard W. Soderberg PA
- Dr. Ronald M. Thom WA
- Gregory J. Hueckel WA
- Dr. James M. Haynes NY
- Tayab M. Rehan Pak.
- Rolland A. Schmitt WA
- Mark Helvey CA
- Mark G. Pedersen WA
- Ben D. Jaco TN

PROMOTED TO MEMBER

Kurt M. Schaefer CA

PROMOTED TO FELLOW

Dr. Neal R. Foster MI
Ronald E. Westley WA

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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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JUNE 1987

October Election

An election will be held in October of this year for President-Elect of AIFRB. John Hunter has appointed the members of the Board of Control as the Search Committee. The general membership is encouraged to submit names of possible candidates to their District Directors or to the AIFRB Secretary, Dr. Roy Nakatani (University of Washington, Fisheries Research Institute, WH-10, Seattle, Washington 98195).

Best Paper Abstract

The April 1987 issue of BRIEFS carried an announcement of the presentation of AIFRB's first regional best paper award to James Brennan. The Central California District made the award at the 1987 Annual Conference of the California-Nevada Chapter of the American Fisheries Society. An abstract of Jim's paper is printed here:

Age Determination and Validation Studies of White Sturgeon (*Acipenser transmontanus*)

James Brennan

Moss Landing Marine Laboratories,
Moss Landing, CA

Sturgeon fisheries worldwide have a history of overexploitation and mismanagement. To properly manage such an economically important fishery information on age, growth, and reproduction are essential. This Sea Grant-sponsored study compared five bony structures of the white sturgeon (*Acipenser transmontanus*) to determine the most accurate and precise technique for ageing. Annuli were counted on otoliths, scutes, opercles, cleithra, and fin ray sections using x-radiography, scanning electron microscopy, clearing, staining and other ageing techniques to elucidate depositional patterns. Although comparison of depositional patterns show similarity among different structures some structures were consistently more readable than others.

Tag-recapture and laboratory grow-out studies were also conducted to determine the validity of ring counts. A total of 1,400 wild white sturgeon from California Department of Fish and Game samples were measured, tagged, injected with 25 mg. of oxytetracycline (OTC) per kilogram of body weight and then released in San Pablo Bay. To date we have recovered 67 of the 191 reported recaptures, all of which reveal OTC uptake in

the bony structures observed. Samples acquired from fish which have been at large for over one year appear to have annual depositional patterns although more fish from a wider range of size-classes and a longer time at large are needed to verify patterns. OTC-injected and non-injected laboratory grow-outs from the aquaculture program at the University of California at Davis appear to validate our hypothesis that depositional patterns are of an annual nature.

Undergraduate Research

An innovative conference was held on the campus of the University of North Carolina at Asheville on April 23-25, 1987. The organization of the *First Annual National Conference on Undergraduate Research* began with an unusual dual aim: to design a conference which combines the presentation of scholarship and the discussion of pedagogy and curriculum. Thus, the largest segment consisted of 170 student papers, in 30 sessions, addressing a variety of academic fields ranging across the arts and sciences. In addition, there were 40 student posters displaying the results of research. The range of student scholarship assured a wealth of topics, approaches, and presenters.

The conference also featured a *Symposium on Undergraduate Research*, a forum for discussion by university faculty, administrators, and representatives of government agencies. It included such topics as: How do undergraduate institutions get started in undergraduate research? What kinds of funding are available? How can student work be published and disseminated? What kinds of relationships can we establish between small colleges and major research universities? The Symposium should contribute to the ongoing national discussion of undergraduate research.

Your BRIEFS Editor attended the conference and was greatly impressed by the planning, organization, and operation of the meetings. A National Advisory Committee, consisting of 37 individuals from colleges, universities, and research agencies from coast to coast, planned the proceedings. Several organizations—Carolina Power & Light, National Science Foundation, Sigma Xi, U.S. Forest Service, and others—contributed to the conference. Students from across the land—CalTech to Univ. New Hampshire and Seattle Univ. to Georgia State—presented highly technical papers with professional demeanor.

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Undergraduate Research cont.

The sessions covered a broad array of arts and sciences, including theoretical physics, experimental nuclear physics, organic chemistry, physical chemistry, astronomy, molecular biology, biochemistry, general biology, developmental biology, ecology, human biology, environmental science, mathematics, computer science, history, clinical and health psychology, sports psychology, social psychology, sociology and anthropology, literature, communications, and general humanities. Notably absent among the many individual papers were reports on fishery research, although there was one paper on nitrogen in developing shark embryos.

Would the fish community be interested in encouraging more undergraduate research?

Oliver B. Cope
BRIEFS Editor

Travel Assistance Awards

Dr. Joseph W. Rachlin announces that selections have been made for AIFRB's 1987 Travel Assistance Program. The winning Associate Members will receive \$250 each to assist them in presenting aspects of their research at national meetings. The selectees, their affiliations, and abstracts of papers to be presented are:

Dr. Mark R. Jennings, Research Associate with the Department of Herpetology of the California Academy of Sciences. He will be presenting papers at the June meeting of the American Society of Ichthyologists and Herpetologists, in Albany, New York.

FREDERIC MORTON CHAMBERLAIN (1867-1921), PIONEER FISHERY BIOLOGIST OF THE AMERICAN WEST.

The life of Frederic Morton Chamberlain (1867-1921) was marked by his many contributions to fishery science. As an assistant with the old U.S. Bureau of Fisheries, he pioneered life history studies of salmon in California and Alaska, and assisted in the collection of hundreds of thousands of natural history specimens from the Pacific Ocean as resident naturalist on the Steamer U.S.S. *Albatross*. He was innovative in the use of field photography in fishery work, and the design and construction of capture nets and collecting gear. His detailed reports were important in documenting the conditions of the native ichthyofauna in Alaska, Arizona, and California at the turn of the century and have been heavily relied upon by subsequent investigators. His ability to design and conduct scientifically justifiable studies to solve fishery problems while under many kinds of hardships is a testament to his background and dedication to the field. He represents the prototype of modern fishery biologists of the twentieth century.

INTERACTIONS OF DESERT PUPFISH (*CYPRINODON MACULARIUS*) AND MOSQUITOFISH (*GAMBUSIA AFFINIS*) IN SYSTEMS OPEN TO EGRESS.

Varying numbers of desert pupfish (*Cyprinodon macularius*) and mosquitofish (*Gambusia affinis*) were introduced separately into experimental habitats open to egress to determine resource requirements for each species and the relationship between numbers and resources. Laboratory environments where "voluntary" colonization was achieved, were created for both species. Results indicate that both fish have the innate ability to regulate numbers in their respective populations to available resources via emigration. When mosquitofish were introduced into tanks with established populations of pupfish in habitats containing constant resources and open to egress, there was

no significant change in population size for either species as compared to single species populations. Adult pupfish and mosquitofish are able to co-exist successfully in habitats open to egress for short periods of time because they use very different resources and do not grow in number beyond resource limits. These data suggest that replacement of desert pupfish by mosquitofish in the southwest is either a phenomenon likely to occur in closed environments or the result of longer interactions between all life stages.

CLOUDSLEY LOUIS RUTTER (1867-1903), PIONEER RESEARCH FISHERY BIOLOGIST AND FISHERIES ADMINISTRATOR OF THE AMERICAN WEST.

The meteoric career of Cloudsley Louis Rutter (1867-1903) is described and his many contributions to fishery science are discussed. As one of David Starr Jordan's first ichthyology graduates at Stanford University, he pioneered life history studies of salmon in Alaska and California and assisted in the study of sea lion predation of commercial fishes of the Pacific Coast. A gifted ichthyologist and administrator, he was responsible for designing and conducting many of the old U.S. Bureau of Fisheries studies in the American West at the turn of the century. His work on Pacific salmon remains a classic in the field and his other 20 publications are important contributions to the ichthyology of China, the northeast Pacific, and the American West. He was innovative in the use of field photography for fishery work and he helped initiate studies in fish embryology, tagging, toxicology, and culture. His untimely death robbed the Bureau of one of their best investigators. He represents the prototype of modern research fishery biologists and fisheries administrators of the twentieth century.

THE PATTERN OF BULLFROG (*RANA CATESBEIANA*) INTRODUCTIONS IN THE AMERICAN WEST: HISTORICAL SIGNIFICANCE AND IMPACT ON NATIVE RANIDS.

The introduction and progressive expansion of bullfrog (*Rana catesbeiana*) populations in the American West is described with data collectively drawn from published records, museum collections, field notes, and personal observations. Bullfrogs were first introduced into ID, CA, and HI in the 1890s as a source of food and to help control insect pests. Populations from these introductions provided much of the stock for subsequent releases in nearby states. These transplants, coupled with new stock from the eastern U.S. and aborted frog farming operations, have resulted in the widespread occurrence of bullfrogs throughout the American West. The ability of bullfrogs to colonize and survive in localities west of the Great Plains is likely the result of land use practices over the past 100 years. The impacts of farming, canal building, flood control, fish introductions, mining, urbanization, and livestock grazing all favor bullfrogs over native western ranids. It is suggested that land use practices, coupled with widespread introductions of non-native fishes, have effectively given bullfrogs an advantage over native ranids in the American West.

Ms. Kathleen R. Matthews, a Ph.D. Student of Professor Bruce S. Miller, at the Fisheries Research Institute, WH-10, of the University of Washington, Seattle. She will be presenting aspects of her thesis research at the Fourth International Conference on Artificial Habitats for Fisheries, in Miami, Florida November 1987.

MOVEMENT STUDIES OF NEARSHORE DEMERSAL ROCKFISHES IN PUGET SOUND, WASHINGTON.

An underwater tagging program was initiated to determine if habitat influences the movement patterns of copper, quillback and brown rockfishes. A total of 222 rockfishes were tagged on three reef types: high relief rocky reef, high relief artificial reef, and low relief rocky reef. Rockfishes confined their activities to smaller areas (80% within 20 m²). Most of the copper and quillback rockfishes left the low relief reef in the fall after residing there during the spring and summer and some (7 of 61 tagged fish) moved offshore to the deeper artificial reef. In translocation experiments (up to 400 m) from reef to unstructured (flat-bottomed) areas, all of the 43 displaced copper and

quillback rockfishes returned to the high relief reefs but none of the 14 displaced rockfishes returned to the low relief reef. Translocations from one reef type to another demonstrated that copper and quillback rockfishes returned to high relief reefs when displaced to a low relief area but did not return to the low relief reef when displaced to high relief reefs.

Ms. Katherine Yudin, a Master's Student of Professor Gregor M. Cailliet, of the Moss Landing Marine Laboratories of the California State University. She will be presenting aspects of her thesis research at the June meeting of the American Elasmobranch Society held in conjunction with the meeting of the American Society of Ichthyologists and Herpetologists, in Albany, New York.

AGE AND GROWTH OF THE GRAY SMOOTH- HOUND, *MUSTELUS CALIFORNICUS*, AND THE BROWN SMOOTHHOUND, *M. HENLEI*, FROM CENTRAL CALIFORNIA.

Growth bands from x-radiographs of vertebral centra of 58 gray and 71 brown smoothhound sharks from central California between 1978 and 1985 were used to determine age composition, age at first reproduction, and growth rates. Total lengths and centrum widths were significant and linear. *M. californicus* ranged between 235mm and 1250mm TL, and were aged from 0 and 9. *M. henlei* ranged between 257mm and 1000mm TL (50mm over the record) and were aged from 0 and 13. Age at first reproduction for both species was between 2 - 3 years. Von Bertalanffy and back-calculated growth curves were similar and asymptotic lengths of females of both species were greater than males. Edge analysis of the centrum clearly demonstrated annual periodicity of growth bands for *M. californicus* but *M. henlei* proved more difficult. These 2 California species of *Mustelus* have growth characteristics similar to those of other species of *Mustelus* reported.

Ms. Barbara E. Warkentine, a Ph.D. student of Professor Joseph W. Rachlin, Lehman College of the City University of New York. She will be presenting aspects of her thesis research at the May meeting of the Northeast Fish and Wildlife Conference, Boston, Massachusetts; and at the 117th Annual Meeting of the American Fisheries Society, September, Winston-Salem, North Carolina.

RESOURCE UTILIZATION AND DIET SIMILARITY OF FOUR SYMPATRIC SPECIES OF FLAT-FISH.

Four flatfish, the sand flounder, summer flounder, winter flounder, and smallmouth flounder, occur sympatrically, during summer months, in regional areas of the New York Bight. One such area is located off Sea Girt New Jersey (40°08.00'N:74°00.90'W). Fish were collected by otter trawl from this area in order to address two questions: How do these flatfish utilize the food resource base in this area of sympatry? And how much dietary overlap is there among these species? Upon capture the stomachs of these fish were removed, the contents identified and enumerated. The Manly preference index and the electivity index of Vanderploeg and Scavia were used to determine which food items were preferentially utilized by each flounder population, and diet similarity between species was calculated using the Schoener overlap index.

The sand flounder, although taking mysids, crangons, amphipods, crabs, nematodes, fish and hydroids, preferentially foraged on mysids, crangons, and hydroids. The summer flounder, which foraged on mysids, crangon, amphipods, nematodes, and fish, showed preference for nematodes and fish. The smallmouth flounder utilized mysids, crabs, and polychaetes but only showed preference for polychaetes. The winter flounder, though foraging on mysids, amphipods, crabs, nematodes, polychaetes, isopods, and hydroids, preferentially selected amphipods, crabs, polychaetes, isopods, and hydroids. These results show that two preferentially foraged on food items are being shared by different flounder populations; the smallmouth flounder and the winter flounder both prefer polychaetes while the sand flounder and the winter flounder preferentially select

hydroids. In examining the overall diet similarity between each species it was determined that only the sand flounder and the summer flounder had very similar diets (97.8% overlap). Thus these two species could potentially become competitive should food resources become scarce. However, as these two species do not show preference for the same food items competition for food may be minimal.

GROWTH CHARACTERISTICS OF THE SAND FLOUNDER: A FUTURE FISHERY.

The sand flounder, *Scophthalmus aquosus*, is the most abundant flatfish occurring in coastal waters of the New York Bight. Its abundance may be attributed to the fact that it has long been considered a trash fish and therefore not subject to intense exploitation. However should a decrease in the stock abundance of the commercially important flatfish occur, the sand flounder may be looked upon as an alternative and valuable resource. Therefore it is important to understand the growth characteristics of this fish now so as to properly manage the fishery should major exploitation occur.

In order to study their growth characteristics, sand flounders were collected from an area of the New York Bight extending from Seaside Heights, N.J. to Elberon Ground N.J. Upon capture fish were measured and weighed and otoliths removed for age analysis. Fish ranged in size from 9.3 cm standard length (S.L.) to 31.0 cm S.L. Age analysis revealed four year classes; 2+, 3+, 4+, and 5+ with respective mean sizes of 11.5 cm, 18.5 cm, 22.4 cm and 26.2 cm. These data, when fitted to a von Bertalanffy growth model, yielded the following relationship:

$$L_t = 33.2 (1 - e^{-0.37(t - 0.86)})$$

This relationship indicates that sand flounders in this area have an asymptotic length of 33.2 cm, a Brody's growth coefficient of 0.37 and a t_0 value of 0.0968. A length-weight relationship was determined for these fish by regressing weight (kg) on length (cm). This relationship was best described by a second order polynomial the equation of which is $Y = 0.0009X^2 - 0.011X + 0.04$, $r^2 = 0.92$. Logarithmic transformation of this data yielded a regression curve of $Y = 2.7976X - 4.3730$, $r^2 = 0.96$. From this relation the type of growth exhibited by this fish population was determined to be allometric.

Albacore Forecasting Model— Preliminary Results

Fisheries scientists have long been interested in being able to forecast when, where, and how many fish will occur in a fishery. The ability to forecast for the albacore fishery is especially important because the cost of search time to the fleet is high and there is a long history of research on the factors influencing albacore distributions. Dr. Roy Mendelssohn, Operations Research Analyst, and David Husby, Oceanographer, Southwest Fisheries Center, U.S. National Marine Fisheries Service, have been attempting to construct a fine-scale (2 weeks by 1 degree square) quantitative forecasting model of the albacore fishery off the west coast of the U.S.

Initially, environmental data were extracted from a data set for Marsden squares 120, 121, and 157. From these, biweekly mean values and variances were calculated by 1 degree square for sea-surface temperature (SST), and the two components of the wind speed. More robust measures of central tendency and spread were also calculated for each variable on the same time and space scales. Mendelssohn and Husby selected these variables based on previous work with tuna in the Gulf of Guinea which suggested that these variables are effective in forming forecasts (see AIFRB BRIEFS, Vol. 12, No. 6). Surface data also are more complete time series than subsurface data and, if real-

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Albacore Forecasting Model cont.

time forecasts are to be developed, wind and SST can be obtained relatively easily compared with other oceanographic variables.

