INTER-AMERICAN TROPICAL TUNA COMMISSION

SUMMARY MINUTES OF THE THIRTY-NINTH MEETING

October 19-21, 1981
Paris, France

Chairman: Louis Roudie

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AGENDA ITEM 1 - OPENING OF THE MEETING

The 39th meeting of the IATTC was opened by the Chairman, Mr. Louis Roudie of France, at 11:00 AM, October 19, 1981, in the Centre de Conferences Internationales in Paris. Mr. Roudie introduced Mr. Jean Claude Hennequin representing Mr. Le Pensec, Minister of the Sea. Mr. Hennequin apologized on behalf of Mr. Le Pensec who could not be present. He welcomed all delegations to France and wished them success in their deliberations. He then noted the importance of tuna fishing to France and commented on the role of the IATTC in management of tuna resources in the eastern Pacific Ocean. He stressed that management recommendations must be made on a timely basis and must be based on a sound scientific program that includes both collection of fishing statistics and scientific studies. He also noted the importance of international cooperation among the nations of a region if such a management program is to succeed.

Mr. Hennequin observed that the IATTC is a mature organization having been in existence over 30 years and that it has a good record of achievement in terms of both science and management. In this regard he singled out the contribution of Dr. James Joseph, Director of Investigations, and on behalf of the French Government, he awarded Dr. Joseph a "Doctor Honoris Causa" from the Universite de Bretagne Occidentale in Brest, France.

Mr. Hennequin then noted that the Commission is in need of a new context within which to work, largely as a result of events relating to the current Law of the Sea negotiations. He stated that his government has worked towards this goal and hopes that further progress can be made as a result of this meeting.

The Chairman thanked Mr. Hennequin for his presentation and turned the floor over to Dr. Joseph who thanked Mr. Hennequin and the French government for the honorary degree that he had been awarded. He noted that the IATTC scientific staff has a long tradition of working with French scientists on tuna research, especially with Dr. Jean-Claude Le Guen and his group of French scientists working in Brest. He also reiterated Mr. Hennequin's observation that international cooperation is essential to the rational management of tunas because of their highly migratory nature. The Commission staff will continue to work toward this goal and to cooperate with their scientific colleagues in France and other countries.

The Chairman then asked the leaders of delegations to introduce themselves and their delegations. Observers representing non-member governments, and representatives of international organizations also introduced themselves. All member governments were represented at the meeting. A list of attendees is attached as Appendix I.

AGENDA ITEM 2 - CONSIDERATION AND ADOPTION OF THE AGENDA

The Chairman stated that a proposed agenda had been distributed several months before the meeting and asked if it was acceptable to all delegations. There were no comments, and the proposed agenda was adopted. The Chairman then proposed that morning sessions run from 10:00 AM to 12:30 PM and that afternoon sessions run from 3:00 PM to 5:30 PM. There was no objection to this schedule, and it was adopted. Mr. Labrousse of France asked for the floor and announced that there would be two cocktail hours for the participants and their wives, one on Monday evening at 6:30 PM at the Conference Center and the second on Wednesday evening at 6:30 PM at the Tour Montparnasse.

AGENDA ITEM 3 - REVIEW OF CURRENT RESEARCH

The Chairman noted that it has been the customary practice for the Director of Investigations under this agenda item to briefly review the Commission's current research programs. He then called on the Director to make this presentation.

The Director began his presentation by noting that this was his main opportunity to explain what the Commission staff is doing in pursuing its research studies as well as how and why these studies are undertaken. It is also an excellent opportunity to get feedback from member governments on the research program. The staff's primary objective is to conduct research that will enable it to make the soundest possible conservation recommendations aimed at enabling maximum yields to be taken from the resource on a sustained basis. The species of concern are the yellowfin, skipjack, bluefin, and bigeye tuna of the eastern Pacific as well as certain minor species. The Commission also has a dolphin research program that will be covered under agenda item 4.

Turning to specific areas of research, the Director stressed that the most fundamental aspect of the Commission's research program is the collection of basic statistics relating to the fishery. These include data on catches and landings, fishing effort, size

composition, and fleet composition. When these data are used in population dynamics studies and other types of research there can be a time lag of months or even, in some case, years between the time that events occur in the fishery and when data describing these events are used in a study. To collect data used in such studies the Commission maintains offices in all ports where major portions of the eastern Pacific catch are landed, including Puerto Rico. IATTC personnel obtain data from vessel logs and cannery landing records, and they take length frequency samples. Beginning in 1966, a yellowfin conservation program was implemented in the eastern Pacific, and it became necessary for the Commission staff to monitor the fishery on a real time basis in order to determine a closure date. Since then real time data on catches by individual vessels have been collected on virtually a daily basis through contacts with vessel managers.

Tagging studies provide valuable information on movement, growth, stock structure, mortality, and other aspects of tuna biology. They are also a major budget item because boat charter costs are high. The Director described progress on Commission tagging programs in the central Pacific, the eastern Pacific, and in Japanese waters.

The Commission is interested in the central Pacific area around the Marquesas, Tuamotu, and Society Islands because of the possibility that skipjack taken in the eastern Pacific, especially in the southern part of the fishery, may originate in the central Pacific. Since the fall of 1977, approximately 30,000 skipjack have been tagged, and a number of recoveries have been made in the central Pacific and the western Pacific, but no recoveries have been made in the eastern Pacific. This indicates that skipjack of the size tagged (mostly about 45 to 55 cm. in length) do not migrate in significant numbers from French Polynesia to the eastern Pacific. It does not indicate however, that the skipjack of the eastern Pacific and French Polynesia are independent subpopulations, for juvenile skipjack are rare in the eastern Pacific and abundant in the Central Pacific, which suggests that skipjack migrate from the central to the eastern Pacific when the fish are less than 45 cm. in length. About 2,000 yellowfin were also tagged in the central Pacific, and 10 of them have been recaptured. Three of these recoveries were made in the eastern Pacific offshore fishery west of the CYRA. This return rate can be compared to the offshore return rate from inshore releases in the eastern Pacific -- 30,000 such releases have produced only 10 offshore recoveries. These data support the hypothesis that the fishery

operating west of the CYRA may be taking yellowfin from a population that is at least semi-independent of the inshore fish.

