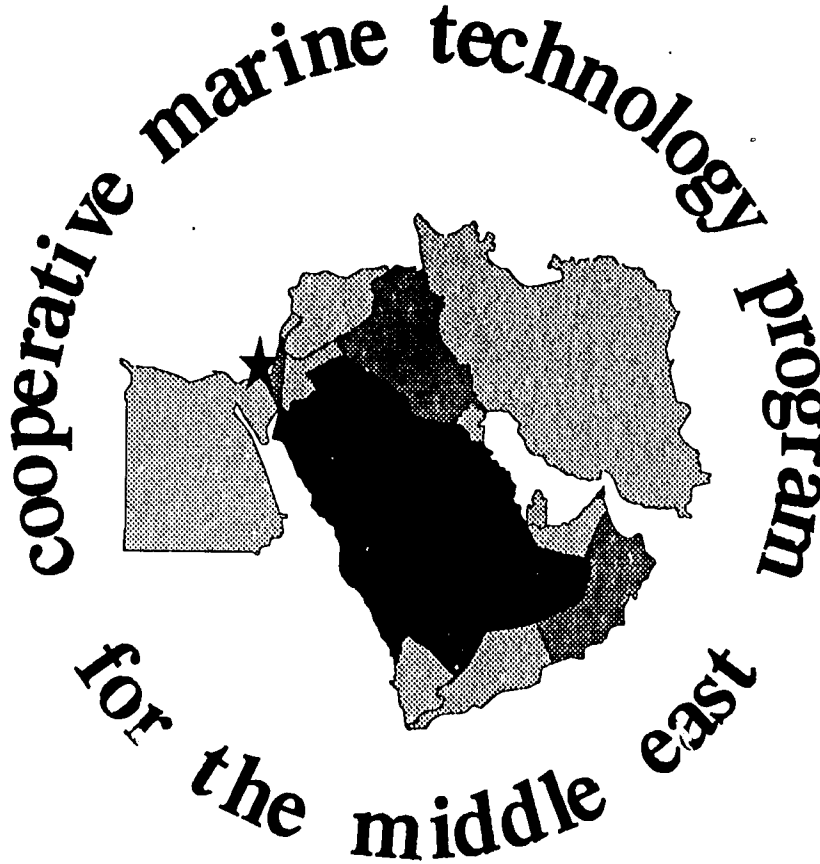


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Annual Report for 1990

January 1991

New Jersey Marine Sciences Consortium

Enclosure (1)

REPORT OF PROGRESS

The following appendices relate to progress achieved during the fiscal year ending September 30, 1990. They relate to Shoreline Processes, Eastern Mediterranean Circulation (climate prediction), Grey Mullet Culture, and Culture of Brackish Water Fishes.

Technical progress was reported in detail in the Sixth Annual Report, submitted last Summer. These reports are updated in the Report of the August 23-30, 1990 meetings in Suez, Cairo, and Haifa (Enclosure 6).

Accordingly, the accounts which follow are primarily condensations of previous documents, in order to minimize redundancy.

INDUCED SPAWNING OF GREY MULLET

(This section is based on the Proceedings of a Progress-Assessment Workshop, August 28, 1990, Haifa, Israel)

Historically, mariculture has been one of the most important components of the Cooperative Program, because it deals directly with food production, is in a very early state of development, and lends itself easily to cooperative research. The pace of Egyptians activity has increased markedly under Dr. Eisawy's guidance, and the Elat Mariculture Center is in every respect, world class.

Mullet is an excellent subject for fish culture. It can exist satisfactorily in a wide variety of environments, and on a low protein diet. It feeds on phytoplankton of which there is an abundance. He noted that the goal of the program was essentially to make a chicken out of a fish. In some ways, however, mullet is difficult to farm and there has been no commercial success recorded to date. The problem relates mainly to reproduction, i.e. spawning.

Figure 1 on the following page illustrates the problems and opportunities attendant on this project. It is concerned mainly with reproduction control, sexual maturation, and spawning. The Israelis started with 70 fish; unfortunately, this is far too few to conduct a program owing to inability to obtain sufficient amounts of necessary chemicals. They have

to examine many parts of the fish, especially the hormones, with particular reference to gonadotropine, which is the functional group influencing reproduction.

The previous sea bream work was used as a model for the current project. It is necessary for experimentation to begin with a five gram pituitary gland protein. Thus, it is necessary to slaughter 3,500 fish! They could develop the fry specifically for this purpose, but that process would be entirely too slow. Accordingly, they had arranged to buy the fish. Unfortunately, just as they had completed these purchase arrangements, a streptococcus infection occurred which made the purchase very risky for the purpose, and they decided not to proceed that way.