Biweekly means by 1 degree square were calculated for albacore catch-per-unit-effort (CPUE) by jig boats only. Robust measures of central tendency and spread were also calculated for CPUE.

Previous efforts in correlating environmental variables with fish catch or CPUE have concentrated on contemporaneous oceanographic conditions restricted to the areas where fishing occurs. This type of analysis ignores the oceanographic processes which precede fishing. Mendelssohn and Husby's results from the Gulf of Guinea suggest that conditions that occur before fishing takes place are the most important factors in forecasting CPUE. The variables in the analysis generally were left untransformed, thereby assuming that the relationships between the fish and the environment were linear.

Finally, when forecasting, it is not sufficient to examine just the areas where fishing has occurred. Suppose a moderate temperature correlates with high CPUE in areas where fishing has occurred. There may also be other areas that have the same temperature but have no fishing. In forecasting, it must be possible to discriminate between these types of areas. Analyses restricted to only the areas of fishing may not find relationships capable of this level of discrimination (i.e., the variables are perhaps necessary but definitely not sufficient) and it does not deal with the very real problem that in any area with no fishing there are missing data.

Preliminary efforts have been aimed at determining the appropriate time scales on which the environment affects the CPUE for albacore, determining the likely functional shapes of these relationships, and in developing techniques for estimating relationships when there are missing data. As an initial effort, Mendelssohn and Husby looked at individual 1-degree squares (thereby ignoring spatial effects), choosing the areas that had the highest number of biweekly periods in which there was at least some fishing. In all, some 24 areas were examined—all were situated around the inshore area from Baja California to the Canadian border.

Using a technique for estimating r-squares in a regression context when data are missing, they found that for each of the 24 areas the multiple r-squared between the contemporaneous (lag 0) environmental variables and CPUE for albacore were less than 0.1—that is, there is little evidence of a relationship. This is consistent with previous correlation studies. However, when using a method to calculate "optimal regressions" (in a sense to be made exact in a moment) they found very different results. For example, for 44°N, 125°W they obtained:

Lags in model	Estimated r-square
0	0.35
0,1	0.67
1	0.65
1,2	0.68

Not only is the lag 0 r-square now much higher, but they found that the lag 1 model does just about as well as the model with both lags 0 and 1. This suggests that

there is very little independent information in the lag 0 data. Moreover, where they originally found almost no predictability in the data, they found that almost 70% of the variance in the albacore CPUE can be explained. That pre-conditions are more important in explaining the presence of tuna is consistent with their previous studies of the Gulf of Guinea.

"Optimal regressions" are an algorithm developed by Breiman and Friedman that empirically calculates transformations of all the variables in a multiple regression so that the normalized sum of squares is minimized. For the two-variable case, this would be equivalent to estimating empirically the transformation of each variable that produces the highest correlation between the variables. The algorithm helps in exploring the *a priori* belief that the relationship between CPUE and the environment is nonlinear, but of a shape not known.

The estimated transformation can be examined by plotting the original data against the transformed data. The transformations for CPUE tend to be close to a log transformation, a result which is not surprising considering that CPUE is the ratio of two variables. The estimated transformations for SST are of a threshold type, and predicts that the albacore should exhibit a preference for slightly colder water as location goes northward. This suggests that there is no single temperature that is "optimal" for albacore, but rather that the temperature reflects more favorable conditions for the albacore and the conditions will vary in space.

The estimated transformations for the two components of the wind speed are highly nonlinear, with winds from the south and east having no effect at all. The "ideal" wind conditions appear to be a wind out of the north-northwest at a speed of roughly 7-10 m/sec. This type of wind is usually associated with upwelling events. The sharp jump in the transformations around 0 m/sec. usually is indicative of two regimes, consistent with the belief that changes in upwelling events are of much different import to the fish than changes in downwelling events.

To determine whether the transformations are meaningful, Mendelssohn and Husby ran the original data through an algorithm that estimates multivariate autoregressive models with missing data, and also produces estimates of the missing data. The estimated CPUE values suggest high level of CPUE at times when it is unlikely that the fish are available to the jig fishery. However, when they ran the transformed data through the identical algorithm they found sharply defined fishing seasons, much more consistent with observed fishing conditions. This suggests that the transformed relationships have gone a long way in defining the conditions in which one can expect high levels of CPUE for albacore.

In sum, Mendelssohn and Husby have shown why they feel previous attempts at correlating tuna CPUE and environmental conditions have failed. The relationships between the environmental conditions and CPUE are highly nonlinear and occur at time scales that are different than the ones normally examined in such studies. The fact that their simple models that do not yet include spatial relationships (at time lags) and longer

scale lags (i.e., seasonal effects) explain such a large part of the observed variance in CPUE makes them optimistic about the possibility of producing fine-scale forecasts of CPUE.

*From Report of Activities, July-August 1986,
Southwest Fisheries Center, U.S. National Marine
Fisheries Service, La Jolla, CA*

District Meetings

CENTRAL CALIFORNIA

Brian F. Waters, Director

Regular District dinner meetings were held in November 1986 at Moss Beach and in March 1987 in Palo Alto. In addition to these meetings the District held its traditional Christmas Chinese Banquet for members, spouses, and friends in San Francisco in December, with a ten-course meal. The District also instituted the AIFRB Best Paper Award program at a regional fisheries conference, described in an article elsewhere in this issue.

The featured speaker at the November meeting was Konstantin Karpov, a marine biologist with the California Department of Fish and Game headquartered at Fort Bragg on the northern California coast. He gave a presentation on "Northern California Red Abalone—The Population and Its Management." He used a combination of telephone interviews and field interviews of sport divers and shore pickers to estimate effort, catch and return rates, mortality, and length frequency distributions for the 1985 sport fishery for this marine mollusc. Diving effort and take were both about twice those for shore pickers, with each method resulting in an estimated take of over three abalone per day. Shore picking effort declined early in the season, indicating a sustained yield fishery with abalone recruited from subtidal to intertidal areas during the closed season.

March's dinner meeting featured speaker was Mark Silberstein, program coordinator for the Elkhorn Slough National Estuarine Research Reserve, tributary to Monterey Bay on the central California coast. His presentation was titled "Elkhorn Slough Research Reserve: Opportunities for Discovery." He described how development of the reserve by NOAA and the California Department of Fish and Game has opened opportunities for research in this unique coastal wetland. Ongoing studies include basic and applied ecological research and work on restoration of coastal wetland habitat.

Thesis and Dissertation Abstracts

The Seasonal and Diel Use by Juvenile and Adult Finfishes of a Mesohaline Intertidal Creek on the York River, Virginia

Robert W. Middleton, Ph.D., 1986

The College of William and Mary in Virginia

An intertidal creek off the York River, Va. was sampled for juvenile and adult fishes during the spring, summer, and fall of 1981. Over 21,500 individuals of 14 species were collected using a block net technique.

Ninety-eight percent of the total number was derived from five species which were, in order of abundance; *Brevoortia tyrannus*, *Fundulus heteroclitus*, *Anchoa mitchilli*, *Leiostomus xanthurus*, and *Menidia menidia*.

Diel variations in abundance were indicated for *A. mitchilli* and *M. menidia* juveniles which were mostly captured at night and for *M. menidia* adults, *L. xanthurus* juveniles, and *F. heteroclitus* of all ages which were typically captured during the day. *A. mitchilli* and *M. menidia* were no longer captured in the intertidal creek after reaching sizes of approximately 60 mm SL and 67 mm SL, respectively.

Production estimates for the fish captured in the intertidal creek system were calculated to equal 2.53 g dry weight m⁻² or 13,051 cal m⁻².

Reproductive Ecology, Population Dynamics, and Seasonal Movements of the Hogchoker (*Trinectes maculatus*) in the Elizabeth River, Virginia

Stephan M. Smith, M.A., 1986

The College of William and Mary in Virginia

Twelve stations, from the mouth to the upper reaches, of the Southern Branch of the Elizabeth River System, Virginia, were sampled by trawl to determine seasonal movements and reproductive ecology of *Trinectes maculatus* within a severely polluted environment. Sex ratio was 1:1.4 (male:female) overall, with males predominating at the most downstream stations during the spawning season. Maximal spawn as determined by female gonado-somatic and maturity indices occurred at the lower station group during July and August with precocious individuals commencing in June. Spawning ceased abruptly in September followed by the commencement of an upstream overwintering migration. Histological examination of ovaries and testes showed mean ripe egg diameter to be 0.354 mm. and all phases of spermatogenesis to be present in unison. Asynchronous single spawning was observed for females; however, males appear to spawn repeatedly throughout the season. All migratory movement ceased as bottom temperatures dropped below 9.8°C. and fish remained resident until at least April 22 when bottom temperatures rose above 16.5°C. A spring return migration to downriver spawning sites was observed from April to June. Maximum rate of movement was 461.8 meters day⁻¹ with some evidence of reduced residence at the most severely polluted bottom sites.

Of 6,418 fish tagged, a total of 90 were recaptured from 2 to 350 days at liberty. Single and multiple census techniques were utilized to estimate population size and survival rate from mark-recapture data. All estimates were within 10% of 241,402 multiple census estimate with $s = 0.2171$ (T.L. > 90 mm.).

Rate of sinistrality for *T. maculatus* was observed to be 0.069 percent within the Elizabeth River system.

Bottom temperature was considered to be the controlling factor for migratory activity, while salinity and channel depth appear important in spawning and overwintering site selection.

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Morphometric and Meristic Stock Identification of Summer Flounder (*Paralichthys dentatus*)

Glenn Roger Delaney, M.A., 1986

The College of William and Mary in Virginia

Multivariate Analysis of Variance (MANOVA) of 16 morphometric characters of summer flounder (*Paralichthys dentatus*) shows a highly significant difference ($p = 0.0001$) between samples representing proposed Mid-Atlantic and Trans-Hatteras stocks. The Atlantic States Marine Fisheries Commission's Fishery Management Plan for Summer Flounder currently recognizes the contribution of only one stock to these fisheries. The implications of this study for state and federal fishery management are discussed.

Fluctuations in the Catchability Coefficient of Atlantic Menhaden, 1968-1982

Steven M. Atran, M.A., 1986

The College of William and Mary in Virginia

Weekly estimates of Atlantic menhaden abundance were derived from catch-at-age data for the years 1968-1982. Initial estimates of weekly catchability coefficients were calculated from the estimates of abundance and catch and effort data. Plots of the average weekly catchability coefficients for age-groups 0 to 5 revealed patterns of fluctuations within a season. Between-year fluctuations in catchability coefficients were found to be significantly different after accounting for the within-season variation. Age-groups were tested separately to eliminate age-dependent variation as a possible cause of fluctuation. The relationship between catchability and abundance was calculated: predicted values of the catchability coefficient based on abundance were subtracted from the original estimates. Significant differences were also found between years for these residual catchability coefficients; thus factors in addition to abundance must contribute to between-year variation in the catchability coefficients. Potential factors affecting catchability coefficients are cyclic changes, long-term trends, density-dependent changes, density-independent changes, and changes due to changes in fishing effort.

Announcements and New Publications

Salt Marsh Conference

The History and Ecology of Salt Marshes in the Gulf of Maine is the title of a conference to be sponsored by the University of Maine Canadian-American Center in June 1988. This inter-disciplinary conference will explore the ecology and history of marshes, and look at contemporary issues, as well. Possible topics might include the formation of marshes and how they are changing, traditional farming of salt hay, and the current regulation of marshes. The 5-day conference will be held in eastern Maine and Nova Scotia and include field excursions. For further information contact: Becky K. Grant, Canadian-American Center, University of Maine, 154 College Ave., Orono, ME 04469.

American Fisheries Society Annual Meeting

The American Fisheries Society will hold its 117th Annual Meeting on September 13-17, 1987 at the Benton Convention Center in Winston-Salem, North Carolina.

Twenty-seven organized sessions will form the core of the meeting; they will be a blend of just about every phase of fishery science. Two eminent fishery scientists, Peter A. Larkin and Ray H. Beverton, will deliver keynote addresses. Another key feature of the meetings will be three AFS Continuing Education Workshops, *Using Computer Spreadsheets in Fisheries*, *The Public Dimension of Fisheries Management*, and *Community Dynamics-Analysis and Management*.

The Board of Control of AIFRB will hold its annual meeting during the AFS meeting.

Stream Habitat Improvement

The third revision of *Indexed Bibliography on Stream Habitat Improvement* was published in 1986 by the U.S. Forest Service in cooperation with the Sport Fishery Research Foundation and Utah State University. This revision contains 1,106 entries to published and unpublished references on or related to stream habitat improvement. Entries are categorized into 20 subject-key word areas relating to both structural and non-structural instream and streambank riparian habitat improvement for salmonid coldwater fish species, as well as warmwater species. References are primarily from North American fisheries workers, but also include international references available from Utah State University. Send a \$6 check or money order to: Department Librarian, Department of Fisheries & Wildlife, College of Natural Resources, Utah State University, Logan, UT 84322.

The Dynamics of Tuna Movements: an Evaluation of Past and Future Research

This paper, by John R. Hunter, A. W. Argue, William W. Bayliff, Andrew E. Dizon, Alain Fonteneau, Daniel Goodman, and Gunter R. Seckel, is the result of panel meetings held in La Jolla, California in 1984 and 1985, as suggested at the "Tuna 2000" meetings held in La Jolla in January 1984 (see AIFRB Briefs, Vol. 13, No. 5, page 5). It is published as FAO Fisheries Technical Paper 277, and can be obtained for \$6.00 from Bernan-Unipub, 10033F Marin Luther King Highway, Lanham, Maryland, 20706.

Common Strategies of Anadromous and Catadromous Fishes

M. J. Dadswell, R. J. Klauda, C. M. Moffitt, and R. L. Saunders are the editors of this book, which is American Fisheries Society Symposium 1. The 570-page volume will be published on June 15, 1987 and has a pre-publication price of \$40 (AFS members, \$35).

Diadromous fishes migrate between marine and fresh waters to feed or breed. They are biologically fascinating and many of them support important sport or commercial fisheries. The phenomenon of diadromy was the focus of a major international symposium sponsored by the Society's Northeastern Division and held in

Boston during March 1986. The experiences and insights of experts from 10 countries have been peer-reviewed and brought together in these proceedings.

Anadromous salmon and catadromous eels may be the best-known diadromous fishes, but 180 species distributed among 32 families show some form of diadromy, according to keynote speaker R. M. McDowell. Diadromy occurs throughout the world; anadromy (marine feeding and maturation, freshwater reproduction) is most prevalent in northern temperate latitudes whereas catadromy (freshwater maturation, marine breeding) is well represented in the southern tropics. Amphidromy (migration for feeding but not for reproduction) is the least understood form of diadromy; it is best known in the southern hemisphere but may be more widespread than that.

The evolution of diadromy remains a speculative subject, but co-keynote speaker Mart Gross argues that the relative availability of food in marine and fresh waters underlies both the existence of diadromy and the latitudinal distribution of its various forms. Although diadromy must somehow enhance the survival and reproduction of the species that practice it, the practice itself is costly. Much energy is expended during migrations that may cover thousands of kilometers each way. Each diadromous fish must change its physiology at least twice in its lifetime to cope with sudden and large changes in salinity. Diadromous fishes need separate environments for growth and breeding and they traverse still other environments during migration. If any of these environments is degraded, the life cycle can be broken. As a life history strategy, diadromy is far from risk-free.

Human activities increase these risks in several ways. Dam building, water diversion, pollution, and intensive fishing have reduced and even extinguished many populations of diadromous salmonids, herrings, sturgeons, and other species. Hatchery propagation of anadromous fish, once considered an important means to supplement declining runs, now is viewed as a potential threat to the genetic and ecological integrity of remaining native stocks. Such problems underscore the need for a better understanding of diadromy so that sound conservation and mitigation policies can be devised to protect these resources for the future.

Common Strategies of Anadromous and Catadromous Fishes does much to advance this understanding.

each other and their enjoyment of life together flourished through the years. They were married in 1966.

Following his completion of a Masters Degree in Fisheries, John pursued his career in this field. He had many years of adventure while working for the University of Washington Fisheries Research Institute, Mathematical Sciences Northwest, Dames and Moore as a Senior Biologist, and, most recently, for CH2M Hill as a Senior Biologist. His work took him on many travels, including trips to the South Pacific, the Aleutian Islands, Bristol Bay, and Seward, Alaska.

John Isakson was active in many areas—camping and fishing, community work, church, Girl Scouts, schools, the YMCA, and numerous others. He was President of the Pacific Fisheries Biologists in 1984.

Relatives, friends, and associates all feel a great loss at John's passing.