There have been two tagging cruises in the eastern Pacific since the last Commission meeting. The first of these was conducted during October-December 1980 in the vicinity of the Revillagigedo Islands. The principal objective was to catch large yellowfin and skipjack, inject them with tetracycline, tag them, and release them so that the relationship between time, growth, and numbers of increments deposited on the otoliths could be determined for larger fish. The second of these was conducted during March-May 1981 off Ecuador, Colombia, Panama, and Costa Rica, and in the vicinity of Clipperton Island. Yellowfin, skipjack, and black skipjack were tagged in all areas. Sonic tags were attached to four yellowfin, two in the Gulf of Panama and two near Clipperton Island to study yellowfin behavior and interactions with dolphins. This sonic tagging is being done by Dr. Frank Carey of the Woods Hole Oceanographic Institute, and the Commission is cooperating with him in the program. Although this work is just beginning there are already some interesting results. For example, the Director showed data on one sonic tagged fish which spent a good deal of its time in the thermocline rather than in the upper mixed layer. This fish also made several descents into oxygen poor water below the thermocline. At this point the Chairman noted that it was 12:30 PM, and the meeting was adjourned until 3:00 PM.

When the meeting resumed the Director continued his discussion of Commission tagging programs. The staff has been engaged in a northern bluefin tagging study in cooperation with the Far Seas Fishery Research Laboratory at Shimuzu, Japan. In the summer of 1980 about 800 small bluefin were tagged near Kagashima. About 125 of these fish were recovered in the same year indicating high fishing mortality. This year there were 33 more recoveries in the Japanese fishery and 21 recoveries in the U.S. fishery. The fish from the Japanese fishery showed more growth than those from the U.S. fishery. Tagging of small northern bluefin continued in 1981 in the area near Shikoku. Over 3,000 fish were tagged in July-September, and there have been about 60 returns so far, all from the Japanese fishery, and more are expected next year. The Commission staff hopes to continue this bluefin tagging for a few more years.

In concluding his review of tagging studies, the Director reiterated that, although expensive, tagging is fundamental to the objectives of the Commission. He then asked if there were any questions concerning tagging.

Mr. Beckett of Canada asked if sonic tagged fish showed any response to boat noise. The Director said there was a response and that the boat tried to stay behind the tagged fish.

Dr. Le Guen of France asked how sonic tagging affected whether fish left or joined schools. The Director said that this was variable in the experiments that we have done so far but that all tagged fish made similar up and down movements in the water column. In some instances tagged fish stayed with the school from which they were captured and in other instances they did not appear to rejoin any school.

The Director then turned to other aspects of the Commission's research program. Information on age and growth of tunas plays a key role in the research program especially in developing age-structured yield models. Historically age and growth has been studied by following the progression of modes in size frequency samples of the commercial catch. A drawback to this approach is that it does not work well on older fish. Tagging studies provide additional information on growth, but only over the limited period of time that tagged fish are at large. For several years the Commisson has been exploring the use of daily marks on otoliths to study growth. It has now been shown that yellowfin in the 35-110 cm. size range do lay down one ring per day on their otoliths. This was demonstrated by injecting fish with tetracycline at the time of tagging. This creates a "time of tagging" mark on the otoliths and enables one to compare the number of natural subsequent marks with days at large. A one-to-one relationship was observed within the size range studied.

The number of otolith rings also correlates well with fork length with no difference in the relationship between males and females in the size range studied. However, in the fishery no large females are encountered. It is not known if this is due to differential rates of mortality, differential availability, or differential growth between males and females. It is believed that extension of the otolith studies can shed considerable light on this issue.

Another current investigation involves studies of the microchemistry of tuna hard parts such as vertebrae and spines. The latest work involves bombardment of a small area of a hard part with a proton beam produced by a cyclotron. This produces back-scattered X-rays which can be analyzed spectroscopically to determine the chemical composition of the sample target area. Using this technique hard parts of small northern bluefin tuna

from the Mediterranean Sea and from off the east coast of the U.S. have been compared. It has been demonstrated that the two groups can be clearly distinguished from one another. The next step is to examine hard parts from larger bluefin. One objective will be to see if migrations from one ocean area to another can be reconstructed from microchemical differences in older and more recently formed portions of a given hard part. These bluefin studies are being carried out by the Commission in cooperation with the Southeast Fisheries Center of the National Marine Fisheries Service. Preliminary studies have also been made of yellowfin samples from different parts of the eastern Pacific. It appears that differences can also be detected in these samples. All cyclotron work is now carried out at the California Institute of Technology in Pasadena, and a semi-permanent facility has been established there.

The Director then discussed the serious lack of knowledge concerning the early life history of tunas. Eggs of various species cannot be distinguished, small tuna cannot be aged, major mortality factors are unknown, and nothing is known about diet, feeding behavior, or the roles played by competition or predation. Ignorance about these aspects of early life history, as well as many others, makes accurate prediction of recruitment to the commercial fishery impossible and places a significant limitation on management effectiveness. To overcome this lack of knowledge, a long term commitment is required to conduct a variety of studies both in the laboratory and in the field. Although the payoff is a long way down the road, this type of work needs to be started. Toward this end, the staff has identified an ideal site in Panama where a small laboratory could be established. The site is located near Cabo Mala just west of the Gulf of Panama. It has a good water supply and is in close proximity to an important tuna spawning area. Thus, it would be suitable for both laboratory and field studies. The Director described preliminary plans for development of a suitable facility on this site. The Government of Panama has been very helpful in supporting and encouraging further pursuit of this project and is making the land available to the Commission.

In addition to these subjects, the Director also briefly touched on staff activities involving population genetics and stock structure, tuna feeding and energy requirements, changes in the skipjack fishery in recent years, and modeling northern bluefin migration in the Pacific. He then asked for questions on his research review.

Mr. Beckett of Canada inquired as to whether or not

dolphin reacted to sonic tags on tuna. The Director replied that sonic tagged tuna have associated with dolphin schools, but we do not know if the dolphin sense the tag. The real problem has been for researchers to detect the tag signals in the presence of dolphin background noise. Mr. Beckett then asked if large female yellowfin are taken in the longline fishery as are large female billfish. The Director responded that large yellowfin females are not taken in the longline fishery, at least in the eastern Pacific.