Last spring, however, the laboratory did buy a large amount of mullet weighing 0.5 kilos per individual. The hormonal pathways are illustrated in their report and described in various studies. In the sea bream they need to measure GCH, but cannot do this yet with mullet. Accordingly they try an indirect bioassay, which must be accomplished in the right season when the pituitary is loaded with gonadotropine. The question is, is this substance stable? If so, why can they not obtain huge amounts from the fish factory? In fact, this is their major source.

A gonadal somatic index of mullets by months, is displayed on the following charts. It demonstrates that their big peak is in February. A graph of the bio assay of the mullet's GCH is also shown. While the peak occurs in

Israel in February, it takes place in Egypt in June and July. Estradiol levels in mullets' blood in 1989 and 1990 peaks in December. The Israelies then tabulated the spawning induced in mullets in January 1990.

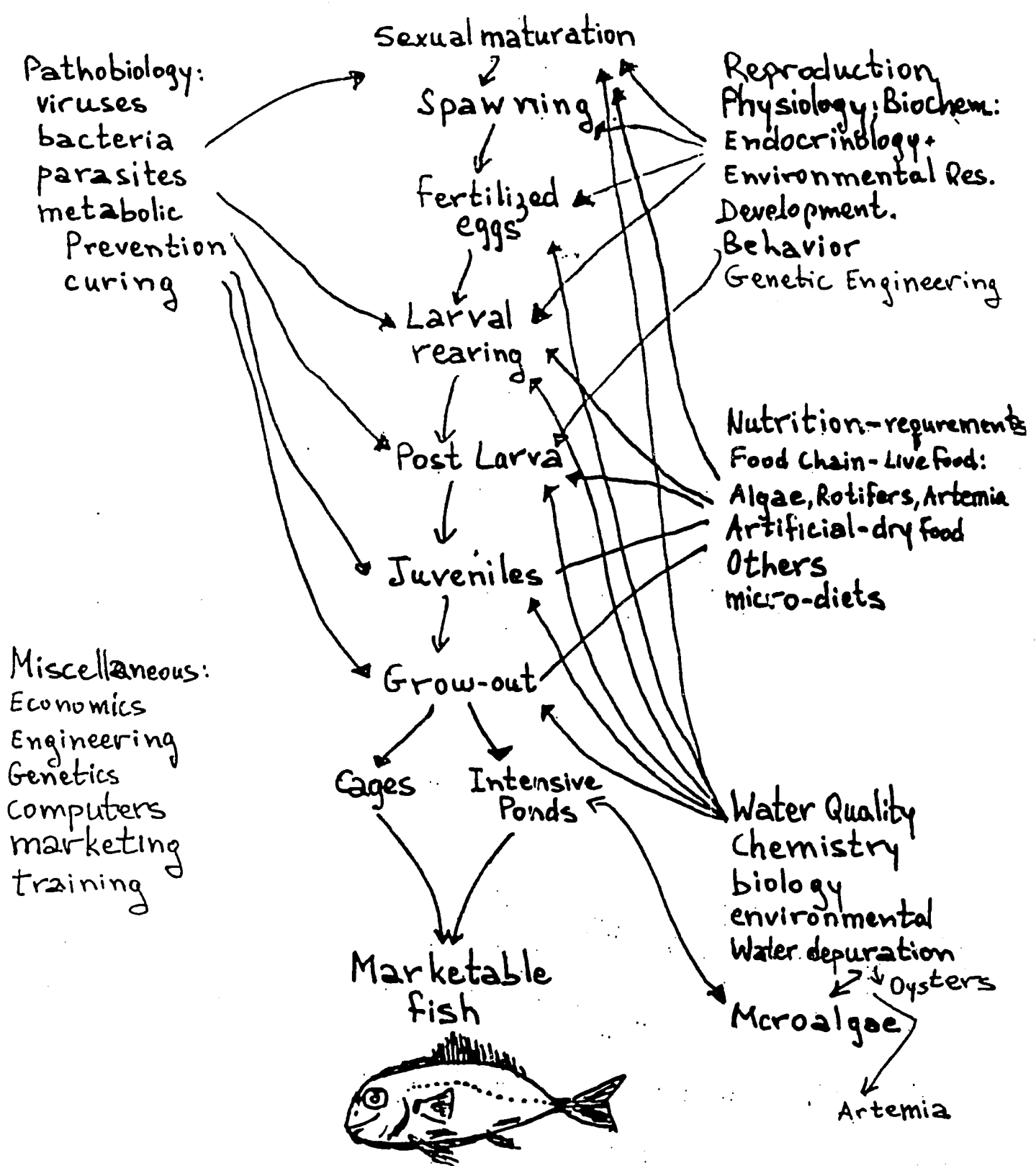
Out of 3,785,000 larvae spawned, the number that finally survived in the grow-out stage, through the period when the eggs were floating, survival in the hatcheries, and survival in the nursery, numbered no more than 500! In other words, 1 out of 7,570 larvae survived into the growout stage. On the other hand, the Israelis are achieving 80% survival in their sea bream experiments.