Membership Report

PROMOTION TO FELLOW

NEW ASSOCIATES

Dr. Raymond E. Baglin, Jr.	AK	Linda Garrett	CA
Dr. Douglas P. Anderson	WV	Katherine Yudin	CA
Ronald E. Westley	WA	Robert Franklin	CA
Dr. Bernard L. Griswold	MD	Kenneth M. Brooks	WA
		George D. Lapointe	VA

PROMOTION TO MEMBER

Dr. Antonios Pappantoniou	NY	EMERITUS	
Dr. David R. Sager	MD		

NEW MEMBERS

Terry J. Foreman	CA	Craig J. Orange	CA
James M. Herkelrath	CA	Sigurd Westrheim	BC
Mark G. Pedersen	WA	L.D. Marriage	OR
Ben D. Jaco	TN	Robert W. Schoning	OR
		Dr. Ralph W. Yerger	FL

Sammy M. Ray, Membership Chairperson
Texas A&M University at Galveston
Building 311, Forth Crockett
Galveston, Texas 77550

Direct membership inquiries to the Membership Chairperson

In Memoriam

John S. Isakson

John S. Isakson, AIFRB Member and Director of the Washington-NW District in 1982-83, died as a result of an automobile accident near Seattle, Washington on May 1, 1987.

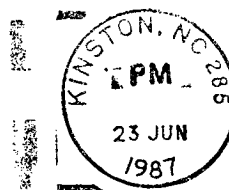
John was born in California in 1942, but moved to Seattle in 1964 to enter graduate school at the University of Washington; Seattle was his home from then on. John and his wife, Carol, met near the University fish troughs while clipping fins, and their commitment to

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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*American Institute of Fishery
Research Biologists*

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FIRST CLASS

American Institute of Fishery Research Biologists

... BRIEFS ...

VOL. 16, NO. 4

AUGUST 1987



Terry Snowden, 1986 winner of the W.F. Thompson Award, receives the Certificate and check for \$750 from Past-President Hugh MacCrimmon. Dr. Geoff Power also receives a Certificate as Mr. Snowden's supervisor at the University of Waterloo.

1987 Annual Meeting

President John Hunter has announced the agenda for the 1987 annual meeting of the Board of Control of the American Institute of Fishery Research Biologists. The meeting will be held in the Blueridge Room of the Stouffer Hotel, Winston-Salem, North Carolina, beginning at 8:30 a.m. Saturday, September 12 and ending during the afternoon of Sunday, September 13. AIFRB visitors will be welcome to attend the meeting.

Agenda

Call to Order:

Adoption of Agenda

Introductions

Determine if Quorum Present

1. Approval of Minutes of 1986 Annual Meeting and Secretarial Report (Cole/Nakatani)
2. President's Report
3. Report of Treasurer (Cole)
Motion to authorize business transactions
4. Reports on Publications
 - A. Report of BRIEFS Editor (Cope)
 - B. Report of Production Editor (Reintjes)
 - C. Report on Membership Directory (Bayliff)
5. Report on Membership Committee (Ray/Jow)

6. Reports on Awards
 - A. Travel Awards (Rachlin)
 - B. W. F. Thompson Best Paper Award (Farris)
Approval of selection
 - C. Outstanding Achievements Award Committee (Myhre)
Approval of selection
 - D. Best Paper Award at local meetings (Hunter)
7. Reports from Districts
8. Other Business
 - A. Progress on Toronto Writing Symposium (Prince/Hunter)
 - B. Interactions with AFS (Hunter)
9. New Business
 - A. Nomination for President-Elect (Nakatani)
 - B. Dues charges for retired members (Hunter)
 - C. Printing of Certificates of Appreciation (Hunter)
 - D. General discussion of recruitment strategies
 - E. Editorial contributions to BRIEFS.
 - F. Appointment of a new Treasurer
 - G. New initiatives for AIFRB (Hunter)
 - H. Some possible changes in bylaws (Hunter)
10. Announcements
Arrangements for next meeting (Time, Place, AIFRB/AFS Coordinator)
11. Adjournment

Rachlin New AIFRB Treasurer

President John Hunter has notified BRIEFS that Dr. Joseph Rachlin, presently Director of AIFRB's New York-New Jersey District, will become Treasurer of AIFRB in September 1987. Joe will assume his new duties immediately after the Board of Control meeting in Winston-Salem.

Dr. Rachlin is on the faculty of the Department of Biological Sciences at Lehman College of the City University of New York, W. Bronx, NY. He became a member of AIFRB in 1973, and became a Fellow in 1986. He has been extremely active in our Institute affairs, having served as Chairman of the Travel Assistance Award Committee as well as District Director.

Rachlin succeeds Dr. Charles F. (Pete) Cole as Treasurer. Pete Cole has held that office since 1981. During his tenure, Pete has served diligently and

cont. on page 2

capably in a position burdened with responsibilities and problems, and he has performed in an admirable manner. Cole was innovative in his approach to the job. He introduced computerization to AIFRB's personnel and financial records. He updated our accounting system. He managed the Institute's changing investment program. He rode out the storm during the publication of AIFRB's first book, a real challenge for some of us. He did all this while attending to the day-to-day routine of paying bills, receiving funds, and the rest of the "little" functions that require attention on a continuing basis. He did all this while earning a living as a professor at Ohio State University.

AIFRB owes a large debt to Pete Cole—the foundations he laid will make Joe Rachlin's task an easier one.

Roster of AIFRB District Directors

Alaska	K V. Koski
California, Central	Brian F. Waters
California, Southern	Peter L. Haaker
Carolina	John V. Merriner
Florida	Ed Irby
Great Lakes-S. Central	Vacant
Gulf of Mexico, N.E.	Charles M. Roithmayr (not confirmed)
New York-New Jersey	Joseph W. Rachlin
Oregon-Washington S.W.	Howard F. Horton
Texas	Andre M. Landry (not confirmed)
Washington DC Metro	Ronald G. Rinaldo (not confirmed)
Washington, N.W.	Alan J. Mearns

Second Regional Best Paper Award

A regional AIFRB Best Paper Award was presented at the 1987 Western Groundfish Conference held at Salisham Lodge on the Oregon Coast. The award was presented to Bruce Leaman of the Pacific Biological Station, Nanaimo, Canada by Award Chairman Ed Ueber of the Northern California District. Bruce and fellow investigator, Richard Stanley, are authors of a report titled, "From Nobility to Nightmares: some object lessons in the planning and conduct of Fishery Harvest Experiments." Their paper examines problems encountered and generated while conducting harvesting experiments on British Columbian rockfish stocks. Also discussed are the operational, interpretational, and organizational nightmares that have accompanied an open-fishing experiment. The experiment began as an investigation of extreme biological and fishery processes with the objective of obtaining maximum contrast in parameter estimates. Data capture, enforcement, and monitoring problems suggested cancellation of the experiment after only 1 year, but the experimental fishery had begun to have an economic life of its own. Pressure

from the industry resulted in a special permit system that almost guaranteed falsification of landing records. Other unanticipated problems are discussed, as are recommendations and future experiments.

Our People

William Herke (AIFRB Fellow 1978) has been given Louisiana's Governor's Award, in the 23rd Annual Governor's State Conservation Achievement Program. He is a pioneer in fisheries research in shallow-water coastal marshes and in 1986 completed a \$1.2 million project to determine the effects of standard, fixed-crest weirs on estuarine-dependent fisheries resources.

Paul Cuplin (AIFRB Member 1973) has retired from the Bureau of Land Management in Denver, CO. Since 1982, Paul has assisted BLM field offices with technical matters dealing with fisheries, riparian habitat, and remote sensing.

D-J/W-B FY87 Apportionments

Federal Aid to Sport Fish Restoration (the Dingell-Johnson or Wallop-Breaux program) apportionments to the states, territories and the District of Columbia totalled \$140,100,700 for FY1987, up some 27.4 percent over the 1986 apportionment and a 300 percent increase over the 1985 apportionment. This sum amounts to approximately \$3 for each of the 46,609,000 fishermen 16 years of age and older identified in preliminary findings from the 1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

The FY1987 apportionment included \$63,351,000 categorized as "base funds" derived primarily from excise taxes on fishing equipment (authorized by the original 1950 Dingell-Johnson legislation), and \$76,749,600 in "expanded funds" resulting from the 1984 Wallop-Breaux amendment which sharply increased funding for sport fish restoration by including a share of motorboat fuel taxes, import taxes on imported fishing equipment and pleasure boats, and excise taxes on previously untaxed fishing equipment.

The FY1987 apportionment reflected 1986 collections totalling \$145,956,584 which included \$65,683,999 from the 10 percent excise tax on fishing tackle, \$2,294,625 from the 3 percent excise tax on trolling motors and fish-finders, \$28,165,303 from motorboat fuel taxes, \$31,294,011 from import duties on fishing tackle and pleasure boats, and \$13,577,944 from accrued interest. An additional \$4,940,700 represented 1986 funds previously sequestered as a result of the Gramm-Rudman Deficit Reduction Act. A total of \$5,885,884 (slightly over 4 percent of total collections) was retained by the Department of the Interior for administration of the program.

Apportionment of sport fish restoration funds to individual states is determined on the basis of relative land and water area (40 percent) and the number of paid fishing license holders (60 percent) within each state. Three states (AK, CA, TX) qualified for the maximum 5 percent apportionment (\$7,005,035 each) and 11 states received the minimum 1 percent allocation of

\$1,401,007 (CT, DE, HI, ME, ME, MA, NH, NJ, RI, VT & WV). Puerto Rico also qualified for the 1 percent allocation and Guam, American Samoa, Mariana Islands, and the District of Columbia each received a 0.33 percent apportionment (\$467,002).

Typical projects funded through the Sport Fish Restoration Program are development, improvement or construction of public access facilities, construction of lakes or other public areas for fishing, improvement of fish habitat, and fishery research. Under the Wallop-Breaux amendment, states are required to obligate at least 10 percent of their annual apportionment for motorboat access. In addition, they may obligate up to 10 percent for aquatic resources education programs. Coastal states are required to allocate the new "expanded" revenues between marine and freshwater projects proportional to the number of marine and freshwater anglers estimated to reside in the state.

From SFI Bulletin, June 1987

Marine Pollution Information

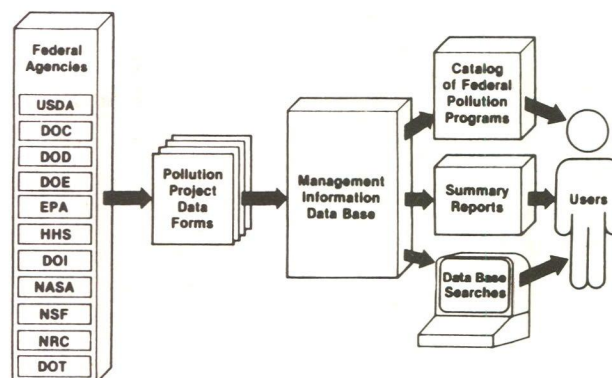
The National Marine Pollution Information System (NMPIS) is a data base containing descriptions of marine pollution programs and projects conducted or funded by agencies of the Federal government. The data base is updated annually by the National Oceanic and Atmospheric Administration to satisfy legislative mandates contained in the National Ocean Pollution Planning Act (Public Law 95-273 and amendments).

Approximately 600 projects from over 60 programs funded by 11 Federal departments and agencies are reported to NMPIS annually. Each project description includes:

- project title, duration, and description
- principal investigator name, address, and organization
- funding sources and levels
- percentage of funds spent by region, state, zone, pollutant, polluting activity, and project purpose

The NMPIS was developed cooperatively by two NOAA components: the National Marine Pollution Program Office (NMPPPO) and NODC's Central Coordination and Referral Office (CCRO), which manages the Ocean Pollution Data and Information Network (OPDIN). The principal product generated from NMPIS is an annual publication, now titled the *Summary of Federal Ocean Pollution Programs and Projects*, that includes descriptions of each Federally-funded project.

NMPIS project descriptions for fiscal years 1982 to the present are available through interactive searches of the computerized data base. The NMPIS data base management system facilitates the printing of a variety of reports. NMPIS records can be selected and sorted using any combination of available information categories. Results can be presented in the form of directories, catalogs, tables, and funding analyses.



NMPIS products and services are generally available at no charge from OPDIN or NMPPPO. Some special products, however, may require a nominal handling fee. Staff members can assist users in formulating their requests to ensure that the information provided meets their needs. Requests for NMPIS products and services may be directed to:

Ocean Pollution Data and Information Network
National Oceanographic Data Center
NOAA/NESDIS E/OC24
Washington, DC 20235

Telephone: 202-673-5539 (commercial or FTS)

Electronic Mail: TELEMAIL (Mailbox "NODC.WDCA")

OR

National Marine Pollution Program Office
NOAA/NOS N/MPP

11400 Rockville Pike, Room 610
Rockville, MD 20852

Telephone: 202-443-8823 (commercial or FTS)

The Hawaiian Aku Fishery: A Lesson to be Learned

A sad story unfolded at a recent workshop in Honolulu on Hawaii's aku (skipjack) fishery. Although the fishery has never been large, it has been a colorful and important feature of island life in Hawaii for much of its 80-90 year history. It is now close to total closure.

The aku fishery is a live-bait, pole-and-line fishery for skipjack using unique boats, "sampans", designed specifically to operate in Hawaiian waters. In the 1950s, there were about 30 of these boats successfully landing fresh skipjack to local markets. A small cannery operated closely with the fishermen, buying fish when the fresh market was oversupplied. The mainstay of the aku fishery is the so-called "season" fish, larger size (70 cm) skipjack not abundant in most Pacific catches.

In the 1970s, things began to change. Fuel prices became very high, discouraging fishermen from spending too much time hunting for schools. The ever-increasing age of the vessels decreased their reliability, increased maintenance expenses, and increased insurance costs. Fish aggregation devices were introduced, causing further disruptions in usual fishing patterns.

cont. on page 4

Hawaiian Aku Fishery cont.

Pollution, combined with legal restrictions on access to principal baiting grounds, decreased the availability of bait. Catches of skipjack increased in the eastern and western Pacific and in the western Hawaiian chain, arousing suspicion that stocks were becoming generally depleted.

At the same time, fishermen reported that catches, particularly of the larger "season" fish, were dropping. Several boats have been retired and there are currently only about nine aku boats active in the fishery.

As if all this was not bad enough, the local cannery has closed and fresh frozen skipjack loins, imported from Japan, have appeared in local markets.

The purpose of the Honolulu workshop was to review the available information as a first step towards possible rehabilitation of the fishery. Scientists and economists were invited from several agencies, including the South Pacific Commission, Inter-American Tropical Tuna Commission, and National Marine Fisheries Service. These experts reviewed pertinent information but none could conclusively identify the cause for the decline in catches.

The local aku fishery did not command much attention during the time when it was operating successfully, and information is incomplete. Data are available on catch by commercial size categories (extra large, large, small, extra small) and some detailed size/frequency distributions are also available. Some tagging studies were done in the 1960s. Effort information is restricted to days fished; no information is available on fishing patterns, catch per bucket of bait, or school-sighting frequency. The extent and impact of Japanese pole-and-line and drift-net fishing in the western Hawaiian chain are unknown because by U.S. law these fisheries are unlicensed and not required to report catch.

Under these circumstances, it is little wonder that scientists were unable to commit themselves to firm conclusions. There was even some uncertainty whether the trends in catch (lack of "season" fish and lower catch rates in general) were a reflection of changes in the stock or due to changes in fishing patterns. The only irrefutable points are that catch rates are low, "season" fish are absent from the catches, and fishermen are not making a living. The consensus among the scientists seemed to be that both changes in local conditions and developments in far distant fisheries must be rigorously analysed to determine the causes of the decline in the aku fishery. The economics, by comparison, were much more confident in their prediction that more boats would drop out of the fishery.

What will actually happen is not clear. Steps are being taken to ensure that biologists have the opportunity to re-examine available information more rigorously. Adjustments may take place in the infrastructure to enable greater access to bait and construction of more efficient vessels.

There is a clear lesson for fisheries managers. Sound advice can only be provided from a solid information base. When one fishery is operating successfully, it is tempting to deploy expertise in other areas of more urgency. That very understandable decision is in

retrospect a mistake. Every fishery sooner or later experiences a period of difficulty. If conditions prior to the problem are not understood, fisheries managers will be unable to suggest sound remedial action. It is absolutely necessary for long-term fisheries management to have an ongoing information-gathering system. If such systems are absent when the crisis comes, as it inevitably will, it is the fishermen who will bear the consequences.

John Sibert

From Fisheries Newsletter of the South Pacific Commission
April-June 1986

Albacore Exploratory Fishing ✓

Exploratory fishing for albacore conducted in the South Pacific in 1986 was described in BRIEFS, Vol. 15, No. 4. Good results were obtained, so further work was done in 1987. The two trollers which had worked there in 1986 returned, and six more trollers joined them. All of these made excellent catches of up to 10 tons per day.