Mr. Michael Hunter of Canada asked for the floor. He stated that he was impressed by the broad scope of the IATTC research program, but went on to comment that in some respects it seemed perhaps a little too "de luxe", especially in comparison with various national research programs which are struggling in the face of very austere times. With this in mind, and in anticipation of later discussions to be held on budget issues, Mr. Hunter asked the Director if he could indicate the relevance of Commission research programs, especially with respect to the objective of determining total allowable catches (TACs). The Director acknowledged that Mr. Hunter's remarks raised some very important issues that he wished to deal with in some depth. He then asked whether he should take these matters up immediately or wait until agenda item 7 dealing with the budget was reached. Mr. Hunter indicated his preference for the latter course of action, and this was agreed upon.

Dr. Le Guen of France then commented on the growth of juvenile tunas noting that it is rapid at first but then slows down and noted that in order to make accurate assessments of yield, growth of tuna must be well defined as well as the distribution of fish by size in time and space. The Director concurred with Dr. Le Guen's assessment and further responded that Dr. Le Guen's observation relates to age of recruitment to the fishery, which varies from area to area, and added that much more work needs to be done in this area. Dr. Le Guen then turned to the subject of genetic studies, noting that in the South Pacific such studies are worthless for separating stocks. The Director agreed that genetics studies do not provide all of the answers that we might hope for. That is why we undertake other types of studies in areas such as tagging, morphometrics, chemical composition, etc. Yellowfin population genetics studies show some degree of heterogeneity, but large samples are needed to show clear differences and define stocks. Nevertheless, the question of stock identification remains an important one because in developing our population dynamics models we must make certain assumptions, and these assumptions need verification.

There were no further questions concerning the Director's research review, and since it was 5:30 PM, the Chairman adjourned the meeting until 10:00 AM the following morning.

AGENDA ITEM 4 - TUNA-PORPOISE PROGRAM

The 39th meeting reconvened at 10:00 AM on Tuesday, October 20. The Chairman asked the Director for his comments on this agenda item. The Director noted that porpoise (or, perhaps more preferably, dolphin) and larger yellowfin frequently associate with each other in the eastern Pacific. Such associated schools can be captured by purse seiners, and in the process dolphin can be killed. During the 1960's and early 1970's dolphin mortality in purse seining operations was high, with as many as half a million animals being killed annually. This caused international concern, especially in the United States, and eventually resulted in a special meeting of the Commission being held in San Diego in 1977. At that meeting the Commission's tuna-dolphin program was initiated. The three objectives of the program were (1) to maintain a high level of tuna production, (2) to maintain dolphin stocks at or above levels that assure their survival in perpetuity, and (3) to ensure that every reasonable effort is made to avoid needless or careless killing of dolphin.

The largest single element of the tuna-dolphin program is the observer program in which the IATTC trains nationals of various countries that participate in the eastern Pacific fishery and places them aboard vessels of their country to collect data on dolphin occurrence and mortality for the Commission's data bank. Other elements of the program are to estimate dolphin abundance and mortality (i.e., population dynamics studies), to study the nature of the bond between tuna and dolphin, to carry out studies on the design and deployment of gear, to organize workshops for dissemination of information on mortality reduction technology, and to organize scientific workshops. Much of the IATTC dolphin research is carried out in close cooperation with the U.S. National Marine Fisheries Service which has a major tuna-dolphin research program of its own.

Having described the IATTC tuna-dolphin program in general terms, the Director turned his attention to some specific matters. With regard to the observer program, Costa Rica, Panama, the U.S., and Venezuela are currently participating. In the case of Mexico, technicians have been trained for observer duties, but there have been delays in drawing up a contract concerning actual placement of observers, and thus far none have made

trips. Recently, Mexico's Ministry of Foreign Affairs has indicated that the difficulties should soon be worked out, and hopefully Mexican vessels can soon be included in the program. This will be important because the Mexican fleet has been expanding rapidly. Other participants in the fishery have also been contacted concerning placement of observers aboard their vessels. One factor that has complicated observer placement has been the large number of recent flag changes.

Dolphin kills have been greatly reduced from their high levels in the 1960's and early 1970's. Much of this reduction has been undoubtedly due to improvements in fishing gear and techniques and to improved fishing skills, but an additional factor is a reduction in the percentage of the tuna catch taken in association with dolphin. During most of the 1970's over 60 percent of the tuna were taken with dolphin while during the most recent 5 years the figure was less than 50 percent.

For 1980 the estimated dolphin kill for all species was about 43,500 animals. This is considerably higher than the estimated kill for 1979, but the 1980 estimated kill is probably biased high as a result of two sets by non-US vessels that resulted in large kills. These two sets alone were largely responsible for the high estimated non-US kill. This result emphasizes the importance of improving observer coverage in the non-US sector of the fleet. Turning to 1981, a preliminary estimate of the U.S. kill through September is about 15,000 animals.

At the 38th meeting in October 1980 the Director recalled that he had expressed some concern over the estimates of the abundance of the eastern spinner stock, which at that time were quite depressed. He then described the method for estimating the eastern spinner population stressing especially the problem arising from the fact that ranges of the eastern spinner stock and the whitebelly spinner stocks overlap broadly. The problem thus arises of apportioning the estimate of unidentified spinners in this region of overlap. Clearly the extremes would be to assume that all unidentifieds are either all whitebellies or all eastern spinners, with the best estimate lying somewhere in between. This estimation problem notwithstanding, analysis of 1980 eastern spinner abundance data indicates an increase in the population. This is an encouraging trend that will be followed closely.

Logbook data play an important role in dolphin population dynamics studies, and two possible problem areas have been studied carefully in 1981. One

possibility was that the reported proportion of dolphin sets and the dolphin catch per set might differ between vessels with and without observers. However, analysis of data from the past few years adjusted for time of year and area indicate that there are no significant differences due to an "observer effect". A second problem is non-reporting of set type in the log. A "nearest neighbor" technique has now been developed to assign such sets to either the dolphin or non-dolphin category.