The Egyptians are dealing with two important species of mullet, mugil cephalus and mugil capito. They are studying all of the characteristics of the eggs as an important indicator of breeding success in six steps, including the immature to the mature spawning and described measurements at different months of the year.

The gonads appear to be at their largest size in November, decreasing in January to a size of 20 centimeters in the male and 25 centimeters in the female, i.e. in the natural state. Those collected from the fish farm measured 13 centimeters and 17 centimeters respectively. Tables of monthly distribution of maturity stages are attached herewith as Appendix D to this report.

National Center for Mariculture

IOLR - Concepts of Research and Development



The Egyptians have observed monthly variations in the sizes of the organisms taken from Lake Edku, graphing particularly the diameter of the eggs, which appear to be bimodal. They have also graphed fecundity, i.e. the numbers of eggs laid and dropped during the year. Apparently, the largest spawning period occurs from October through February, and these statistics are also described in the Appendix.

They are also studying the histology characteristics of the fishes' gonads. Half of the egg is yolk and the other half is cytoplasm. Their next experiments will measure the relative factors in egg characteristics with respect to e.g. temperature, salinity, etc.

The Egyptians have published five papers on their project thus far. Measurements have also been taken at three collecting ponds at Alexandria, Lake Burullus, and Damietta. Rather surprisingly, the fry maximize first in Alexandria, fifteen days later at Burullus and then fifteen days later at Damietta showing an apparently statistical significance in correlation with longitude. There is little understanding of why this should be taking place in that fashion. (The Shore Process project engineers, however, offer the possibility that one of the factors, if not the principal factor, would relate to the major water movement itself which follows approximately the same periodicity.)