The success of these boats has led to a collaborative effort involving the U.S. albacore industry, the U.S. NMFS, the New Zealand Ministry of Agriculture and Fisheries, the French agency ORSTOM, and the South Pacific Commission. With scientists from the Honolulu Laboratory of the NMFS taking the lead, the program is directed at a range of areas, including fishery data collection, stock assessment, biology, and fishery development. The objectives are to estimate the potential yield of a surface fishery, to compute the impacts of a surface fishery on traditional longline operations, to understand albacore population dynamics, and to model the relationship between albacore distribution and availability, and such oceanographic features as currents and thermohaline structure.

R. Michael Laurs
U.S. NMFS
La Jolla, CA

District Activities

SOUTHERN CALIFORNIA

P. L. Haaker, Director

The Southern California District, together with the Southern California Ichthyologists Interested In Nearshore Resources and the Cabrillo Marine Museum, sponsored a seminar on June 8 entitled *Enhancement of Nearshore Fish Stock: Status and Future*. The seminar was held at the Cabrillo Marine Museum, and featured seven morning papers on *Paralabrax*, the kelp bass and the sand basses. Several aspects of the biology of these species were addressed, and recent trends in the kelp bass fishery were reported. In the afternoon there was a panel discussion of marine fisheries enhancement.

The Southern California Ichthyologists Interested In Nearshore Resources (SCINR), formerly SNICCR, convened 2 years ago to discuss the condition of nearshore fishery resources and to interface with the Department of Fish and Game with our recommendations for enhancing impacted populations and directions for research which could yield important information concerning these resources.

Announcements and New Publications

Midwest Fish and Wildlife Conference

The 49th Midwest Fish and Wildlife Conference will be held 5-9 December 1987 at the Marc Plaza Hotel, Milwaukee. This conference is an annual gathering of fish and wildlife professionals from throughout central North America. The emphasis of the conference is on applied research relevant to the management of regional aquatic and terrestrial animal populations and communities.

Nineteen eighty-seven is the 100th Anniversary of noted conservationist Aldo Leopold's birth, and the theme of the 1987 Midwest Conference will be "Ecological Thinking in Fish and Wildlife Management: A Tribute to Aldo Leopold." In keeping with this theme, many papers presented at the conference will focus on ecosystem-level approaches to resource management. All of the "fish" sessions at the conference should appeal to fishery research biologists. Of particular interest are workshops on Fisheries Genetics and on Computer Applications for Fish and Wildlife Management, a symposium on Biology and Management of Coregonids in the Great Lakes Region, and special paper sessions on Impacts of Agricultural Land-Use on Streams and their Biota, Food-Chain Manipulation in Aquatic Systems, and Biology of Native Lampreys. Contributed paper sessions will deal with many other aspects of fisheries research and management.

For further information about the 49th Midwest Fish and Wildlife Conference, contact John Lyons, Program Chair, Wisconsin Department of Natural Resources, 3911 Fish Hatchery Road, Fitchburg, WI 53711, (608) 275-3223.

Ecological Restoration Conference

RESTORING THE EARTH • 1988, a national conference on natural resource restoration and environmental planning, will take place at the University of California, Berkeley on January 13-16, 1988, initiated by the Restoring the Earth project of The Tides Foundation, cosponsored by the Center for Environmental Design Research, University of California, Berkeley. Proceedings will be published and distributed by the Center. The conference is to further the exchange of scientific information on restoration and to present the accomplishments and capabilities of restoration technology in resource management and planning.

Topics to be covered include restoration of coastal ecosystems and estuaries; rivers and lakes; streams and fisheries; rangelands, prairies, mined lands, forests and wildlife; atmosphere; dry lands and agricultural lands; redesign of human settlements; and control of toxic wastes. The nontechnical sessions will include discussions of relevant policy issues, legislation, litigation, conflict resolution, trends, and accounts of restoration successes.

Those who wish to read papers should submit title and 200-400 word descriptions of proposed 20-minute presentations asap but not later than October 15, 1987. Final text of accepted papers will be due November 30, 1987. Send proposals to Restoring the Earth Conference, 693 Mission Street, Room 708, San Francisco, CA 94705. Telephone (415) 777-9515 for list of sessions and preliminary agenda.

Salmon Commission Change of Address

The International Pacific Salmon Fisheries Commission went out of existence in 1985 with the signing of the Pacific Salmon Treaty. The new organization governing the Pacific salmon fishery, the Pacific Salmon Commission is situated at the following address:

Pacific Salmon Commission
1155 Robson Street
Sixth Floor
Vancouver, B.C. V6E 1B9

Dynamics of Marine Fish Populations

Brian J. Rothschild is the author of this 1986 book which contains 352 pages and 118 illustrations. Chapters cover variability in fish-stock abundance, fish-stock variability from the historical record,

fishery-related population-dynamics theory, the context of the problem, the recruitment-stock paradox, egg production, the life and death of fish eggs and larvae, the population-dynamics process, and references and index.

The author states: "The approach in this book is to work toward a theory that will explain variability in fish-stock abundance. Any such theory has two components: one that explains causality in terms of the status quo and another that explains the evolution of the causal mechanisms. The first component is addressed here as a prerequisite to future study of the second. The focus of the presentation is generally limited to species of marine fish harvested by large commercial fisheries. There are several reasons for such a focus. First, attention to commercially harvested fish permits the utilization of numerous data and studies on fish-population dynamics. Second, the study of harvested fish populations provides otherwise unobtainable insights into the responses of population to measured perturbation, especially those that enhance population growth in numerically depressed populations and dampen population growth in relatively abundant populations. Third, most commercially harvested species have a primitive form of reproduction in the sense that they are highly fecund and exert no parental care (one example in the text, however, involves the pink salmon, which spawns in nests or "redds"). This feature permits my study to serve as a point of departure for exploring the dynamics of many species of fish that exhibit some form of parental care, which may include nest-building behaviors in marine, anadromous, and freshwater fishes.

The theory I elaborate takes into account the dynamic behavior of harvested fish populations to rephrase the notions of density-dependent, density-independent population regulation and to explain population variability in terms of a population-dynamics process that accounts for *both* population stability and fluctuation. I suggest that stability is induced through an interaction between density-enhancing and density-dampening mechanisms; that efficient operation of the interaction depends on the fidelity of population-abundance signals transmitted to the population from the environment and vice versa; and that fluctuation is due either to unusual magnitudes of environmental signals or to associated noise."

The book is available for \$37.50 from Harvard University Press, 79 Garden Street, Cambridge, MA 02138.

New Books from Academic Press

The following books are available from Academic Press, Orlando, FL 32887-0510.

Ecology of Tropical Oceans, by A. R. Longhurst and D. Pauly.

Drs. Longhurst and Pauly break new ground in this integration of geography, oceanography, and plankton, benthic and fish biology to present a comprehensive account of the ecology of the tropical ocean. Proceeding from a description of the geomorphology, sediments, and vegetation of tropical continental shelves and the oceanography of tropical regions, the authors describe the benthos, plankton, and fish communities of tropical seas. An examination of the production of plant and animal life in tropical oceans is presented together with the numerical population biology of fish and invertebrates. This book will be of interest to all students and researchers in marine biology.

CONTENTS: Introduction. Geography of the Tropical Ocean. Circulation of Tropical Seas and Oceans. Biological Production of Benthos and Plankton. Species Assemblages of Demersal Fish. Pelagic Fish of Tropical Oceans. Fish as Components of Marine Ecosystems. Dynamics of Tropical Fish Populations. Biology and Population Dynamics of Invertebrates.

Fall 1987, 364 pages, \$39.95 (tentative).

Fishery Development, by William F. Royce (AIFRB Fellow).

This book is an overview of the whole process of fishery development and an appraisal of how it can be done more efficiently. My objectives are to identify the technical, social, political, organizational,

cont. on page 6

Announcements and New Publications cont.

and time requirements of long-term development programs. The audience will encompass a broad spectrum of people who are concerned about the fishery development decisions being made by both industry and governments. Planners and administrators will find helpful information for blending their fishery development projects into long-term programs. Fishery students should also find it useful as a text for a general course.

CONTENTS: *Lessons from the Past:* Issues and Challenges. Economic Development. Fishery Systems. The Transition of the Fisheries. *Fishery Development Experience:* The Evolution of Fishing and Its Governance. Case Histories of National Market Fishery Development Experience. The Farmers' Edge. The Anglers' Edge. *Future Strategy:* Constraints on Fishery Development. Overcoming the Constraints. Appendices. Index.

1987, 187 pages, \$24.95.

The Biology of Fish Growth, by A. H. Weatherley and H. S. Gill (Chapter 7 by J. M. Casselman).

This book presents a comprehensive, modern view of the phenomenon of growth plasticity in fish. The core chapters consider somatic growth in relation to nutritional and metabolic aspects, protein and lipid contents and interdependences, the dynamics of tissue growth, and hormonal dynamics of tissue growth, and hormonal influences. The remainder of the book discusses methods of age and growth determination, the consequences of plastic somatic growth on the dynamics natural and managed populations, and finally, attempts to relate how growth biology may be applied to aquaculture and fishery management.

CONTENTS: The Study of Fish Growth. Nutrition, Metabolism. Protein, Lipid and Caloric Hormones. Determination of Age and Growth of Fish. Growth, Competition and the Niche Concept. Increase and Self-regulation of Fish Populations. Feeding Relations, Correlated Functional Morphology, Growth and Size. Production Dynamics of Fish. Fish Culture. Epilogue: Applications and the Future. References. Index.

1987, 446 pages, \$65.00.

Fishes of the Okefenoke Swamp

This book, by Joshua Laerm and B. J. Freeman, is an identification manual for the 36 fish species of Okefenoke Swamp; it has a 2-page narrative on description, habitat, and biology of each species.

The volume, from the University of Georgia Press, has 118 pages and sells for \$7.50.

Thesis and Dissertation Abstracts

The Use of Brewers Condensed Solubles in Bivalve Mariculture

David S. Gussman, Ph.D. 1987

The College of William and Mary in Virginia

Brewers Condensed Solubles (BCS), a by-product of the brewing industry, was evaluated as a nutrient source for rearing juvenile oysters (*Crassostrea virginica*) and clams (*Mercenaria mercenaria*). The BCS was used to culture bacteria which were fed to colorless flagellates which were in turn fed to oysters and clams. The overall growth efficiency of oysters on BCS was 473 mg of oyster (whole weight) per g of BCS (dry weight).

Fourteen isolates representing nine genera of bacteria were isolated from BCS enrichment cultures. Specific growth rates of the isolates at 24°C on a BCS medium ranged from 0.48 h⁻¹ to 0.11 h⁻¹. The conversion of BCS to bacterial biomass was examined for four isolates at supplements of 0, 38, 76, and 152 mg/l of ammonium sulfate. The largest bacterial biomass (127 mg/g BCS) was obtained with *Pseudomonas marina*. The largest bacterial biomass when averaged over all bacterial isolates was obtained with 38 mg/l of ammonium sulfate. Yields of *P. marina* on BCS ranged from 27.4% for no am-

monium sulfate addition to 38.5% with 38 mg/l of ammonium sulfate.

The effects of dissolved nutrients, salinity, temperature, shaking, bacterial concentration, and bacterial species on the growth rates of five species of colorless flagellates were examined. The five species studied included *Paraphysomonas vestita*, an unidentified chryomonad, two bodonids, and a choanoflagellate. None of the colorless flagellates could be raised on the dissolved nutrients in BCS; all required a bacterial diet. Shaking, salinity, and the bacterial isolate used as food had little effect on the flagellate growth rates. Temperature and bacterial concentration had pronounced effects. The greatest growth rates were recorded at temperatures between 21 and 26°C. Growth rates increased with increasing bacterial concentration in a manner suggestive of Michaelis-Menten kinetics. Maximum specific growth rates ranged from 0.11 h⁻¹ to 0.16⁻¹. Yields of colorless flagellates growing on bacteria ranged from 0.30 to 0.42.

The growth of oysters and clams fed colorless flagellates, BCS enrichment cultures, and bacteria was compared to the growth of starved controls and animals fed *Tetraselmis suecica*. *P. vestita* was the only species of colorless flagellate to consistently result in growth greater than the starved control. The BCS enrichment culture varied greatly in its nutritional value. The average oyster growth on *P. vestita* was 55% of the growth obtained with *T. suecica*. Oysters fed combinations of *T. suecica* and *P. vestita* did not grow as rapidly as on a pure diet of *T. suecica*. No growth occurred when oysters and clams were fed a purely bacterial diet.

The Use of Crab Meal as a Supplemental Food for Juvenile Hard Clams (*Mercenaria mercenaria*)

Patricia L. Duncan, M.A. 1986

The College of William and Mary in Virginia

Nursery culture of the juvenile hard clam, *Mercenaria mercenaria* (Linnaeus), a necessary step in commercial clam culture, is not considered economically feasible by many workers. This is largely due to the costs involved in supplying algae as the primary food source. An inexpensive artificial food which could partially replace cultured algae would greatly reduce food costs.

Commercially available crab meal, a by-product of crab picking houses, was tested as a supplemental food with various sizes of juvenile hard clams. Feeding experiments were conducted in the summer of 1982 and from July to December in 1983 to determine optimum feeding methods and rates. In each experiment, both control and crab-meal-fed groups received filtered seawater at flow rates which contained enough natural food to support clam maintenance activities. Supplemented groups received crab meal at different rations proportional to total clam live weight. Various experiments tested methods of crab meal preparation. These included different sieve sizes of crab meal and autoclaving. Also, different solutions were mixed with crab meal before delivery to trays. Growth was evaluated as the increase in shell height, and live, dry, and ash weights.

In all experiments, significantly greater increases in clam shell height and weight were observed in supplemented clams compared to control clams when crab meal was fed in proper amounts. Increases in clam shell height in control and crab-meal-fed clams were not directly correlated with seawater flow rates or chlorophyll *a* levels. There appeared to be a direct relationship between the percent increase in shell height and crab meal ration at optimum feeding rates. Optimum feeding rates for smaller clams (4-6 mm) were crab meal rations 20-24% of total clam live weight per day. Crab meal which was sieved through 100 or 134 micron mesh, autoclaved, and mixed with 25-micron filtered seawater produced the greatest increases in clam weight and shell weight. This study represents the first successful feeding of an artificial food to juvenile hard clams in a flow-through seawater system. These experiments, conducted under conditions similar to those in commercial nurseries, indicate the potential for the use of crab meal in commercial nurseries as a partial replacement for cultured algae.

**Biological Review and Commercial Fisheries
Analysis of *Busycon carica* with Comments on
B. canaliculatum and *B. contrarium* in Virginia**

Jane DiCosimo, M.A. 1986

The College of William and Mary in Virginia

Busycon carica, the knobbed whelk, *B. contrarium*, the lightning whelk, and *B. canaliculatum*, the channeled whelk, constitute the whelk fisheries of Virginia. *Busycon carica* is harvested primarily in a direct summer dredge fishery and as a by-catch from winter blue crab (*Callinectes sapidus*) dredging. Peak landings occurred in 1966 with 216,000 kg (476,000 lb), with a value of \$70,500. *Busycon contrarium* is primarily landed by the surf clam (*Spisula solidissima*) fishery offshore of the Virginia/North Carolina boundary and *B. canaliculatum* primarily as a by-catch from crab pots, otter trawls, and surf clam dredges. Peak landings of *B. contrarium* and *B. canaliculatum* occurred in 1974 and 1975 with over 464,000 kg (1 million lb) at an ex-vessel value of \$110,000 for each year, coincident with peak surf clam landings. Virginia landings for all species in 1984 totalled 64,000 kg (141,100 lb) with an ex-vessel value of \$75,500.

Biological information for the three species are summarized from published and unpublished reports and theses to identify gaps in the scientific literature.

Species identification, size frequencies, sex ratios, movement on and off commercial fishing grounds and edible meat yields were determined from commercial catch samples from June 1983 through August 1984. *Busycon carica* occurred primarily in the Bay summer dredge fishery, comprising 99 percent of the conch by-catch. Females predominated over males in size and sex frequencies. *Busycon canaliculatum* was caught in a variety of fisheries, but was landed primarily in the Bay crab pot and offshore surf clam dredge by-catch. It is distinguished from its congenics by its willingness to enter baited pots. Females also predominated over males in size and sex frequencies. *Busycon contrarium* is distinguished from the other Virginia whelk species by its greater size and sinistral orientation. It contributed nearly three fourths of the offshore surf clam dredge conch by-catch. Females also predominated over males in size and sex frequencies.