The Director then described a survey which was undertaken to study dolphin schooling behavior by means of aerial photographs. This survey was an outgrowth of earlier photographic work that had been carried out using helicopters. The 1980 survey was undertaken in cooperation with the U.S. National Marine Fisheries Service and the Instituto de Pesca in Mexico. It was originally scheduled for late summer, but a variety of problems were encountered, and the survey was delayed until late fall. The survey focused on relatively nearshore areas off of Zihuatanejo, Acapulco, and Tapachula in Mexico, and aerial photos of over 100 dolphin schools were obtained. A number of general observations were made. For example, off Tapachula a tendency was noted for dolphin schools to be concentrated over the area in which the continental margin dropped off from 100 to 1000 fathoms. However, the primary objective of the study is to study the composition of individual schools. This is being accomplished by computer processing of the photos, and the Director presented some examples. Ultimately, knowledge of school size composition and social structure should make it practical to estimate reproduction rates.

The Director also described a staff program to anchor rafts in areas where large yellowfin are frequently taken in association with dolphins. It was hoped that this might lead to an alternate way to harvest these large fish. Altogether, five anchored rafts were deployed and tuna were attracted to the rafts. In fact, 40 to 50 tons of tuna were reported to have been taken in association with the rafts. Unfortunately two serious problems were encountered. First, and perhaps solvable, was the fact that all five rafts were lost, either by breaking loose in some way or by being cut loose. Second, and more serious from a management point of view, the fish attracted to the rafts were generally small and were typical of the kind of fish that are attracted to natural floating objects (i.e., "logs"). Based on these outcomes, no further raft studies are planned for the near future.

The Director also touched briefly on certain other activities, describing attempts to follow sonic tagged dolphin using a sailboat, gear workshops in Panama and Ensenada, Mexico,, a technical workshop in Nicaragua, development of a backdown board system for preventing net collapse, and lighting systems for use in evening or "sundowner" sets.

The Chairman then called for questions and comments on the Director's presentation on the tuna-dolphin program. Dr. Le Guen of France began by pointing out that it is not known why tuna and dolphin associate in the eastern Pacific, and, more particularly, why it is generally larger yellowfin that are involved in this association. He then noted that avoiding fishing on associated schools of dolphin and larger yellowfin tends to cause more effort to be expended on smaller yellowfin which are below their optimum size for harvest. This is poor practice from a tuna management point of view. Dr. Le Guen then asked if aerial photos are taken continuously or only when dolphin schools are sighted. In response, the Director said that aerial photos are taken only when schools are sighted. He went on to state that he agreed with Dr. Le Guen's observation on the inherent conflict between the goals of fully protecting dolphin and fully utilizing tuna resources.

Mr. Yao, observer from Taiwan (Republic of China), then asked for clarification of the use of the terms "dolphin" and "porpoise". The Director responded that there is some ambiguity in the use of these terms in the English language. Some cetacean taxonomists believe that the term "dolphin" should be applied to beaked species such as those that are involved in the eastern Pacific fishery, with the term "porpoise" applying to round-nosed, non-beaked species of small marine mammals. Fishermen in the eastern Pacific generally use the term "porpoise", but IATTC and U.S. scientists prefer to use the term "dolphin". A further complication is that a popular sportfishing and eating fish is also known as a "dolphin". This fish is also known by the names "dorado" and mahi-mahi".

There were no further comments on the subject of tuna-dolphin studies, so the Chairman proceeded to agenda items 5 and 6.

AGENDA ITEMS 5 AND 6 - THE 1981 FISHING YEAR AND CONDITION OF THE YELLOWFIN STOCK AND RECOMMENDATION FOR 1982

In introducing agenda items 5 and 6, the Chairman explained that because these items are closely related,

he would ask the Director to discuss them together as he has done in the past. In making his presentation the Director made use of a number of tables and figures from Background Papers 1 and 2 giving data on various aspects of the fishery.

The Commission began research on the tuna stocks of the eastern Pacific in 1950. It has been established that the present levels of exploitation of yellowfin are sufficiently large to affect stock abundance in subsequent years, but such is apparently not the case for skipjack. By 1960 it was estimated that the maximum sustainable yield of yellowfin from inshore areas then under exploitation was 90 to 100 thousand short tons annually. In the early 1960's much of the fleet changed from baitboat fishing to purse seining, and catches increased to about 120 thousand tons, which was greater than the estimated sustainable yield for the inshore fishery. Subsequently, the catch declined to about 80 thousand tons as was predicted by the Commission staff.

In 1962 the Commission first recommended a yellowfin quota, and in 1966 a conservation program for yellowfin tuna was established. The key element of the conservation program was the overall quota on the yellowfin catch from within the CYRA. This quota is taken on a first-come, first-served basis. Although the CYRA boundary was originally drawn in a rather arbitrary fashion, it now appears that yellowfin harvested west of the CYRA are relatively independent from those taken in the CYRA. Shortly after the initiation of the conservation program construction of new vessels caused the fleet to increase in size. This increase in fleet size increased competition and vessels began fishing further offshore in areas that had not previously been exploited. It was clear that the potential yield from the population relative to that during the period when the fishery was concentrated inshore on smaller fish had increased. In order to generate information with which to quantify this increased potential yield, the Commission began an experimental program of gradually increasing the quotas to empirically test the productivity of the stock. At the same time, areas of the CYRA where effort had not previously been generated were experimentally left open after closure elsewhere. The results of this unique experiment showed that the yellowfin fishery was capable of sustaining a catch of about 175,000 tons within the CYRA.

The conservation program was effective through 1978 in maintaining the CYRA yellowfin resource at a high level of productivity. In 1979 the program was not implemented until so late in the year that no effective

control of fishing effort was possible. In 1980 and 1981 no program was implemented at all, although agreement was reached on what the overall quota should have been in the event that a program had been implemented.