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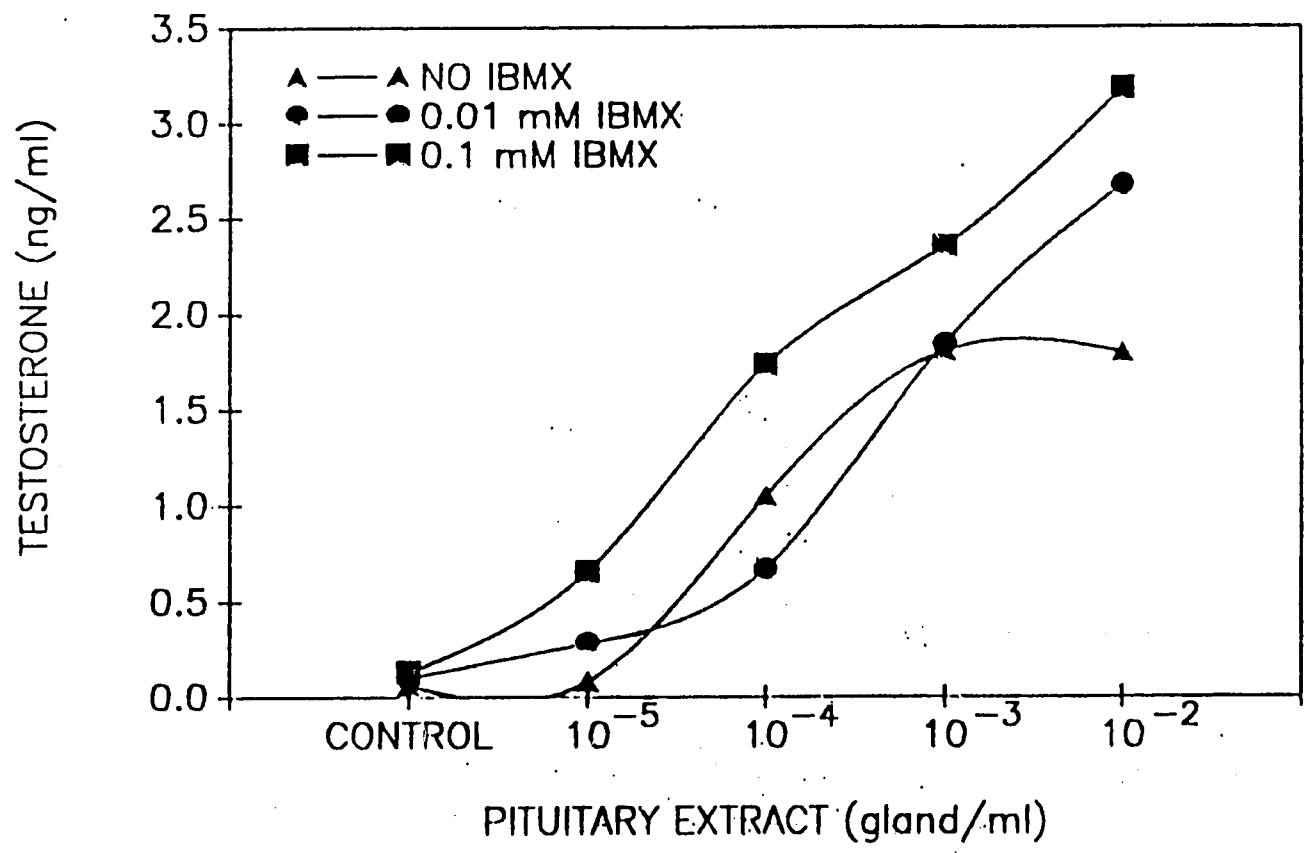
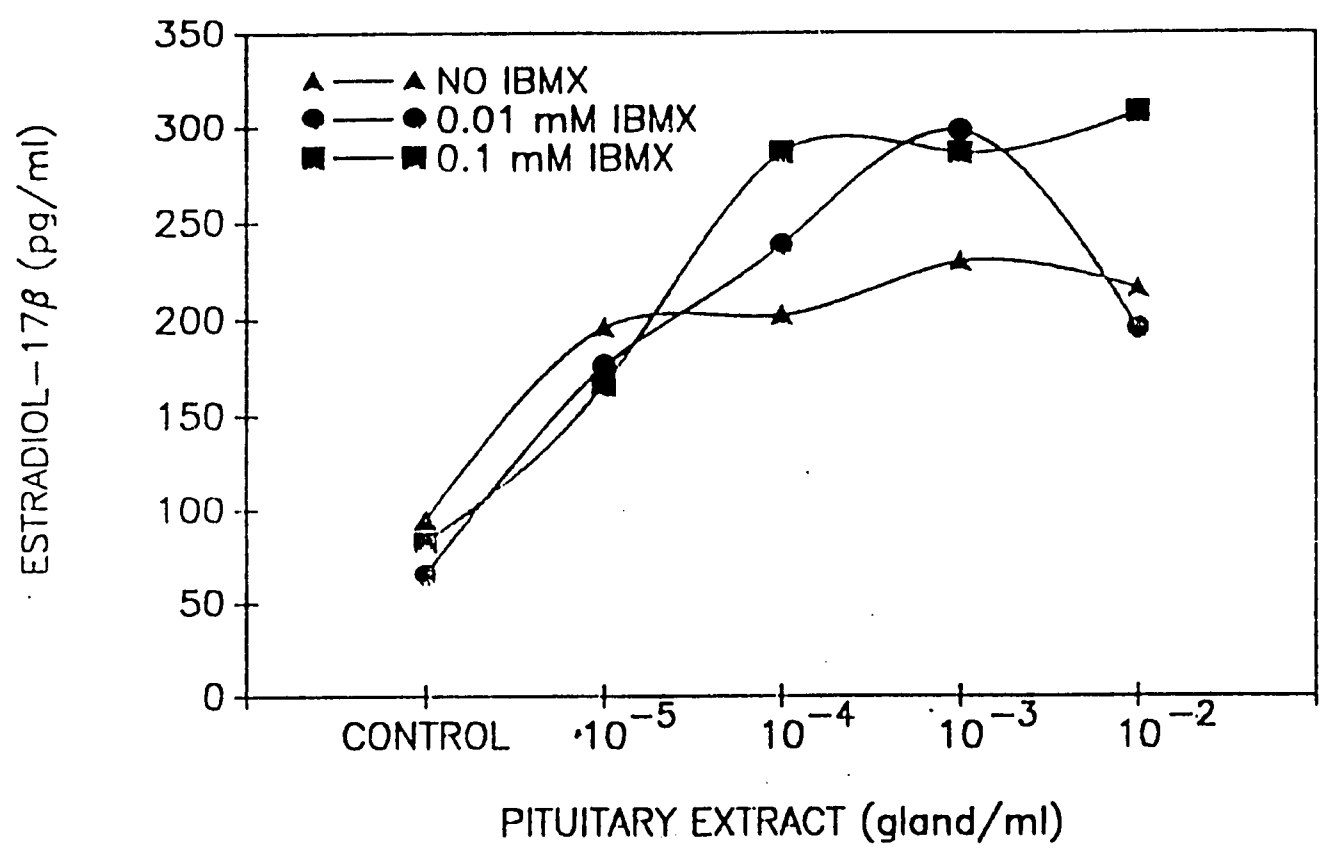