**A Morphological Study of the Pharyngeal Sac of
Two Species of Stromateid Fishes, *Peprilus*
triacanthus and *P. paru***

Thomas R. Sminkey, M.A. 1986

The College of William and Mary in Virginia

The butterfish (*Peprilus triacanthus*) and harvestfish (*Peprilus paru*) are members of the sub-order Stromateoidei. This group of fishes is distinguished by the presence of an accessory organ in the gullet, the pharyngeal sac, and by the unusual diet of medusae during part or all of their lives. The structure and function of the pharyngeal sac is not well known. The structure of the sac was examined using histological and histochemical methods. Food of these two species is medusae, small crustaceans, and unidentified soft matter. The pharyngeal sac was muscular and contained epophageal teeth and many goblet cells, which principally secreted the glycoprotein group of sialomucins. Sphincters located at each end of the sac suggested a mechanism for control of passage of food through the sac. The muscles in the wall of the sac were striated, indicating voluntary control of this structure. The thickened mucosal lining, heavy muscular walls, fine upturned esophageal teeth, numerous mucous-secreting cells, and the appearance of the medusan remains in the stomach suggested a grinding and shredding function of the pharyngeal sac. The stomach may chemically alter the proteinaceous nematocyst toxin through acid denaturation, rendering the venom useful as a food item.

**Identification and Distribution of
Urophycis (Gill) and *Phycis* (Artezi) Larvae
and Pelagic Juveniles in the Middle Atlantic Bight**

Bruce H. Comyns, M.A. 1987

The College of William and Mary in Virginia

Analysis of surface and subsurface plankton collections in the Middle Atlantic Bight yielded larvae and juveniles of *Phycis chesteri* and five species of *Urophycis*. Identification was based on meristic, osteological, and morphometric criteria. Meristic characters included numbers of epibranchial gill rakers, vertebrae (abdominal and caudal), and fin rays (dorsal, caudal and pelvic). Osteological analysis was based on patterns of interdigitation between the pterygiophores supporting the median fins and the neural or haemal spines. Morphometric characters included height of the pelvic fin-base, mandible length, and body depth at the vent.

U. chuss was found in summer and fall collections off the coast of both New Jersey and Virginia, with abundances highest at mid-shelf stations. *U. chuss* was the only species found during summer, dominating plankton collections at this time of year. *U. regia* was primarily found in mid-shelf areas of the southern sector during fall, but was also a component of the southern fauna found offshore from both Virginia and New Jersey during winter. *P. chesteri*, also found in fall and winter collections, was restricted to offshore stations. Southern species, found exclusively in offshore winter collections, included *U. floridana* and *U. cirrata*. *U. earl*, if present, would probably also be found in these collections. *U. tenuis* was found during spring off Virginia and New Jersey, with highest abundances appearing offshore. *U. tenuis* accounted for 99% of the *Urophycis* or *Phycis* larvae and juveniles taken at this time.

Pelagic *Phycis* and *Urophycis* showed patterns of diel vertical migration. *U. tenuis* was most abundant in surface waters at night, while other species were more abundant in the neuston during early morning or evening hours. This vertical movement in the water column was probably a response to changing light levels and may have been due to diel feeding behavior or to a predator avoidance mechanism, but further research is needed.

**Parasite Community Structure in Summer Flounder,
Paralichthys dentatus (Linnaeus),
of the Chesapeake Bay**

Maura E. Jansen, M.A. 1986

The College of William and Mary in Virginia

A survey was made of the parasites of 341 summer flounder, *Paralichthys dentatus*, of the Chesapeake Bay. Thirty-eight species of parasites were collected. Twenty species are new host records: *Amyloodinium* sp., *Ichtyobodo* sp., *Hexamita* sp., *Davisia branchiophora*, *Trichodina* sp., *Bucephalopsis paralichthydis*, *Stephanostomum tenue*, *Lepocreadium areolatum*, *Fimbriatus fimbriatus*, *Parahemirus merus*, *Hirudinella ventricosa*, *Microphallus turgidus*, *Dollfusentis chandleri*, *Grillotia smaragdina*, *Scolex pleuronectis* Type D, *Ceratobothrium xanthocephalum*, *Rhinobothrium* sp., *Capillaria* sp., *Hysterothylacium habena*, and *Hysterothylacium* Type A. New geographic records for the Chesapeake Bay are *Hexamita* sp., *D. branchiophora*, *B. paralichthydis*, *Stephanostomum dentatus*, *L. areolatum*, *Lecithochirium synodi*, *H. ventricosa*, *M. turgidus*, *Nybelinia bisulcata*, *G. smaragdina*, *Bothriocephalus scorpii*, *S. pleuronectis* Type A, Type B, Type C, Type D, *C. xanthocephalum*, *Rhinobothrium* sp., *Acanthochochondria galerita*, *Dichelyne cylindricus*, *Capillaria* sp., *H. habena*, and *Hysterothylacium* Type A.

Comparison was made of the parasite fauna of adult flounder before and after their winter migration. *Cryptobia* sp., *Trichodina*

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Thesis and Dissertation Abstracts cont.

sp., *Neoheterobothrium affine*, *B. paralicthydis*, *S. dentatum*, *O. vitellosus*, *Argulus chesapeakensis*, and *D. cylindricus* are acquired in the Chesapeake Bay or during migration. *Acanthochondria galerita*, *B. scorpii*, *S. pleuronectis* Type B, *H. habena*, and *Rhinobothrium* sp. appear to be acquired offshore.

Cryptobia sp. and *Trypanoplasma bullocki* were more prevalent in juvenile flounder, probably due to immune mechanisms. *Stephanostomum dentatus*, *S. tenue*, *Serrasentis socialis*, *G. smarigora*, *N. bisulcata*, *S. pleuronectis* Types A, C, and D, and *Rhinobothrium* sp. were more prevalent in adult flounder, reflecting dietary differences between age-groups.

Although the complete life histories are not known, *S. socialis*, *Hysterothylacium* Type A, *C. xanthocephalum*, *S. pleuronectis* Type D, and *S. tenue* are potentially useful as indicator species of flounder overwintering on the continental shelf that originated in the Chesapeake Bay.

In general, most of the parasites collected do not appear to harm the host. Only *T. bullocki* has been associated with morbidity and mortality in the field. *Amyloodinium* sp., *Ichtyobodo* sp., *Hexamita* sp., *Trichodina* sp., *S. tenue*, *S. pleuronectis* Type D, and *A. chesapeakensis* were identified as potential flounder pathogens.

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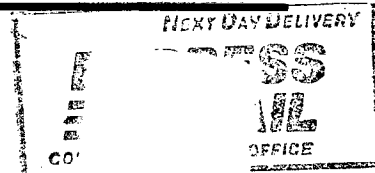
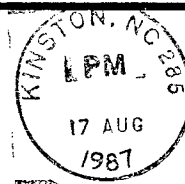
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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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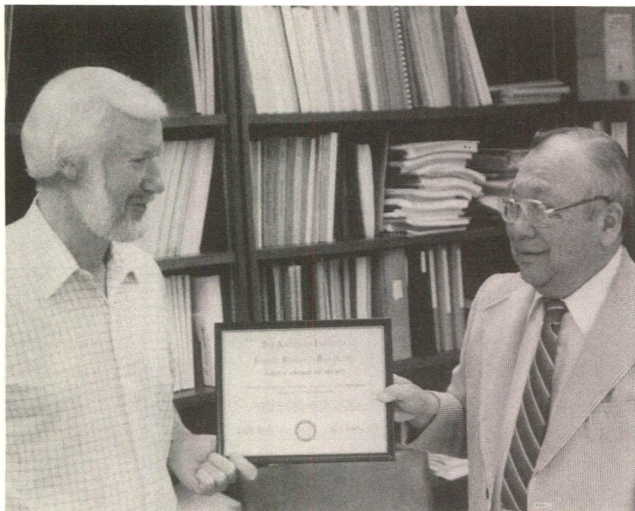
FIRST CLASS

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VOL. 16, NO. 5

OCTOBER 1987

Halibut Commission Presented Group Award



Dr. Donald A. McCaughran, Director, International Pacific Halibut Commission, receives the AIFRB Special Group Award of Excellence from **Dr. Roy E. Nakatani**, AIFRB Secretary.

The International Pacific Halibut Commission has been awarded AIFRB's prestigious Special Group Award of Excellence for 1986 (see BRIEFS, Vol. 15, No. 6, 1986). This honor comes after the Commission has completed over 50 years of research and successful management of the Pacific halibut resource, twice discovering the cause of depletion and recommending measures that permitted the stocks to rebuild.

The Halibut Commission had strong support from the fishing industry and other groups for this award.

* * * Editorial * * *

Erosion of Our Professional Image*

William F. Royce

AIFRB Fellow, Seattle, Washington

The measure of professionalism is public trust. AIFRB has detailed many particulars for its own use but as Professor Gilbert noted in 1971 with respect to professionalism in the wildlife sciences, "the people must be made to understand."¹ Only when they do, can we subscribe to the definition adopted by the AFS committee on professionalism "A pro-

fession does not exist until a group of practitioners is accorded autonomy and prestige by society in return for certain services for which there is a market. The professional's authority rests upon a body of knowledge and set of skills certified by the profession, which is characterized by self-regulation, a set of guiding ethics, a shared identity, and sense of community."²

I propose to review some facts and trends that I think make improvement of our professionalism and ethics more urgent than ever, and, in a second editorial, venture some suggestions on the next steps that we should take.

First is the overriding fact that all fishery scientists are involved with public service in one way or another, and public service involves political decisions. We must understand and participate in the process, although some scientists think they are above that dirty duty. Such thinking may come from colleagues who have coasted along on the old and strong support for conservation that is widely accepted by the public in many fishery situations, particularly in our management of recreational fisheries. Conservation has also been supported by a widespread feeling that it is fundamental to economic development (e.g. TVA, Columbia River water projects, and the Magnuson Fishery Conservation and Management Act). In addition, our recent laws emphasize public values and amenities plus environmental or economic benefits, and when we recommend environmental decisions or manage the market fisheries, we stir up emotional political issues.

Second is failing market fishery management. A major proportion of the world's large-scale fisheries are failing economically and their management is not achieving conservation. The evidence is in widespread falsification of statistics, illegal fishing, economic failures in fishing, and exorbitant government costs of management. This is associated primarily with support from most people for the ancient right of piscary and with inadequate government institutions, but government scientists are caught in the bight of the line.^{3, 4}

Third is our escalating involvement with aquatic environmental management. The scientific complexity of this area is troublesome enough, but more important as far as

*The views expressed are only those of the author and do not reflect policy of AIFRB.

our profession is concerned is involvement with environmental activists. These people, some of whom have scientific degrees, tend to dominate the political process with a play on the politics of fear. They extrapolate scientific bits and pieces into doomsday predictions of ecocatastrophe. Some of them, such as parts of the Greenpeace organization, have resorted to violence. Others such as representatives of the Sierra Club and the National Wildlife Federation have distorted facts or actually lied in court cases or in front of legislative committees.⁵ Since journalists commonly report at length on activists of all kinds and imply that business or government representatives are defending their turf, their accounts may give little emphasis to accurate but necessarily complex and perhaps inconclusive information.

Fourth is the inadequacy of our sciences. Many oceanic populations are subject to environmental stress in unpredictable ways, and collection of adequate information may be prohibitively expensive. Furthermore, we may use very complex equations that convey an impression of scientific reliability when, in reality, the resulting predictions may be subject to gross errors. Such difficulties have certainly reduced confidence in science based decisions.

Similar complexities are common in environmental impact statements in which effects of certain actions may be evolutionary over a long term and impossible to forecast with existing scientific evidence.

Fifth is our long-standing habit of equating fishery science with biology of fish. We do this even in our title, American Institute of Fishery Research Biologists. The phrase, fishery research biologists, is an oxymoron (self-contradictory) because we are not studying the biology of the human activity of fishing. Long ago we began using many natural and social sciences in addition to biology, so we should refer to ourselves as fishery scientists.

Sixth is the habit of our scientific forefathers, the zoologists, aquatic biologists, limnologists, oceanographers, and ecologists, of neglecting the role of applied science. One can consult comprehensive biological and ecological texts and scarcely find mention of, or use of, the atmospheric, hydrologic, agricultural, soil, forest, wildlife, and fishery sciences with respect to their contributions to biology and ecology or to the origin, growth, and public service aspects of them.

Seventh is fraud in science generally—both basic and applied—that has begun to receive much more attention. A recent issue of *Science* has two articles implying problems of integrity. In one about the changing field of superconducting compounds, a scientist submitted an exciting paper for peer review with a mistaken identification of the critical compound only to have someone quickly apply for a patent on the substance as stated incorrectly.⁶ A second article, close to our environmental concerns, reports on the chemical and microorganismic decomposition of PCBs in aquatic sediments despite the widespread impression of non-degradability.⁷ The article closes with the comment that a sampling of archival

data indicates that such degradation must have been observed hundreds of times without being reported in the literature.

A long article in *Nature* about fraud (which was delayed in publication for 3½ years by threatened legal action) has suggested a comparison of scientific method of a soap opera.⁸ A writer for *The Economist* noted the article and referred to fraud as the first problem of modern science. It related the apparent increase in the problem to the proliferation of scientific literature, to simple errors and lapses, to multiple authors, and to "honorary authors".⁹ Still another article from the Associated Press headlined "Colleagues often falsify their data, say scientists", was based on a paper presented at a recent meeting of the American Psychological Association.¹⁰

Eighth is misuse of the press by using a public forum with supporting publicity to present scientific information related only to a narrow aspect of a major public issue of the moment. An example is public lectures by a chemist detailing pathology of certain bottom fish from Puget Sound at the time in 1986 of major public debate about secondary treatment of sewage. The chemist's findings related almost completely to toxic materials deposited long ago by industry, did not apply to the great majority of fish consumed by the public from Puget Sound, and did not apply to the immediate public decision of secondary treatment. Yet they probably generated public support for a very expensive project which, in my judgment and the judgment of most senior fishery scientists of my acquaintance, was not nearly as important as several other actions to clean up the waters.

In summary, I suggest that our public status as fishery scientists is in trouble and it is probably going to deteriorate unless we take positive and effective steps. We must expect increasing involvement with public policy and make much greater efforts to inform the public with the facts and, perhaps more importantly, with a balanced judgment. John Harville has aptly described our predicament as between two worlds. The inner one is the calm deliberate classical realm of science. The outer one is the turbulent one of society that surrounds us.¹¹ We must work effectively in both worlds.

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Salem OR 97301
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Ed. note: Rebuttals to or comments on editorials should be submitted to the AIFRB Editor.

Missing

Our AIFRB Treasurer is diligent about keeping the Institute records up to date, so he seeks help in locating members whose current address is unknown to AIFRB. Any reader who knows of the latest address of any of those listed here would perform a service by notifying the Treasurer, Dr. Joseph Rachlin, Dept. of Biological Sciences, Lehman College, City University of New York, W. Bronx, NY 10468.

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Conservation Award Nomination

Nominations for the oldest privately-sponsored conservation awards program in the nation are being accepted until December 15, 1987. The general public, as well as professionals, are encouraged to submit nominations of deserving individuals and organizations devoted to the cause of conservation. The 1988 Chevron Conservation Awards Program honors those who have made an outstanding contribution to the conservation of natural resources. The awards program began 33 years ago and has been sponsored by Chevron since 1985.

The 1988 Chevron Conservation Award winners will be honored at a Washington D.C. banquet next May. Each will receive a \$1,000 honorarium, an engraved bronze plaque, and a trip to the nation's capital for the awards presentation. Nominations for the 1988 Chevron Conservation Awards will be judged by an independent committee of distinguished conservationists.

The Conservation Awards Program is administered by its founder, nationally-known *Field & Stream* editor-at-large and outdoor writer, Ed Zern, who has served as its director since the program's inception in 1953. Since then, a total of 624 individuals and 90 organizations have been honored.

Zern said, "Nominees, for the most part, work in virtual anonymity and do not seek recognition for their efforts. We hope that through this recognition program the honorees will be encouraged to continue their good work with even greater dedication and accomplishment. For this reason, we welcome nominations of younger conservationists whose efforts and enthusiasm inspire their colleagues. Of course, we're also

privileged to honor veterans with a long record of noteworthy achievement."

Both the general public and those associated with the conservation effort are encouraged to submit nominations in any of the following categories: professional, citizen volunteer, and organization. Nominations should include a letter of recommendation that describes the nominee's achievements in detail. Complete information should be provided within the letter, including the nominee's address, telephone number and available documentation, such as magazine and newspaper articles. Also, a brief biographical sketch of the nominee should be included. At least two additional letters of endorsement must support the nomination.

The address for nomination guidelines, information, and nominee submissions is: Chevron Conservation Awards Program, P.O. Box 7753, San Francisco, CA 94120-7753.

The 1987 awards ceremony, held on May 14 in Washington, D.C., recognized 25 individuals and organizations, including 10 citizens who made voluntary contributions to conservation and 10 professional conservationists who are employed by non-profit organizations. Also honored were 5 non-profit organizations. A number of honorees this year were involved in land management and wildlife protection. Other 1987 honorees were recognized for teaching conservation to our young people; seven of the 10 citizen volunteer honorees were women. Indeed, women are taking an increasingly larger role in conservation every year. Each year, people from every corner of the country and from all walks of life are nominated for this award.