The Director then reviewed progress of the 1981 fishery through August and compared 1981 to earlier years. Items discussed included fleet deployment by week, cumulative yellowfin and skipjack catches, geographic distribution of the catches, and the catch and fleet composition by flag. In 1981 the fleet put to sea for the first trip more slowly than usual, probably because no race against a closure date was anticipated. In other respects fleet deployment was normal. The cumulative yellowfin catch lagged behind the catch for last year through August,but by October it had caught up. By the end of the year the 1981 CYRA catch should be close to the 150 thousand tons taken last year. Skipjack catches for 1981 were excellent until July, but they then dropped off sharply. The reasons for this surprisingly sudden change are unknown. The total skipjack catch for 1981 will probably fall between 100 and 125 thousand tons, below the 1979 and 1980 catches, but still a good year.

Catches of both yellowfin and skipjack in Mexican waters were good in 1981, especially off the entrance to the Gulf of California (yellowfin) and south of the tip of Baja California (skipjack). Offshore yellowfin catches were widely distributed and up somewhat from 1980. Skipjack catches were also good off Central America, but the inshore Central American waters did not produce well for the second year in a row. The northward and offshore shift of skipjack catches noted in recent years has thus been sustained in 1981. West of the CYRA yellowfin catches are about the same as last year, while skipjack catches are down from the all time record catches made there in 1980.

Catch by flag shows the U.S. share of the catch (although still the largest of any nation) being down, while Mexico's is up rather sharply. This primarily reflects changes in the composition of the international fleet in 1981 when a significant amount of U.S. and other tonnage transferred to the Mexican flag.

At this point the meeting was adjourned for lunch. When it was reconvened at 3:00 PM, the Chairman asked the Director to continue with his presentation.

The Director began his review of the status of yellowfin stocks by stressing the fundamental role of data from the fishery itself in making stock assesments.

Techniques that can be used effectively in other types of fisheries such as acoustic surveys or egg and larval surveys are not applicable to tuna fisheries for a variety of reasons. He then went on to discuss changes in indices of abundance and size composition, results obtained from general production models and cohort analysis, recruitment, and yield per recruit.

Briefly, various indices of catch per unit of effort are routinely followed on the assumption that they measure the abundance of the stock. All of these indices have been declining steadily since the early seventies. Although in 1981 a slight upturn was noted in catch per effort, the yellowfin population remains at a low level. The size composition of the catch also changed during the 1970's from being dominated by 2- and 3-year old fish to being primarily 1- year old fish, with the abundance of older fish being noticeably depressed. This trend has continued in 1981.

Turning to the results of modelling, the simplest approach is to use only catch and effort data to develop general production models. In this type of model the average sustainable catch increases with increasing effort (the underfishing side of the curve) until a maximum is reached. Thereafter the average sustainable catch declines more or less rapidly depending on what assumptions have been made (the overfishing side of the yield curve). Studies of this type show that on the average the maximum sustainable yield of yellowfin from the CYRA is about 175,000 short tons annually. Also for several years fishing effort has been on the overfishing side of the yield curve. Although the exact shape of this part of the curve cannot be determined from available data, the sustainable yield that would be produced by the current level of effort is probably between 160 and 170 thousand tons.

Cohort analysis represents a considerably more sophisticated approach to yield analysis in that age specific estimates of growth and mortality rates are incorporated into the model. The Director stressed that such estimates were derived from a wide variety of sources such as tagging studies, length-frequency analysis, etc. Cohort analysis suggests that the present concentration of the fishery on 1-year old fish results in a sub-optimal yield per recruit of roughly 6 lbs. per recruit. In earlier years, when older fish predominated in the catch, yield per recruit was more like 8 lbs.

Recruitment cannot presently be predicted in advance, but it can be estimated by following cohorts through the fishery and estimating the numbers caught and

the numbers dying of natural causes. Since 1966 recruitment estimates have varied from 29 million to 83 million fish and have averaged 47 million. Recruitment has been declining since 1978, a strong year, and was estimated at 43.5 million in 1981. To date no relatonship has been observed between spawning stock size and subsequent recruitment.

Having presented these findings, the Director proceeded to draw some conclusions and to present staff recommendations for yellowfin conservation measures for 1982. He noted that there are two types of overfishing. Recruitment overfishing results when fishing pressure causes a reduction in the exploited stock's reproductive capacity. There is no evidence of recruitment overfishing in the eastern Pacific yellowfin fishery, although the general production model does suggest that the trio of recruitment, growth and mortality are density dependent. Growth overfishing occurs when fish are harvested at a non-optimal size so that the yield from the resource is not maximized. This type of overfishing causes economic losses and is definitely taking place in the eastern Pacific yellowfin fishery where 1-year old fish are being heavily exploited and considerable growth potential is being sacrificed. In fact, it is estimated that biomass yield could be increased by about 15 percent if 2- and 3-year old fish were the principal components of the catch as they were prior to 1973.

To correct the growth overfishing problem and move toward the objective of harvesting the maximum sustainable yield from the resource, fishing effort should be reduced somewhat and the average size at capture should be increased. The most feasible way to accmplish these goals is to set the overall yellowfin quota for 1982 at a relatively low level. It would not be practical to try to control size at capture by other means for several reasons. Fisherman cannot easily determine the size of fish in a school before setting on them, and small fish are not really well segregated from larger fish in specific areas or schools. Also skipjack and small yellowfin frequently intermingle so that if setting on small yellowfin is prohibited there would be a substantial reduction in the skipjack catch that would more than offset any resulting gains in yellowfin production.

With all of this in mind, the Director recommended that the CYRA yellowfin quota for 1982 should be set at 160,000 short tons. To allow for the possibility that the staff has underestimated the abundance of the stock, the Director should have the option to adjust the quota upward in either one or two increments of 15,000 tons

each. The Director stressed the importance of the Commission taking a position on what the proper quota level should be even though it may be unlikely that the member governments will take action to implement a conservation program for 1982 because of the current political situation.

It was noted that no conservation measures were necessary for skipjack or for yellowfin in the area to the west of the CYRA. Yellowfin in this area appear to be relatively distinct from the CYRA population and catch per unit of effort has remained relatively constant for a number of years.

The Chairman then asked if there were any questions or comments on the Director's presentation.