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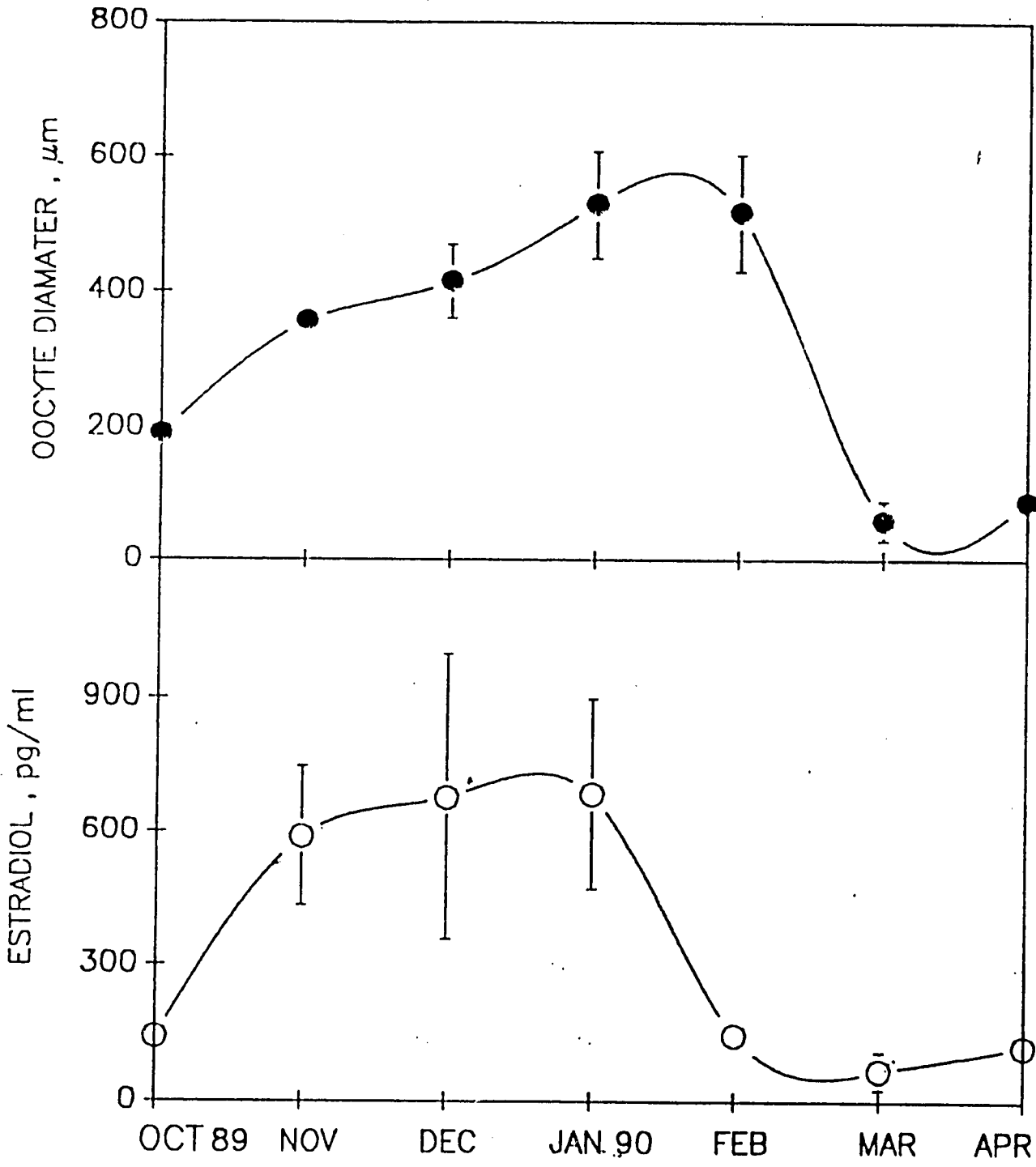
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BIOASSAY OF MULLET GtH