Honorees this year included: a U.S. Fish and Wildlife Service special agent who revolutionized wildlife law enforcement; a Canadian biologist who helped to increase the population of the North American whooping crane; a Wyoming rancher who, through personal care and even financial loss, ensured the survival of a rare colony of black-footed ferrets, once thought to be extinct; and a California marine mammal organization that worked to return stranded mammals to the sea.

Our People

Kendall Warner (AIFRB Member 1970; Fellow 1971) of Orono, Maine has been presented the "Professional Award of Merit for 1987" by the Northeastern Division of the American Fisheries Society. Warner, a member of the American Fisheries Society since 1950, served as president of the Northeastern Division, AFS, in 1972-73, and has served it in other official capacities.

Kendall is currently fishery research and management supervisor for the Maine Department of Inland Fisheries and Wildlife, operating from the Bangor Research Facility. He is the co-author, with Keith A. Havey, of "The Landlocked Salmon—Its Life History and Management in Maine." He has also authored numerous scientific papers and popular articles on fishery research and management for *Maine Fish And Wildlife* magazine. He joined the Department of Inland Fisheries and Wildlife in 1952 and served as a

cont. on page 4

Our People cont.

regional fishery biologist in northern Maine from 1953 to 1968; and as a resources planner, 1968-71; fishery research supervisor, 1971-84; and fishery research and management supervisor, 1984 to present.

Kendall Warner has been a member of AIFRB's Membership Review Committee from 1981 to the present.

Roy Heidinger (AIFRB Member 1977) is the new Director of the Fisheries Research Station at Southern Illinois University. The laboratory is undergoing an expansion which includes a completed 10,000-sq-ft wet lab.

Announcements and New Publications

Brown Trout Workshop

A national workshop, *Brown Trout Biology, Use and Management: Putting the Puzzle Together*, is scheduled for April 28-30, 1988 at the Great Smokies Mountain Hilton, Asheville, North Carolina. Sponsors of the meeting will be the Trout Committee of the Southern Division, American Fisheries Society and the North Carolina Council of Trout Unlimited.

The workshop aims to give a critical assessment of current brown trout management techniques, exchange information and ideas among users and managers of the resource, stimulate new ideas for managing brown trout, and identify research and management needs and goals.

Information is available from T. Wayne Jones, Division of Boating and Fisheries, 512 N. Salisbury Street, Raleigh, NC 27611.

Salt Marsh Conference

The University of Maine Canadian-American Center will be the site of a conference on the history and ecology of salt marshes in the Gulf of Maine in June 1988.

Subjects to be covered during the conference are the formation of marshes and how they are changing, traditional farming of salt hay, and the current regulation of marshes.

The 5-day conference will be held in eastern Maine and Nova Scotia and will include field excursions. Information is available from Becky K. Grant, Canadian-American Center, University of Maine, 154 College Ave., Orono, ME 04469.

✓ Fish-Marking Symposium

An *International Symposium and Educational Workshop on Fish-Marking Techniques* will be held at the University of Washington on June 27-July 1, 1988. Sponsored by the American Fisheries Society and the U.S. Fish and Wildlife Service, the Symposium and Workshop will be the first international meeting to bring together fisheries biologists and managers with equipment manufacturers to discuss all aspects of marking and tagging fish. Fish-marking technologies have rapidly improved and diversified in recent years. They embrace physics, electronics, chemistry, genetics, and

morphology. Sophistication of experimental design and analysis has grown with the technologies. Each technological and analytical approach has advantages and disadvantages in particular situations, which may involve small ponds or the open ocean, resident or migrant fish, aquaculture or ecology, basic science or interjurisdictional resource management. Experiences with fish marking have been widespread and worldwide, but information about them is scattered and often informal. A synthesis is needed.

The symposium will address these matters in several ways. Technical and poster sessions will cover every facet of fish-marking techniques and applications. A trade show and equipment demonstrations will allow biologists, managers, and manufacturers to explore technical opportunities and constraints face-to-face. The peer-reviewed symposium proceedings will collate today's (and tomorrow's) state of the fish-marking art and science in published form. Finally, and most importantly, a manual of fish-marking techniques will be distilled from information presented at the symposium. Everyone with a professional interest in fish-marking and tagging will gain valuable information by participating in this symposium and workshop.

A call for papers has been issued, and information is available from Dr. Nick C. Parker, Marking Symposium, U.S. Fish and Wildlife Service, Route 3, Box 86, Marion, Alabama 36756.

✓ International Billfish Symposium

This symposium, to be held in Kailua-Kona, Hawaii on August 1-5, 1988, will be sponsored by the National Coalition for Marine Conservation, the U.S. National Marine Fisheries Service, the Inter-American Tropical Tuna Commission, the U.S. Fish and Wildlife Service, the Sport Fishing Institute, and The Billfish Foundation.

The purpose of the symposium is to review and evaluate science and management relative to billfishes in order to foster more effective management and conservation domestically and on a worldwide basis. Further information can be obtained from Ken Hinman, National Coalition for Marine Conservation, Box 23298, Savannah, Georgia 31403.

A Generalized Bioenergetics Model of Fish Growth for Microcomputers

This consists of two 2-sided microcomputer disks and a 52-page user manual, prepared by Steven W. Hewett and Barry L. Johnson. Fishery managers, fish ecologists, limnologists, marine biologists, and educators will find this new microcomputer model of fish bioenergetics especially useful. The model is designed for use on Apple II (64K minimum) and IBM (512K minimum) or compatible microcomputers. It consists of a series of menu-driven programs that require only a minimum of experience with personal computers.

Originally developed by University of Wisconsin Sea Grant researchers to assess the growth and food consumption of Great Lakes predator and forage fish populations, this generalized model can be used to estimate growth and food consumption for many cold-, cool- and warm-water species of fish. It addresses a broad range of environmental

conditions and circumstances that can affect fish growth and food consumption and can be applied to stream, river, lake, or marine environments.

The model can enable fishery managers to estimate predator demand on forage populations and the rate at which prey are consumed. It can also be used to predict consumption patterns over time, enabling fishery managers to estimate critical periods of predator demand and the consequences of alternative harvest- and stocking-rate decisions. Wisconsin and Michigan state fishery managers, for example, are currently using the model's estimates of consumption demand by piscivores as a basis for their annual stocking decisions for the multimillion-dollar Lake Michigan salmonid fishery.

The model can also be used by fish biologists to evaluate the effects of different environmental factors or prey abundances on individual fish growth rates and total production by whole populations.

Educators can use the model to teach students about the various factors that affect fish growth and survival and to experiment with fish growth and food consumption outcomes under a variety of environmental or physiological conditions.

The package includes a manual (in a ring binder for easy use), a two-sided model program diskette and a two-sided data diskette. Physiological data is provided for 12 species of fish—including lake trout, northern pike, muskellunge, yellow perch, walleye, bluegill, coho and chinook salmon, alewife, large-mouth bass, dace and sea lamprey—but the model's data files can easily be adapted to consider other species of fish with the input of physiological parameters, site-specific temperatures, fish growth, and diet information.

The cost is \$20 from UW Sea Grant Institute, 1800 University Ave., Madison, WI 53705.

Fisheries Research in the Hudson River

C. Lavett Smith of the American Museum of Natural History is the editor of this new 368-page book about the Hudson River. The book addresses specific water quality and pollution problems and documents the changes that occurred during the critical transition period when PCB dumping was discontinued and water treatment plants came into increased use. It will appeal to fishery biologists working with Atlantic coast species, people involved with estuaries worldwide, and to all environmentalists interested in the history of the landmark Hudson River Settlement Agreement.

The signing of the Hudson River Settlement Agreement ended more than a dozen years of controversial court battles over the placement of electric generating plants on the Hudson River estuary. Much of this agreement was based on original field research, the most compelling of which is found in this book.

Fisheries Research in the Hudson River includes a summary of existing fisheries data bases, with comments on their strengths and weaknesses and a guide to their availability, as well as discussions of the natural history of striped bass, white perch, river herrings, tomcod, sturgeon, and a very important food source, the amphipod *Gammarus tigrinus*. It also proposes a management plan for sturgeon, a plan based on an age-structured population model that demonstrates the

practical application of basic scientific data.

This volume can be purchased from the State University of New York Press, Box 6525, Ithaca, NY 14850 for \$24.50 (pb) or \$49.50 (hc).

Toxicity Manual

Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals is Resource Publication 160 of the U.S. Fish and Wildlife Service. This 1986 book has 574 pages and is authored by Foster L. Mayer, Jr. (AIFRB Member 1976) and Mark R. Ellersieck.

Acute toxicity data developed by the Columbia National Fisheries Research Laboratory of the Fish and Wildlife Service since 1965 were evaluated for quality, and a data base was established for 4,901 tests with 410 chemicals (mainly pesticides) and 66 species of aquatic animals. Insects were the most sensitive group, followed by crustaceans, fishes, and amphibians. Among the most commonly tested forms, daphnids were the most sensitive 58% of the time, followed by rainbow trout (35%), bluegills (5%) and fathead minnows (2%).

This is a most valuable book for those interested in toxicants and aquatic animals, with a wealth of specific data on LC50's, effects of temperature on toxicity, effects of pH, effects of chemical formulation, differences in developmental stage, and other factors tested.

The volume is available from the Publications Unit, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

Fish and Wildlife Organizations and Programs

The Wildlife Management Institute is pleased to announce release of its latest edition of *Organization, Authority and Programs of State Fish and Wildlife Agencies*. It is a comprehensive, analytical description and review of major features of each of the 50 state fish and wildlife agencies. Compiled with the cooperation and assistance of those agencies, the information represents the only detailed reference of its kind available on those programs.

Earlier editions were produced by WMI in 1948, 1968, and 1977. Each has been used widely to evaluate, compare, enhance, and improve the role of state agencies in managing fish and wildlife resources.

Organization, Authority and Programs of State Fish and Wildlife Agencies is available for \$10.00 per copy, postpaid, from: Wildlife Management Institute, 1101 Fourteenth Street, N.W., Suite 725, Washington, D.C. 20005.

Inventory and Monitoring of Wildlife Habitat

Allen Y. Cooperrider, Raymond J. Boyd, and Hanson R. Stuart are the compilers and editors of this 875-page hard-bound book published by the Bureau of Land Management in 1986. Although terrestrial vertebrates receive most of the attention in this comprehensive volume, there is considerable material for the aquatic biologist. The main headings cover planning, major habitats, species groups, habitat measurements, special studies, and analysis and presentation. Among

cont. on page 6

the 42 chapters are some on riparian habitats, marshes, streams, lakes, fish, aquatic physical features, hydrologic properties, water quality, data management, statistical analysis, habitat evaluation systems, evaluation and interpretation, economic analysis, written communications, and verbal presentations.

This book is generously illustrated, well organized, and goes into some depth in many of the topics. It could be considered a "bible" even for those with freshwater interests, and is worth keeping on the shelf as a reference.

The Superintendent of Documents, Washington, D.C., sells the book. The Bureau of Land Management, Denver, CO, would know the price.

Water Pollution and Fish Physiology

This 1987 book by Alan C. Heath of Virginia Polytechnic Institute is a current interpretive review of the physiological effects of water pollutants on both marine and freshwater fish. The volume is organized by physiological function, with an emphasis on mechanisms of sub-lethal effects from the cellular to the "whole animal" level. Chapters briefly review normal physiology, followed by a more detailed discussion and synthesis of the effects of particular pollutants on the function under consideration. Additional chapters are devoted to the responses by fish to environmental hypoxia and to the processes of pollutant uptake, biotransformation, accumulation, and excretion.

Chapters also cover introductory concepts, environmental hypoxia, respiratory and cardiovascular responses, hematology, uptake, accumulation, biotransformation, and excretion of xenobiotics, liver, osmotic and ionic regulation, physiological energetics, cellular enzyme activity adenylates, behavior and nervous system factors, reproduction and growth, and use of physiological and biochemical measures in pollution biology.

The 272-page volume is available for \$145 from CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, Florida, 33431.

Demersal Fishes Guide

A Preliminary Guide to Demersal Fishes of the Gulf of Mexico Continental Slope (100 to 600 fathoms), by Danny T. Potts and John S. Ramsey, is a pictorial guide for identification of common or representative bottom fishes encountered in offshore Gulf waters from Yucatan along the northeastern Slope to Florida. Copies at \$3.50 may be obtained from Alabama Sea Grant Extension, Alabama Cooperative Extension Service, 3940 Government Boulevard, Mobile, Alabama 36609, with checks made payable to the Alabama Cooperative Extension Service.

Dissertation and Thesis Abstracts

Influence of the Environment on the Distribution and Relative Apparent Abundance of Juvenile Atlantic Bluefin Tuna Along the United States East Coast

Mitchell A. Roffer, Ph.D. 1987

University of Miami

The preferred thermal habitat for juvenile Atlantic bluefin tuna (*Thunnus thynnus thynnus*), ages 1-4, has been determined from analyses of behavioral, hydrographic, and catch data derived from bluefin (ABT) fisheries in the Middle Atlantic Bight (MAB) from 1976 through 1982. The data indicate that both inter-seasonal and intra-seasonal changes in catchability (availability and vulnerability) are affected by the dynamics of the preferred habitat and that catch-per-unit effort (CPUE) data are valid indices of ABT concentration or catchability. Use of CPUE with constant or random catchability results in biased estimates of ABT stock abundance, especially when environmental conditions vary. Inter-seasonal changes in the geographic location of the center of apparent abundance and duration of the various fisheries for ABT from North Carolina to Rhode Island has been interpreted as being a function of the location and condition of the preferred temperature habitat. It appears that relatively cool summers favor southern fisheries of Virginia and North Carolina and that relatively warm summers favor the northern fisheries of New Jersey, New York and Rhode Island. Since sea surface temperature (SST) is a proxy indicator for the location of the sub-surface preferred habitat, one can monitor the habitat from satellite infrared (IR) data and use the IR and other data to derive models which result in forecasts of the onset, location, and duration of the various ABT fisheries in the MAB.

Daily changes in the distribution, concentration, and CPUE of juvenile ABT in the Virginia Beach, Virginia fishery followed the ephemeral changes in the offshore location, history, and temperature gradients of the Chesapeake Bay plume frontal zone. The effect of bottom topographic features and SST fronts on CPUE were profound, especially when horizontal SST gradients were located within the Rossby radius of internal deformation. The results suggest that the optical characteristics of the water (transparency and chlorophyll concentration) play a greater role in influencing the distribution and relative apparent abundance of tunas than previously thought.

Synoptic scale SST data derived from NOAA-series satellites were essential for monitoring the location and orientation of the Chesapeake Bay plume frontal zone in relation to observed changes in the fishery. The utility of the Coastal Zone Color Scanner (CZCS) on the NIMBUS satellite could not be extensively evaluated in this research due to problems of obtaining usable data for the Virginia coastal waters for the 1979 and 1980 fishing seasons.

Juvenile Chinook Salmon Abundance, Growth, Production, and Food Habits in the Mattole River Lagoon, California

Douglas A. Young, M.S. 1987

Humboldt State University

The purpose of this study was to investigate the abundance, growth, production, and food habits of juvenile chinook salmon (*Oncorhynchus tshawytscha*) residing in the Mattole River lagoon, a small coastal lagoon in northern California. Juveniles were monitored from their migration into the estuary in May until their entry into the ocean in October. Information was obtained by seining at two stations in the lower lagoon; water quality trends were monitored at four stations located throughout the lagoon.

The juvenile population was estimated at about 41,000 fish in early July, after river mouth closure; the largest estimate was approximately 83,000 individuals in early August. Juvenile chinook experienced a rapid decline in numbers, apparently due to high mortality, beginning in late August. Chinook mortality continued through September and the lagoon contained about 5,500 juveniles in early October, 2 weeks before fall rains breached the sand berm. Juvenile chinook grew well until lagoon closure, when warm

water and high fish densities reduce the growth rate. Growth was reduced through July and August. Growth increased in late August, the same period the size of the population was declining rapidly. Juveniles that survived in the lagoon entered the ocean at an average size of approximately 107 mm fork length.

Juvenile production rates decreased during the reduced growth period, but increased after the population began to stabilize in September. Total production during 1985 was approximately 162 kg. Juveniles appeared to feed heavily on dipteran pupae and adults that occurred near the surface and *Corophium* spp. that occurred at the bottom. Food did not appear to be the limiting factor in controlling growth or abundance. High water temperatures in the river and upper lagoon may have forced juveniles into the lower lagoon and appeared to be a factor causing reduced growth and high mortality in juvenile salmon.