Dr. Marcille of France had some questions concerning cohort analysis and estimation of recruitment. First, how is data from outside the CYRA treated; second, how are the older fish handled in the cohort analysis if age determination on older fish is so difficult; and third, why is there a problem combining the biomass estimates on dolphin schools and pure schools? The Director responded that fish west of the CYRA seem to be a sufficiently distinct population to be left out of the CYRA analysis. Also, because older fish cannot be accurately aged, they are lumped together in the analysis. Finally, data on all types of schools are lumped together in the staff's analysis of stock condition when the classic CPUE estimates are made, but in the biomass estimate there is no way to mathematically standardize between a vessel fishing on porpoise and a vessel fishing on pure schools when the two are analyzed separately. The Director added a general comment that dolphin fishing takes yellowfin that are closer to the optimum average size than are fish taken in other types of sets. This creates something of a conflict between protecting dolphin and maximizing tuna yields.

Dr. Pianet of France asked what consideration had been given to establishing minimum size limits for both yellowfin and skipjack and if temporary area closures had been considered to protect smaller yellowfin. The Director replied that it would do no good to protect small skipjack because they are only available for a limited period of time in the CYRA. The best policy is to harvest skipjack as heavily as possible when they are available. Small yellowfin cannot be protected by either a minimum size limit or temporary area closures without significantly reducing the skipjack catch.

There were no further questions for the Director.

The Chairman noted that with respect to taking action on recommending an overall CYRA yellowfin quota for 1982 of 160,000 tons, last year's resolution on this matter could be simply updated and adopted. This was agreeable to all delegations and, at the suggestion of the Canadian delegation, agenda item 6 was left open pending completion of agenda item 8, Review of Negotiations towards a New or Modified Tuna Convention.

On the following day, Wednesday, October 21, after completion of agenda item 8, the Chairman returned to agenda item 6. A draft of the proposed resolution had been circulated to all delegations, and it was unanimously approved. The full text of the resolution is as follows:

"Whereas no mechanism for a 1982 regulatory program for the conservation of yellowfin tuna in the eastern Pacific Ocean has yet been agreed to, and

Whereas such a yellowfin conservation program has been in effect every year from 1966 through 1979, and

Recognizing that there continues to be a need for a yellowfin conservation program in 1982 in order that the yellowfin resources may be maintained at a level that will insure continued high productivity in the future,

The Inter-American Tropical Tuna Commission therefore recommends to the high contracting parties that when a yellowfin conservation program is adopted for 1982, there should be established an annual quota on the total catch of yellowfin tuna for the 1982 calendar year of 160,000 short tons from the CYRA as defined in the resolution adopted by the Commission on May 17, 1962, and

Further recommends that the Director of Investigations should be authorized to increase this limit by no more than two succesive increments of 15,000 short tons each, if he concludes from examination of available data that such increases will offer no substantial danger to the stock, and

Finally recommends that all member states and other interested states work diligently to achieve the implementation of such a yellowfin conservation program for 1982".

AGENDA ITEM 7 - RECOMMENDED RESEARCH PROGRAM AND BUDGET FOR FY 1983-1984

The Chairman opened discussion of the FY 1983-84 budget proposal by asking the Director for his comments.

The Director noted that Background Paper No. 3 dealing with the budget gives much more detail this year than it has in previous years. This was done at the request of some of the delegations. The budget proposed for FY 1983-84 ($2.638 million) is at essentially the same level as in FY 1982-1983 ($2.633 million) in spite of inflationary increases. This was accomplished by curtailing at-sea work which involves major vessel charter expenses. The biggest expense item is salaries and related employee benefits. The largest research activity in terms of expense is the tuna-dolphin program. The largest tuna research item is collection of fishing data and maintenance of the data base.

The Director then turned to the question of the relevance of the various tuna research items to determination of allowable catches. This question had been raised by Mr. Hunter of Canada following the Director's earlier presentation on the research program (Agenda item 3). The Director explained that all of the Commission's tuna research was related in some degree to determining allowable catches but that the relationship was sometimes indirect. A good deal of the research which he had described was being accomplished at a very low cost to the Commission because it was largely funded from outside sources. The development of a laboratory facility in Panama for early life history studies and the microchemistry studies of hard parts utilizing a cyclotron produced proton beam provide good examples. The Director then asked for questions and comments.

The delegate of Japan asked for the floor. He stated that the position of his government was that all dolphin research should be supported by nations that are engaged in fishing for tuna associated with dolphin schools, and that the dolphin research funds should be accounted for separately from all other funds. Because Japan does not participate in the fishery for tunas associated with dolphins, she cannot contribute funds for dolphin research.

At this point the Director noted that he had never received any guidelines on what to do on the matter of Japan not wishing to support dolphin research. He asked that such guidelines be given. In the ensuing discussion the Director was asked what had been done in the past. He stated that the first two budgets for dolphin research were add-ons to already approved tuna research budgets. Because of this they were treated separately. For the 1977/78 FY porpoise budget, which was a separate billing, Japan did not contribute. For FY 1978/79 Japan was billed, per instructions from the Commission Chairman, for the full amount of the budget including porpoise.

She paid the full amount in that year. For FY's 1979/80 and 1980/1981, according to instructions from the Commission Chairman, the billings were separated as to the porpoise and non-porpoise portions. Japan in those two years paid only the non-porpoise shares. As the discussion continued, a consensus developed among all but the Japanese delegation that dolphin research should be a part of the regular budget and should be supported by all member governments. However, the delegate from Japan stressed that his delegation had clear instruction from his government and that he could not alter that position. He also indicated that he would consult with his government for further guidance. Because no further progress could be made on agenda item 7, the Chairman left the item open and adjourned the meeting until the following day.

When discussion of agenda item 7 was resumed on the following day (Wednesday, October 21), the Japanese delegate indicated that he had been in touch with government officials in Tokyo and that they had expressed surprise that the Japanese position had generated so much discussion. It was noted that Japan had taken the same position for several years and that it had never generated any problems. In any event, he stated that he could not at the present time say that Japan would make contributions to support the tuna-dolphin research program. His government required more time to consider this matter.

The Director took the floor to note that a unanimous vote was required to take final action on the FY 1983-1984 budget proposal, but that such unanimity clearly was not forthcoming at the present meeting. This left two alternatives : Either hold the whole budget issue in abeyance or else take a provisional vote on approval of the budget and await final word from Japan. All delegations favored the latter alternative and the proposed budget for FY 1983-1984 was provisionally approved pending word from Japan.