PREMATURATIONAL OOCYTES - JAN 1990

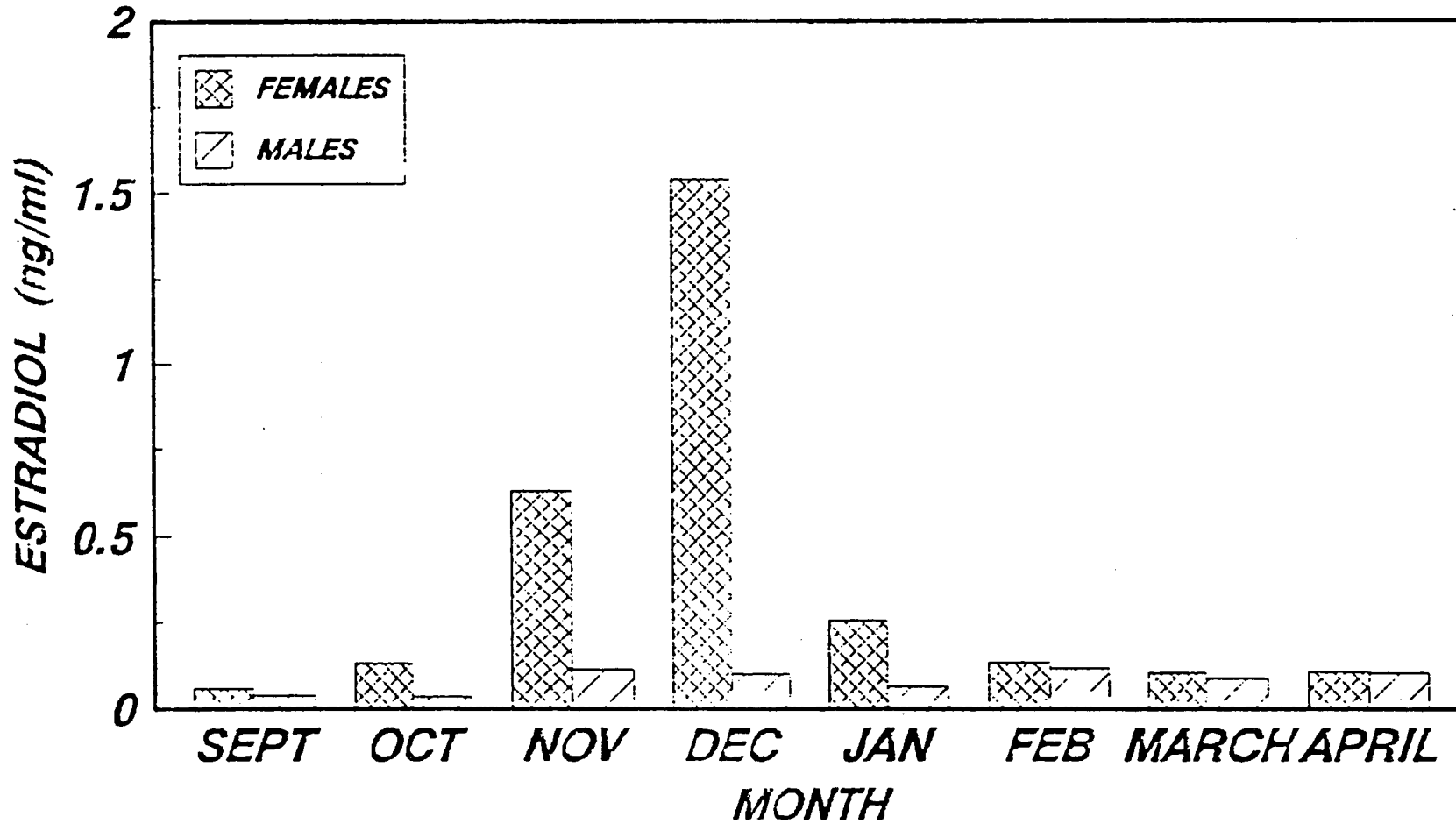


PLASMA ESTRADIOL LEVELS AND OOCYTE DIAMETERS
in Mullet (Mugil cephalus)