Methods for Reducing Handling and Thermal Stress in Rainbow Trout (*Salmo gairdneri*)

George Boakye-Donkor, M.S. 1987

Humboldt State University

Rainbow trout (*Salmo gairdneri*) ranging from 33.5 to 46.8 cm in length and 400 to 1520g in weight were subjected to 5 minutes of handling stress at a temperature of $21 \pm 0.2^\circ\text{C}$. Within 6 hours about 50% were dead, as indicated by an absence of ventilatory movements. Handling stress involved netting a fish and letting it struggle continuously at the surface of the tank. Fish were acclimated for a minimum of 7 days at 21°C before stress experiments.

Blood pH and plasma lactate analysis of the stressed rainbow trout showed that while lactate rose to about ten times normal levels, depression in blood pH to as low as 7.170 ± 0.081 correlated most closely with delayed mortality.

As a means of reducing delayed mortality, trout were injected intraperitoneally with a solution of 0.15M sodium bicarbonate at approximately 100cc of solution per 400g of body weight. Control fish were injected with 0.85% NaCl at the same volume per weight as the buffer injection. The buffer injection elevated blood pH in stressed fish to levels close to those of unstressed fish, and reduced delayed mortality to 12.5%, compared to 62.5% in saline-injected fish.

These results indicate that an intraperitoneal injection of sodium bicarbonate may reduce delayed mortality associated with thermal and handling stress.

Utilization of the Redwood Creek Estuary, Humboldt County, California, by Juvenile Salmonids

James P. Larson, M.S. 1987

Humboldt State University

The timing, duration, and extent of utilization of the Redwood Creek estuary by juvenile chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Salmo gairdneri*) were examined in 1980. All of the chinook were young-of-the-year, whereas 79% of the steelhead were yearlings. The primary food items consumed by chinook and steelhead were dipteran larvae and pupae. Peak downstream migration into the estuary occurred in late May and early June for chinook salmon and steelhead trout. Both salmonid species appeared to reside in the estuary and did not immediately enter the ocean. Ocean entry of both salmonid species in early July was linked to the breaching of the sand berm that partially dammed the creek mouth. The breaching of the sand berm forced the juvenile salmonids to involuntarily enter the ocean and may have reduced survival.

Histology and Ultrastructure of the Jellied Condition of Dover Sole, *Microstomus pacificus* (Lockington)

Robert A. Fisher, M.S. 1986

Humboldt State University

Muscle samples of "normal" and "jellied" Dover sole, *Microstomus pacificus*, were taken from fish on the fillet line at Eureka Fisheries, Inc.,

Eureka, California and from whole, live fish as they were brought on board a commercial fishing vessel out of Eureka. Muscle tissue samples were processed for percent moisture content and for histological and ultrastructural analyses. Percent moisture content for fish samples from the fillet line ranged from 82.8 to 92.1 percent. Samples from the commercial dragger ranged from 84.3 to 89.2 percent moisture. Histologically, normal Dover sole muscle is typical vertebrate muscle. Jellied muscle was characterized by much intercellular space with a proliferation of connective tissue, loosely packed muscle cells resulting in spherically shaped cells in cross-section and severe waviness of cells in longitudinal-section, hypertrophic nuclei, and degraded muscle contractile elements. Occasionally, dystrophic-like characteristics such as internally positioned nuclei, myofibril fragmentation, and variations in fiber size were also observed. Ultrastructural examination of the jellied condition showed loosely packed, randomly spaced myofibrils with few myofibrils occupying the periphery of the cell. In the majority of samples observed, myofilaments were densely packed within myofibrils. Torn myofilaments and pyknotic-appearing nuclei with oversized nuclear envelopes were observed. Three out of 100 fillets contained *Kudoa clupei* cysts, suggesting that the jellied muscle condition is not likely a result of myxozoan infection.

In Memoriam

Joseph E. King

Fellow 1959, Emeritus 1971

St. Simons Island, Georgia

August 18, 1987

Born in Washington Court House, Ohio in 1914. Obtained B.S. Wilmington College (Ohio), M.S. University of Cincinnati, and Fellow University of North Carolina.

For 28 years he was Fishery Biologist with USFWS and successor agencies, BCF and NMFS, to retire in 1971. His career took him to the Gulf States, Alaska, Virgin Islands, Hawaii and eventually to Washington, D.C. where he was Chief, Division of Marine Fisheries.

An Outstanding Scientists and Honorary Member of AFS. In retirement he was active in the Coastal Georgia Audubon Society and previously had established ornithological societies in Louisiana and Hawaii.

Membership Report

PROMOTION TO FELLOW

J. Howard McCormick	MN
Dr. R. Michael Laurs	CA PA
Dr. James W. Meade	PA
Dr. Douglas S. Vaughan	NC

NEW FELLOW

Dr. Bruce B. Collette	DC
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PROMOTED TO MEMBER

M. R. Gribben	VA
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NEW MEMBERS

Gilbert J. L. E. St-Pierre	WA
Dr. John L. Butler	CA
Barton D. Rogers	LA
Talat Farooqi	LA
Dr. Brian R. Murphy	TX
Thomas J. Hall	OH
A. Gail Theilacker	CA

NEW ASSOCIATES

Kate Puckett	WA
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Denby S. Lloyd	AK
Dr. Adolphe O. Debrot	FL
Steven A. Fischer	FL
Patricia Wolf	CA
Ronald C. Dotson	CA
EMERITUS	
E. A. Best	WA

Sammy M. Ray, Membership Chairperson
Texas A&M University at Galveston
Building 311, Fort Crockett
Galveston, Texas 77551

Direct membership inquiries to the Membership Chairperson

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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Participants in the 1987 AIFRB Board of Control Meeting in Winston-Salem, NC. Front row—**Brian Waters**, *Director, Central California District*; **Ronald E. Westley**, *Director, NW Washington District*; **Sammy M. Ray**, *Membership Chairperson*; **Hugh R. MacCrimmon**, *Past President*; **Peter L. Haaker**, *Director, Southern California District*; **Charles F. Cole**, *outgoing Treasurer*. Back row—**John V. Merriner**, *Director, Carolina District*; **Joseph W. Rachlin**, *incoming Treasurer*; **John W. Reintjes**, *BRIEFS Production Editor*; **K V. Koski**, *Director, Alaska District*; **Oliver B. Cope**, *BRIEFS Editor*; **John R. Hunter**, *President*; **Roy E. Nakatani**, *Secretary*.

Charles F. Cole is President-Elect

The Secretary of AIFRB announces that the membership has elected Dr. Charles F. (Pete) Cole to the position of President-Elect of AIFRB. Pete, whose assumption of the President post will take place in 1988, received 57.4% of the votes cast.

Congratulations are in order for Dr. Cole, who served capably as AIFRB's Treasurer from 1981 to 1987 during some difficult times. Congratulations also go to Dr. Saul Saila, the other candidate, who ran a close race and whose qualifications made it a hard choice for many voters.

1987 Board of Control Meeting

President John R. Hunter called the annual meeting of AIFRB's Board of Control to order at 0830, 11 September. The following officers and members of the Board of Control were present: President, John R. Hunter; Treasurer (ex officio), Charles F. Cole; Secretary (ex officio), Roy E. Nakatani; BRIEFS Editor, Oliver B. Cope; Past President, Hugh R. MacCrimmon; Past President, Bernard E. Skud; Membership Chairman, Sammy M. Ray; Production Editor, John W. Reintjes; Alaska, K V. Koski; Central California,

cont. on page 2

1987 Board of Control Meeting *cont.*

Brian Waters; Southern California: Peter L. Haaker; Carolina: John V. Merriner; New York-New Jersey: Joseph W. Rachlin; N. W. Washington: Ronald E. Westley; Emeritus: William C. Royce.

President's Report

President Hunter made an appeal for more contributions from the membership to a series of provocative editorials for BRIEFS. There are a number of good subjects but few to write and contribute—e.g., concept of unit stock, natural mortality, stock enhancement.

To be discussed later under New Business will be (1) new treasurer, (2) new directory, (3) dues for retired members, (4) editorial series for BRIEFS, (5) joint meetings and relationships of AIFRB and AFS, and (6) some changes in bylaws.

Treasurer's Report

If the organization has more than \$25,000/yr income, the accounting needed to meet IRS standards requires hiring a professional. For the present, all accounting is done more or less gratis by the Treasurer. Income is invested in mutual funds because of the convenience, although there are better short-term investments. AIFRB has about \$30,000.

A motion was carried that the new Treasurer, Dr. Joseph W. Rachlin, has the Board's authorization and the President's approval to open a business checking account in AIFRB's name in New Jersey. Also, President Hunter would be authorized to sign the checks.

A motion was unanimously carried that Dr. Rachlin is authorized to open the case of the Apple IIC unit and to install an add-on board costing about \$400; it will increase the computer's memory to as much as 512K. This will not solve all the problems, as the system is no longer a state-of-the-art microcomputer.

Some discussion followed on raising dues, but no action was taken.

BRIEFS Editor's Report

Dr. Oliver B. Cope reported that BRIEFS has a self-imposed number of eight pages because of mailing costs. He also encouraged the District Directors to submit their reports to him because he received only six reports last year. Any news from the Districts needs to be relayed to Cope, such as special honors to any member, members who passed away, etc.

Job placement is always a subject for discussion for the BRIEFS, but since it is published only every other month, the timing is not suited for such service in most cases.

Treasurer Pete Cole reported the mailing list for the BRIEFS was sold last year to a user for \$60.

Production Editor's Report

John W. Reintjes wishes to resign but since Dr. Cope is continuing as Editor, John feels that he can continue. The cost of printing the BRIEFS every two months is about \$475;

with the cost of labeling and mailing, it is about \$755.

The proceedings of a symposium, "Fish and Wildlife Relationships in Old-Growth Forests," published by AIFRB, need to be distributed to scientists and students who have interest in the subject. The book, which originally sold for \$20, is now available to legitimate users at cost of mailing at \$6.99 per 14 books per case. AIFRB has no storage funds for insurance to store these books. We have about 500-600 books and will save about 100 books for AIFRB.

Appreciation to Dr. Cole

President Hunter made a motion to express the appreciation of AIFRB and all its members to Dr. Charles F. Cole for all his years of faithful, excellent service as Treasurer of AIFRB. The motion was passed unanimously.

New Membership Directory

Dr. William H. Bayliff reported on the preparation of the new directory of the members of AIFRB. It is hoped this new directory will be printed and distributed in October 1987.

Membership Committee Report

Dr. Sammy M. Ray reported that the committee has processed 46 new applications which were all approved this year. AIFRB has 1,178 active members.

Because recruiting is a local issue, Dr. Ray suggests that the District have a meeting jointly with another society and hence increase AIFRB's visibility to other possible candidates. Tom Jow of San Jose, CA will assist Dr. Ray in the recruitment of possible new members.

Some discussion was directed to the question of qualifications for an Associate and focused on the possible separation of a graduate student member and a working biologist member, both classified as Associate members. No resolution was reached. It is important to Dr. Ray that some resolution be reached.

Bernie Skud raised the question of the possibilities of the Membership Committee meeting together as a group, and strongly recommends that this be done whenever a new chairman is appointed. Mr. Skud also raised the subject of delinquent members. AIFRB has been very liberal and kept the names of delinquent members on the membership rolls for more than 3 years, in some cases.

Promotions for members need periodic review by District Directors. Directors should try to obtain current curricula vitae and make recommendations to the Membership Committee. Individuals may of course request a review directly to the committee. Also, we need some clarification and definition of who is eligible for membership.

Reports on Awards

Travel Awards. Dr. Joseph Rachlin reported on the AIFRB Travel Assistance Program, which is open to all associate members. Dr. Rachlin suggested that the Travel Assistance budget be larger than the present \$1,000-\$1,200, so that more assistance may be given for the stipend, if needed. Dr. Rachlin will increase the budget to \$2,000 next year.
Individual Award. Some discussion was given to the

composition of the AIFRB Award Committee. Some felt it should not last longer than 2 years, but no action was taken. The Committee recommended that Dr. William C. Royce receive the outstanding achievement award for 1987. The motion was carried.

Group Award. The motion was made by Brian Waters that no group award be made this year because of selection procedure matters. Motion was carried.

Best Paper Awards. The North California District gave two \$50 awards which were well appreciated by the recipients, but Brian Waters suggested a greater amount. The President suggested that AIFRB also present a "Certificate of Appreciation." Peter Haaker will work on a draft of a certificate of appreciation for a District.

Other Business

President Hunter reported on the AIFRB Symposium on Scientific Writing to be held at the American Fisheries Society national meeting in Toronto in 1988. The plan is to produce a symposium document that can be used as a general reference for writers of fishery science. The volume will specifically address issues related to publication of articles in fishery journals. A possible title is "Style Manual for Fishery Biologists." The President is looking for a publisher; the Board suggested University of North Carolina and Ohio State University as possibilities.

District Reports

Southern California District. Peter L. Haaker. The gillnet symposium was a very successful and well-attended meeting. In fact, some funds were realized from this event. This event demonstrates that a well-selected local issue and inviting the interested public will do much to revitalize a District. We are working on holding another symposium centered on "high-tech" fishing science.

Central California (Northern California). Brian Waters. The District held dinners and included non-members as well as members to encourage new members. They plan to have a Chinese banquet with an interesting speaker in December. Their Best Paper Award in the District was very successful. Presently, they also have a Director Elect, so that each Director will serve 2 years, with each term beginning in January.

After a short discussion by Brian Waters on the need to change the name of the District, the motion was carried unanimously to change the name of *Central California District* to *Northern California District*.

NW Washington District. Ronald E. Westley. Mr. Westley thought that the NW Washington District had 20 new members; nevertheless, NW Washington is making a concentrated effort to recruit new members, especially young graduate students, by the faculty at the University of Washington. The District has a new Director in Dr. Alan Mearns, and Katherine W. Myers is the Vice Director.

Carolina District. John V. Merriner. A District meeting will be held this coming fall with a program of professional and social events to rekindle the membership's interest in AIFRB and develop an activities and events program for 1988.

New York-New Jersey. Joseph W. Rachlin. A problem of lack of communication exists in this District, although the District had a membership drive and successfully recruited five members and two associate members. Dr. Rachlin hopes to organize some level of activity around the new membership.

Alaska District. K V. Koski. Dr. Koski reported the following: He assumed Directorship in fall 1985 and held a number of seminars which were largely on fisheries political issues. This subject does not seem to appeal to the younger members. Dr. Koski felt strongly that AIFRB needs two districts in Alaska, a northern District in Anchorage and another District in Juneau. The city of Juneau has more fisheries biologists per capita than any other city. Furthermore, at present, Dr. Koski has no deputy director to assist him in Anchorage. The Alaska District will be changing directors in January 1988. The Board agreed to consider the establishment of two Districts in Alaska upon a written request from Dr. Koski.

Interaction with AFS

President Hunter opened the second day of the meeting with the old-business item, "Interaction with AFS." He and Shelby Gerking, president of AFS, have met to discuss the subject; President Hunter concludes that AIFRB should remain independent of AFS because of the net merits of being an autonomous organization. However, AIFRB needs to redefine some of its purposes with the changing times and growth in the activities of AFS. We all need to work harder to make AIFRB a better and more effective organization. AFS has a very large organization and financial backing (at some cost), compared with some \$30,000 in AIFRB.

Other Old Business

What is AIFRB going to do about future fisheries problems (query from Dr. W. Royce)? Dr. Hunter said that here is an opportunity for AIFRB writers to contribute a white paper on various subjects. Dr. Cope would welcome more white papers from the members. Hunter feels that if he can identify 10 people who can write and who can commit 4 hours to draft and 2 hours to edit the paper, a big step forward would be made. District Director Koski is quite busy with brushfire-type work and has little time for good science, but Dr. Hunter would appreciate write-ups on local issues, too. For example, the gillnet issue in the Southern California District generated much interest, but for BRIEFS a national issue seems more appropriate.

Guidelines for Animal Care

Dr. Rachlin stated that AFS received a document entitled "Guidelines on Any Federally Funded Project Using Animals." AIFRB was requested by Dr. Clark Hubbs, president of American Society of Ichthyologists and Herpetologists (ASIH), and by AFS, to endorse the response to that document, entitled "Guidelines for Use of Fishes in Field Research." A draft copy of this response was distributed to the Board. Ron Westley made a motion that

cont. on page 4

1988 Board of Control Meeting *cont.*

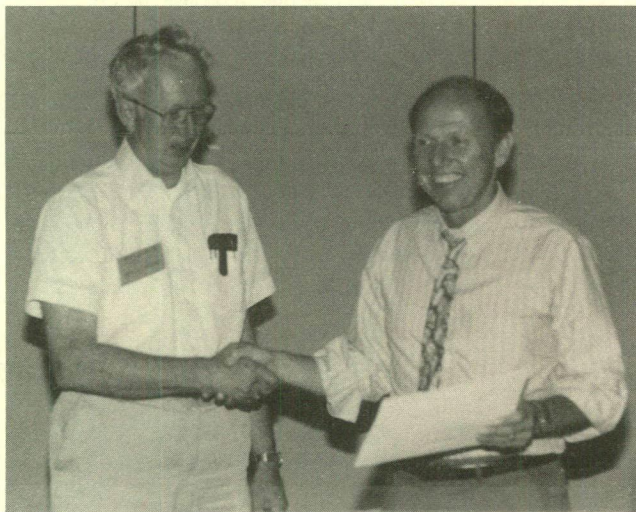
AIFRB endorse this draft document by ASIH and AFS. The motion was carried unanimously.