AGENDA ITEM 8 - REVIEW OF NEGOTIATIONS TOWARD A NEW OR MODIFIED TUNA CONVENTION

When the meeting reconvened at 10:00 AM on Wednesday, October 21, the Chairman opened discussion on agenda item 8 by asking the Director to review progress in negotiations for a new tuna convention. The Director noted that interest in negotiating a new tuna convention was first expressed in the early 1970's by several nations of the eastern Pacific region. Then in 1975 Mexico announced its intention to convene a plenipotentiary meeting. Such a meeting was subsequently

held in San Jose, Costa Rica, with the nations of the eastern Pacific plus non-regional IATTC members in attendance. Mexico and Costa Rica presented a document at that meeting outlining 38 points that they proposed for inclusion in a new convention, but no further action was taken. A series of informal meetings followed involving various nations. A second plenipotentiary meeting was held in Mexico City in 1979 at which two proposed texts were presented, one from Mexico and Costa Rica and the other from the U.S. These were combined into a single text with areas of agreement and disagreement clearly indicated. Several more informal meetings followed, and consideration was given to a possible interim agreement, but no agreement was reached. In the course of these negotiations, however, agreement was reached on a number of important points including the need for international management, the area and species covered, the need for coastal state yellowfin allocations related in some way to concentration of the resource, the need for an international licensing system, the need for uniform enforcement provisions, and the desirability of including provisions pertaining to marine mammal protection.

Ambassador Kronmiller of the U.S. indicated that his nation had met bilaterally with certain Latin American states on an exploratory basis seeking a temporary agreement based on regional licensing with reasonable fees. This approach will be pursued further. A permanent agreement may be more difficult to achieve because of differing views on certain key issues among the nations involved.

Mr. Rodriguez of Panama noted that his nation was very interested in the negotiations. They are especially concerned about yellowfin conservation and the effect of further fleet growth on the economics of the fishing industry and associated industries. He stated that his government felt that further negotiations should take place and indicated that invitations will soon be extended to nations to attend a meeting in Panama.

Mr. La Brousse of France expressed his government's concern for tuna conservation and their disappointment over the recent failure of the IATTC management program. He then indicated France's desire to participate in the Panama meeting just announced.

Mr. De Miguel, an observer from Spain, indicated his nation's desire as a participant in the fishery, to attend any future meetings concerning tuna in the eastern Pacific.

Mr. Urroz of Nicaragua expressed his nation's desire to find a satisfactory solution to the management problem in the eastern Pacific and its willingness to participate in any discussions.

Mr. Hunter of Canada indicated his government's willingness to participate in future talks and added that the successful negotiation of an albacore agreement between the U.S. and Canada was an encouraging sign.

Mr. Bakula, an observer representing the Permanent Commission for the South Pacific, noted that the tuna management problems in the eastern Pacific will not be easy to resolve. Colombia, Ecuador, Peru, and Chile are all interested in tuna conservation and should be included in any new agreement if it is to be effective. He stressed that in negotiating a new tuna agreement the text of the draft Law of the Sea text as it pertains to highly migratory species must be taken into account.

Mr. Campos, an observer from Mexico, indicated that his nation shared the concern of other nations for tuna conservation. Mexico has a conservation program and will continue to work closely with the IATTC.

AGENDA ITEM 9 - PLACE AND DATE OF NEXT MEETING

In opening discussion on this item, the Chairman noted that it was Canada's turn to host the next meeting and that Nicaragua and Japan would follow.

Mr. Hunter of Canada stated that he had no instructions from his government to extend an offer to the IATTC to host the 1982 annual meeting. However, he stated that he would confer with his government on this matter and advise the other delegations of its decision. This course of action was agreed to by all members. It was also unanimously agreed that the meeting should be held sometime in October, 1982.

AGENDA ITEM 10 - ELECTION OF OFFICERS

The Chairman noted that election of officers would depend upon determination of the host nation according to IATTC custom. Since the host nation was still undecided, election of officers was deferred. In the meantime Mr. Roudie agreed to continue to serve as Chairman.

AGENDA ITEM 11 - OTHER BUSINESS

Mr. Rodriguez of Panama advised the Chairman that the heads of delegations had met in private with the Director on the previous day to decide on how the

Director should report on a matter involving embezzlement of Commission funds. It had been concluded that the matter should be dealt with in plenary session. This being the case, the Chairman turned the floor over to the Director.

The Director explained that a former bookkeeper for the Commission, Mr. A.L. Sion, had embezzled close to $200,000 in Commission funds. The embezzlement started in 1978 and was discovered in 1981. Several types of embezzlement were utilized with the principal one involving manipulation of documents pertaining to the Commission's pension fund. However, the pension fund itself was not affected. The Director went on to explain how the funds had been embezzled and how Sion was detected and apprehended. Sion has pled guilty to interstate transfer of stolen funds and is presently serving an 8-year term in Federal Prison. A substantial share of the embezzled funds has been recovered, and prospects for full recovery are good. Sion was bonded for $100,000.

As a result of this unfortunate experience, a new auditor has been retained and much tighter controls on Commission bookkeeping procedures are being adopted. These measures will add to the expense of running the Commission, but they are clearly necessary.

Mr. Hunter of Canada raised the possibility of increasing the level of the bonding insurance. The Director agreed that this should be done and was instructed to look into the matter further. Any action recommended by the Director can be approved by mail.

Mr. Gambell, an observer from the International Whaling Commission (IWC), noted that the IWC and IATTC have cooperated closely in the past on matters of mutual interest. He then observed that the role of the IWC with respect to small cetaceans is an open issue whose ultimate resolution will depend in part on the outcome of the Law of the Sea Conference.

AGENDA ITEM 12 - ADJOURNMENT

The Chairman noted that agenda items 7, 9, and 10 remained open and would be dealt with through exchange of communications among the delegations. There being no other business, the Chairman thanked the delegations for their efforts and adjourned the 39th meeting of the IATTC at 12:30 PM.