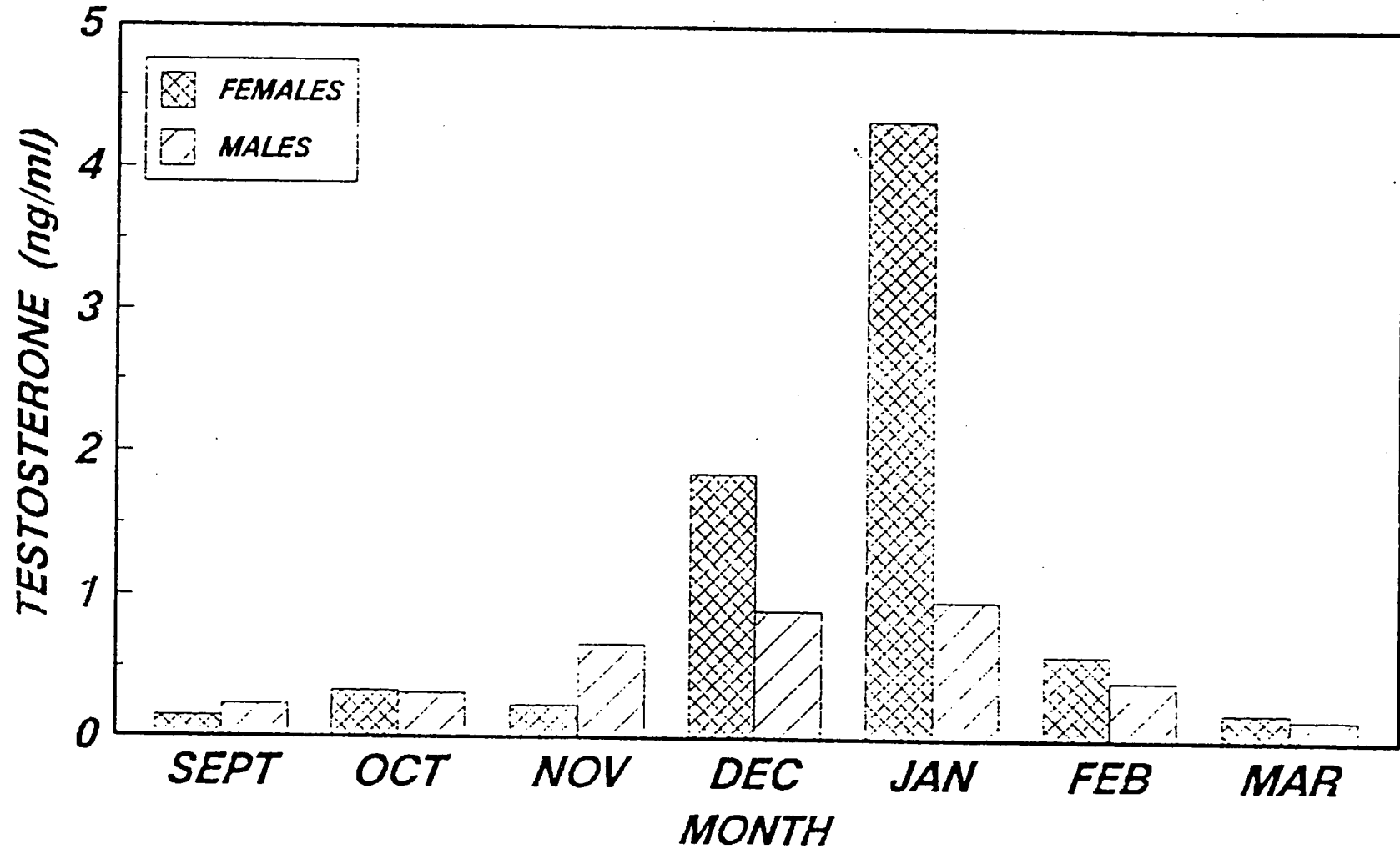


ESTRADIOL LEVELS IN MULLET'S BLOOD

1989-1990



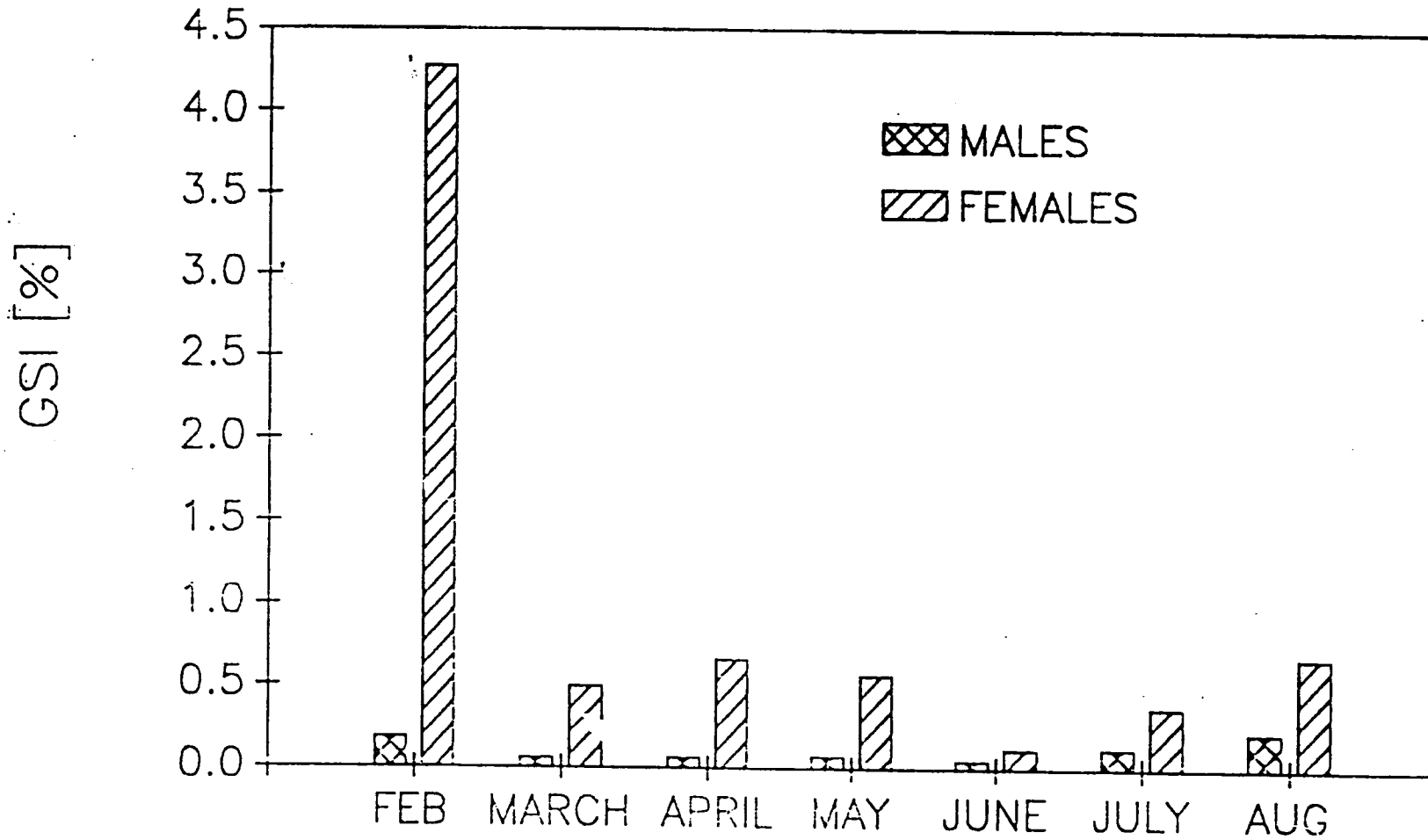
TESTOSTERONE LEVELS IN MULLET'S BLOOD



GONADAL SOMATIC INDEX OF MULLET

FROM DAG SHAN 1990

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EXPERIMENTAL FEEDING AND NUTRITION STUDIES OF
SOME BRACKISH WATER FISHES

Israelis and Egyptians are working on food and feeding of marine fishes. Feed is possibly the most important factor in a typical fish farm, and mullet thrive on a wide variety of food.

The Egyptians' work generally concerns the progression of fish fry (.5 grams at 2 centimeters) through the fingerling stage (3 grams at 7 centimeters) to the adult stage. They determine food preferences by starving the fish and then: first applying natural foods obtained through plankton nets and other similar means; feeding egg yolks; and then yeast. They then upgrade the raw materials using, for instance, egg yolk/starch combinations and egg yolk/mill flour combinations. (The feeds being developed from chicken feathers and tomato waste five years ago have been discontinued, as ineffective.

Apparently, the best results are obtained from combinations of the egg yolk and rice bran indicating that protein/starch combinations are more effective than protein products themselves. The Egyptians are obtaining growth rates of approximately 1/10th of a gram per fish per day for the first month for the capito species. They are now experimenting with dried blood and slaughterhouse waste as possible feeds for the mullet. At this point in time, however, the Egyptians have not optimized a fingerling stage

feed. However, as expressed previously, the starch/protein mix does appear to be heading in the right direction.

Another line of research refers to the particle size of the feeds. Apparently there is a significant difference in the ability of the respective species of mullet to ingest foods according to the size of the feed particles. In the case of capito, it is quite necessary to recognize a serious restriction in the size of the feed particle. Accordingly, rice bran appears to be