Nomination of Candidates for President-Elect

The President called for nominations for President-Elect. Before the floor was opened for nominations, Past President B. Skud took up the matter of proper procedures and operational matters, as follows:

1. Each District Director as well as the National Secretary should keep a "Briefing Book."
2. Election procedures and bylaws of AIFRB—we need at least two names or candidates from different regions. There must be no regional bias (should not be all United States or West Coast).

The names of Saul Saila, Robert C. Summerfelt, John Mark Dean, Charles C. Coutant, John H. Helle, and Charles Cole were offered as possible candidates for the office. (Dr. Cole excused himself from the room, for obvious reasons). After a screening vote, the Board of Control chose with two excellent candidates: Dr. Charles F. Cole and Dr. Saul B. Saila. The motion was carried to offer these names as candidates for President Elect. A national election will be conducted by the Secretary.



Ron Westley, Washington, NW District Director, receives an award from John Hunter, AIFRB President, during the 1987 Board of Control meeting.

Dues for Retired Members

President Hunter summarized a letter from an emeritus member who felt dues should be paid by an emeritus member if he considers AIFRB is worthwhile. Since emeritus members are exempt from paying dues, perhaps emeritus members could place their payments under "contributions." Some comment followed but no action took place.

Certificate of Appreciation

President Hunter said we need a new certificate of appreciation designed for service to AIFRB. Presently, we use the same style of certificate for all occasions. For example, we need a certificate for service for Ed Best, who served as NW Washington District Director from 1983 to 1985. A

certificate of appreciation would be useful in recognition of speakers, best papers, etc., at local Districts.

Recruitment Strategies

About 1,500 copies of the "yellow brochure" on AIFRB have been printed for distribution. Recruitment is a District responsibility and activity. On the national scene, we currently have 1,178 members on the mailing list.

Editorial Contributions to BRIEFS

Contributions to BRIEFS are a mixed bag, coming from different committees. Ron Westley says the former Director of the Washington State Department of Fisheries, an attorney, may write an editorial, "What's Wrong With A Fishery Biologist."

New Initiatives for AIFRB

President Hunter believes the bulk of the work of revitalizing AIFRB rests with the Districts. Concentration of viable local issues of interest is one way to attract much interest. A motion carried that if there is a majority opinion of the Board of Control that there has been no action for 2 years in a District, the President may appoint a new Director to replace the old District Director. Whatever is legitimate to get the local biologists together is a good start for a District that has become inactive.

Possible Changes in Bylaws

President Hunter raised this question since he feels that 2 years is too short a period in office for a newly elected president to accomplish some of his tasks. A longer period in office may be more effective. The AIFRB's Bylaws state, "These Bylaws may be amended by majority vote of the Board of Control or of the Fellows and Members of the Institute." Consultation followed but no action was taken by the Board.

Announcements

The 1988 annual Board of Control meeting will be at Toronto at the Royal York Hotel just prior to the American Fisheries Society meeting of 1988. The question of whether AIFRB should always have a joint meeting with AFS national meeting was discussed. Should AIFRB have a joint meeting with ASIH or ASLO? Members of the Board expressed the opinion that such meetings were acceptable but annual meetings of the Board of Control should continue to be held in conjunction with the AFS meeting.

A poster session at the AFS 1988 annual meeting was discussed. John V. Merriner and John W. Reintjes will be tending the AIFRB booth. Mr. Reintjes also has about 300 copies of the proceedings of the symposium published by AIFRB. Copies will be available gratis.

It was suggested that an application for membership be printed on the yellow AIFRB brochure. Although not put to a vote, there was general agreement with this suggestion.

Appointments

The President formally appointed Dr. Joseph W. Rachlin as AIFRB's new Treasurer. Dr. Hunter also announced that Dr. Rachlin is the new Director of the New York-New Jersey

District, and Dr. Alan Mearns is the new Director of the NW Washington District.

Dr. Gregor M. Calliet was appointed chairman of the Awards Committee, replacing Mr. Richard Myhre.



For Secretary Roy Nakatani and President John Hunter, there were many serious moments during the 1987 Board of Control meeting.

*** * * Editorial * * ***

How We Can Enhance Public Trust In Our Profession*

William F. Royce

AIFRB Fellow, Seattle, Washington

How do we as professionals balance our two worlds—the calm classical one of science with the turbulent political one of society? In particular, how should we cope with the increasing publicity about general scientific fraud. We must recognize that these issues are vital, and approach them through our individual professional behavior, our professional education, and our professional organizations such as this one.

As employed scientists, we have obligations to each other and to our employers of competence, integrity, and fair play. Exercise of these includes maintaining confidences and being forthright when called upon. We should also include praise among ourselves for work well done, and private criticism for work ill done. (Public criticism is impractical because of the tort laws.)

As employees, communicating with the public is an almost daily task. We are expected to have the pertinent facts, and provide trustworthy judgments of facts and values. We may face ethical problems of dealing with an employer's "party line", or vested interest. In either case, there may be issues associated with an employer's use of our findings and recommendations. A solution usually depends on skilled communication with the employer—perhaps occasionally finding other employment.

As informed citizens, we can do more through participation in local or regional associations, such as community advisory groups. It may be especially important publicly to comment on (to praise if possible) wise decisions by public officials and sound articles or editorials in the press. With respect to the press we should keep in mind (as the press

must) that over 80% of American students take no science or mathematics after the tenth grade and have very limited understanding of scientific particulars.¹ We should try harder to foster good judgment on the part of the press after noting two general weaknesses in our relationship with it. These are a defensiveness over the possible threat of value differences between science and the press, and a tendency to try to manipulate rather than support the press.²

Our private professional behavior reinforces our public image but probably does not advance it in our changing world. I think much more must be done, and it must be done primarily through our institutions.

Our extensive involvement with public policy needs to be understood and taught much more explicitly in our university fishery programs. Obviously it is not enough merely to train basic biological scientists who publish primarily in refereed scientific journals.

That will be a difficult task because more than 200 colleges and universities in Canada and the United States claim to provide some instruction in fisheries, and probably less than 1,000 jobs for new graduates become available in any one year. A large proportion of these institutions likely have appended a little fish biology instruction to some biology courses.

An approach to strengthening the university instruction has been elaborated by the AFS committee on professionalism.³ It has recommended "development of a renewing, tier certification program based upon a nationally administered qualifying examination. Continuing education will be required to renew the certification."

Further, the committee has recommended that the Association of University Fish and Wildlife Program Administrators expand its mission and become a formal element of the National Association of State Universities and Land Grant Colleges.

Lacking accreditation of fishery programs by outside reviewers, the AFS Committee has also recommended that the Education Section of AFS address the academic issue of what courses best identify our field.

These recommendations formalize an approach that has been discussed for some time and seems likely to continue with little change. We have made scant progress either with educators or with employers.

University fishery programs should also recognize the importance of good press coverage through working more closely with journalism departments. And our organizations ought to recognize excellence in popular writing or broadcasting by either fishery scientists or reporters.

How much more can we do through AIFRB? My guess, on the basis of my 1985 survey, is not much.⁴ Our membership is probably less than 15% of the working fishery scientists and, of our members, only about 11% returned the

*The views expressed are only those of the author and do not reflect policy of AIFRB.

questionnaire. Our members hold a great diversity of opinions about the value of the election program in obtaining employment, and only a small minority feel that the AIFRB recognition is more desirable than certification by AFS. Even fewer felt that separate recognition of fishery research scientists or of fishery research specialties was desirable.

Undoubtedly, it is important for us as individuals to reaffirm our dedication to professional standards, but I am convinced that we can do little about advancing our profession as a whole without greater organizational strength. We must gather support of a large proportion of the people whom we consider to be professionals and from their employers. With better organization, perhaps we can stimulate adoption of more clearly defined and more appropriate programs by our universities. Furthermore, acquaintance with the long-term needs of society as a whole might well be better preparation for students of fishery science forced to accept employment in other fields.

I suggest that we work more closely with AFS. We can have a major influence on AFS, and the two organizations together can be much more effective with employers and academe than they can separately.

In closing, I note the minor role of fishery science among our many sciences, and I turn to a philosopher's comment about fragmentation of science made many years ago. "Each profession makes progress, but it is progress in its own groove. Now to be mentally in a groove is to live in contemplating a given set of abstractions. The groove prevents straying across country, and the abstraction abstracts from something to which no further attention is paid. But there is no groove of abstraction which is adequate for the comprehension of human life. Thus in the modern world, the celibacy of the medieval learned class has been replaced by a celibacy of the intellect which is divorced from the concrete contemplation of the complete facts."⁵

Notes and References

1. Walsh, J. 1980. Trouble in science and engineering education. *Science* 210:615-616.
2. Goodell, R. 1985. Problems with the press: Who's responsible. *Bioscience* 35(3):151-157.
3. Cole, C. F., et al. 1986. A professional umbrella for the 80s: Report of the 1983-84 professionalism committee. *Fisheries* 11(6):22-28.
4. Royce, W. F. 1986. The Royce report. *BRIEFS, American Institute of Fishery Research Biologists*, 15(2):1-4.
5. Whitehead, A. N. 1925. *Science and the modern world*. Macmillan. See chapter XIII, Requisites for social progress.

Ed. note: Rebuttals or comments on editorials should be submitted to the AIFRB Editor.

Financial Report

At the 1987 Board of Control meeting in Winston-Salem, NC in September, Dr. Charles F. Cole, outgoing Treasurer,

presented an annual financial report covering AIFRB's fiscal affairs during the period from September 1, 1986 through August 31, 1987. The balance sheet has been reviewed and accepted by the Audit Committee. The following summary shows the principle features of Dr. Cole's report:

Expenditures

Item	Budgeted	Expended
Travel	\$ 4,000.00	\$ 3,337.20
BRIEFS, printing	4,000.00	3,166.58
BRIEFS, postage	1,200.00	1,777.52
Offices, supplies	1,100.00	1,227.94
Offices, postage	800.00	721.91
Office help (Klingler)	-0-	1,104.00
Awards	1,750.00	1,750.00
Computer (OSU)	500.00	312.67
Bank charges	80.00	114.18
Telephone	100.00	-0-
Expense advances	500.00	200.00
Prepn. of 990	500.00	-0-
Alaska Book expenses	-0-	60.03
Miscellaneous	-0-	497.40
TOTAL	\$14,530.00	\$14,269.43

Income

Item	Budgeted	Receipts
Dues	\$11,900.00	\$16,726.51
Alaska Book	4,000.00	761.00
Miscellaneous	-0-	1,521.29
TOTAL	\$15,900.00	\$19,008.80

Assets, August 31, 1987

I. LIQUID ASSETS		
Checkbook balance		\$ 2,165.43
Bache cash account		0.33
MoneyMart Assets		17.00
CD Western S&L FSLIC 6.150 due 9/7/87		2,000.00
CD American S&L FSLIC 8.200 due 12/18/87		2,000.00
TOTAL		\$ 6,182.71
II. ASSETS FUND		
	Cost	8/31 market
AmCapSecFd 327.822 sh x 10.830	(3,006.64)	\$ 3,550.31
PruBache Govt.Sec. Int. 1,224.685 x 10.27	na	12,577.51
PruBache Equity Fd. 557.971 sh x 11.95	(5,506.40)	6,667.75
PruBache Incomevert. Plus 490.195 x 12.71	(5,008.58)	6,230.38
PruBache Utility Fd. 238.184 x 14.77	(3,006.75)	3,517.98
TOTAL	(29,646.59)	\$32,543.93
III. FIXED ASSETS		
Apple IIC System (fully depreciated 8/31/87)		-0-
TOTAL		-0-
IV. INVENTORY		
Alaska Symposium books, 1000 copies @ \$2.00		\$ 2,000.00
GRAND TOTAL		\$40,726.69

Dues From Outside U.S.A.

AIFRB Treasurer Joseph Rachlin requests that members from Canada and other places outside the U.S. remit their dues in U.S. currency only.

A check for \$20 drawn on a bank in Canada has a \$5.00 fee Canadian deducted during the transfer to U.S. currency. This fee is deducted by the Canadian exchange.

The check is then worth \$15 Canadian. At a typical rate of 72¢ on the dollar, this translates into \$10.80 U.S. currency. However, the U.S. banks then deduct \$5.50 as an exchange handling charge, so the Institute realizes only \$5.30 from the original \$20 Canadian. The same applies, with slightly different figures, for all foreign currency. If the original check is drawn in U.S. funds, the Institute realizes the entire dollar value.

1987 W. F. Thompson Award

AIFRB's W. F. Thompson Best Student Paper Award for 1987 has been selected by the Award Committee, and the Institute is proud to announce that an outstanding contribution to fishery science and tuna biology is the winner. Authors Robert J. Olson of the Inter-American Tropical Tuna Commission and Christofer H. Boggs of the University of Wisconsin Center for Limnology (now of the NMFS SWFC Honolulu Laboratory) will receive their cash awards early in 1988 for their paper, which was published in the Canadian Journal of Fisheries and Aquatic Science 43: 1760-1775. An abstract of their contribution follows here:

Apex Predation by Yellowfin Tuna (*Thunnus albacares*): Independent Estimates from Gastric Evacuation and Stomach Contents, Bioenergetics, and Cesium Concentrations

Three approaches for estimating predation by yellowfin tuna (*Thunnus albacares*) were compared: (1) stomach analysis adjusted for gastric evacuation; (2) food energy required as a function of swimming speed in yellowfin tracked at sea; and (3) food intake needed to maintain cesium concentrations. Gastric evacuation data from captive yellowfin were best fit by linear functions of time for four foods. Fish with high lipid content (mackerel, *Scomber japonicus*) were evacuated at a slower rate (proportion per hour) than smaller fish (smelt, *Hypomesus pretiosus*), squid (*Loligo opalescens*), and small fragile fish (nehu, *Stolephorus purpureus*), all of which had lower lipid contents. Tuna captured in the eastern Pacific had daily rations averaging 3.9% of body mass based on stomach contents and gastric evacuation rates, 5.2% based on bioenergetics estimates, and 6.7% based on the cesium estimate. Swimming costs accounted for one-third to one-half of the energy budget. Annual predation by the eastern Pacific yellowfin population averaged 4.3-6.4 million metric tons during 1970-72, depending on the method used for estimating ration; 34% was frigate tunas (*Auxis* spp.). High growth and turnover rates (P/B ratios) of tropical tunas in contrast with low conversion and trophic transfer efficiencies suggest a trophic structure that differs from more productive ecosystems.

1988 AIFRB Travel Assistance Program

The purpose of the Travel Assistance Program is to provide travel assistance for qualified graduate students and other Associate Members so that they may present a paper at a scientific meeting of their choice.

All Associate Members of AIFRB are eligible.

Applications should include a written request and letter of support from your research mentor or supervisor, for a specific meeting. Also submit a copy of an abstract of the paper and notification of the paper's acceptance for publication to Dr. Joseph W. Rachlin, Department of Biological Sciences, Lehman College of C.U.N.Y., Bedford Pk. Blvd. West, Bronx, NY 10468-1589.

The deadline for 1988 assistance is April 1, 1988.

Recipients of Travel Assistance Awards will have their name and abstract published in BRIEFS.

Recipients of 1987 awards were:

Dr. Mark R. Jennings California Academy of Sciences
Ms. Kathleen R. Mathews University of Washington
Ms. Katherine Yudin California State University
Ms. Barbara Warkentine Lehman College, C.U.N.Y.

Membership Report

PROMOTION TO FELLOW

Dr. David T. Hoopes
Donald E. Sweat

PROMOTION TO MEMBER

Dr. Craig V. Sullivan

NEW MEMBERS

Dr. Lawrence L. Moulton
Dr. David B. Grobecker
Michael Hinton
Dr. Thomas Quinn

NEW ASSOCIATES

WA Stephen M. Kaimer
FL Victor D. Palma
Bruce R. Eddy
S. G. Tolley

WA
TX
OR
FL

EMERITUS

WA Jack. W. Gehringer
Dr. E. S. Iversen
Clyde S. Sayce

WA
FL
WA

Sammy M. Ray, Membership Chairperson
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77551

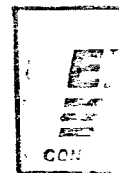
Direct membership inquiries to the Membership Chairperson

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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