LIST OF ATTENDEES AT THE 39TH MEETING OF THE IATTC

CANADA

James S. Beckett

Michael Hunter

FRANCE

Robert Letaconnoux

Christian Brossier
Pierre-Jean Chailley
Michel Dion
Bernard Forey
Serge Garache
Pierre Haren
Jean Claude Hennequin
Bertrand Labrousse
Jean-Claude Le Guen
Jacques Marcille
Alain Parres
Renaud Pianet
Louis Roudie
Eric Saillard
Bernard Salvat

JAPAN

Hajimo Suzuki
Miyamoto Yoshinori

NICARAGUA

Jamil Urroz Escobar

Jose Balladares Cuadra

PANAMA

Luis E. Rodriguez

Thomas F. Melchior
Juan A. Stagg

UNITED STATES OF AMERICA

Robert C. Macdonald

Gordon Broadhead
Peter Buchan
Cosimo Cutri
D.E. De Havens
August J. Felando
Charles E. Finan
Paul P. Finnerty
Alan Ford
Brian S. Hallman
Theodore Kronmiller
Barbara Keith Rothschild
Gary T. Sakagawa

COLOMBIA

Manuel F. Meneses

MEXICO

Salvador Campos

PERU

Martha Chavarri-Dupuy

REPUBLIC OF KOREA

Kyung-Dong Park

SPAIN

Jose Luis Meseguer
Ramon de Miguel

TAIWAN (REPUBLIC OF CHINA)

Tao Yi Yao

VENEZUELA

Efrain Pico-Ponte

INTERNATIONAL ORGANIZATIONS

INTERNATIONAL WHALING COMMISSION

Ray Gambell

COMISION PERMANENTE DEL PACIFICO SUR - CPPS

Juan Miguel Bakula

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paul Adam

INTER-AMERICAN TROPICAL TUNA COMMISSION

James Joseph
Joseph W. Greenough
Regina A. Newman

INTER-AMERICAN TROPICAL TUNA COMMISSION

SUMMARY MINUTES OF THE THIRTY-NINTH MEETING

ADDENDUM - April 30, 1982

October 19-21, 1981

Paris, France

Chairman: Louis Roudie

SUMMARY MINUTES OF THE THIRTY-NINTH MEETING ADDENDUM

EXPLANATORY NOTE

The 39th meeting of the IATTC was held in Paris from October 19-21, 1981, under the chairmanship of Mr. Louis Roudie of France. At that meeting deliberations on all agenda items were completed except for items 7, 9, and 10. These three items involved the recommended research program and budget for FY 1983/84, the place and date of the next meeting, and election of officers. When the meeting was adjourned by Chairman Roudie, it was with the understanding that these items would be dealt with through exchange of communications among the delegations. This process has now been completed, and this addendum will complete the Summary Minutes of the 39th Meeting.

AGENDA ITEM 7 - RECOMMENDED RESEARCH PROGRAM AND BUDGET FOR FY 1983-1984

When agenda item 7 was taken up in Paris, the Director of Investigations noted that Background Paper No. 3 proposed a $2,638.355 budget for FY 1983/84.

In the ensuing discussion the chief issue that arose was whether or not Japan could contribute funds to support the Commission's dolphin research program. This issue could not be resolved at the meeting, so the budget was provisionally approved by the other delegations pending a final decision from the Japanese Government.

On December 14, 1981, Mr. Tsuneo Tanaka, Consul General for Japan in Los Angeles, wrote the Director of Investigations to advise him as follows:

> "I have received instructions from the Minister for Foreign Affairs to inform you that Japan has decided to approve the budget for fiscal year 1983/84 and to share in the cost of the tuna-porpoise study project for fiscal year 1983/84."

This decision by Japan made the vote on approval of the proposed budget of $2,638,355 for FY 1983/84 unanimous.

AGENDA ITEM 9 - PLACE AND DATE OF NEXT MEETING

In Paris Commissioner Hunter of Canada stated that although it was Canada's turn to serve as host nation for the 1982 annual meeting, he had no instructions from his Government to extend an offer to serve as host. He indicated that he would confer further with his Government on the matter. On November 30, Commissioner Hunter wrote to the Director of Investigations advising him that his Government would be unable to invite the Commission to Canada for its 1982 meeting.

The Director of Investigations reported this decision to Commissioners and attendees to the 39th meeting in a memorandum dated January 14, 1982. He suggested that under the circumstances the most convenient and expeditious way to resolve the problem of a meeting place would be for the staff to organize the meeting in San Diego from October 18-21. This procedure was agreed to by all delegations with the understanding that normal procedures for determining the site of the annual meeting would be resumed in 1983.

AGENDA ITEM 10 - ELECTION OF OFFICERS

No action on this agenda item was taken in Paris because the host nation for the 40th meeting had not been determined (see agenda item 9). In his memorandum of January 14, the Director of Investigations stated that Commissioner Hunter of Canada could serve as Chairman of the 1982 meeting. This he indicated would be a logical choice because Canada would hosted the 1982 meeting if the usual procedures for selecting a site had been adhered to. Commissioner Hunter had also indicated his willingness to accept the Chairmanship. All delegations approved of this course of action. A Secretary will have to be elected by the delegates when the 1982 meeting is opened.

AGENDA ITEM 12 - ADJOURNMENT

With the completion of agenda items 7, 9, and 10, the 39th meeting of the IATTC was ready for final adjournment. Acting on behalf of Chairman Roudie, the Director of Investigations announced the final adjournament in a memorandum to all delegations dated April 30, 1982.

PROVISIONAL AGENDA

40th MEETING OF THE INTER-AMERICAN TROPICAL TUNA COMMISSION

19, 20, 21 October 1982

La Jolla, California

1. Opening of the Meeting
2. Consideration and Adoption of the Agenda
3. Review of Current Research
4. Tuna-Porpoise Program
5. The 1982 Fishing Year
6. Condition of the Yellowfin Stock and Recommendation for 1983
7. Recommended Research Program and Budget 1984-1985
8. Review of Negotiation towards a New or Modified Tuna Convention
9. Place and Date of next Meeting
10. Election of Officers
11. Other Business
12. Adjournment