satisfactory for the process from fingerling to adult stages. While the capito can absorb relatively large particle sizes for feed, there is a definite anatomical limit to the particle size which can be utilized by the cephalus. Accordingly, it is one of the objective of the Egyptians' project to determine an optimum mix of the starches and proteins in terms of nutrition and utilization and then to reduce the cost by adjusting its composition.

The Israelis are trying to determine the degree to which fish can synthesize the various fatty acids. Accordingly, they feed the fish these fatty acids which have been dosed with radioactive carbon (i.e. C14). C-14 is introduced into the fish as pellets, injected through capillaries directly into the fishes' stomachs. The quantitative rate at which the food composition of these pellets is utilized is measured by the carbon dioxide output of the fish through respiration. This, in turn, is accomplished by absorbing the expired carbon dioxide on various CO₂ absorbants. The

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organic chemistry of the process is determined by analyzing the relative amounts of the unsaturated fatty acids in the bodies of the fish before and after the experiment. The standard paths of development of the various fatty acids which are measured by chromatography in determining the relative amounts of these acids before and after the experiment, using C 14 tracers.

The Egyptians are trying several directions. An initial experiment was on carp where fry were placed in enclosures to maximize production. As a concomitant measure, farmers were stopped from taking the fry for any other uses. Then fertilizer food was added to these enclosures. The problem was how to raise the production of the enclosures. Initial efforts resulted in increasing production from 200 to 500 fish per fedan. They are now able to produce 1,950 kilograms per fedan (approximately one acre) under optimal circumstances. In actuality, however, production of 1,000 kilograms per fedan is more likely.

The problem now is to turn the enclosure into a managed farm with particular reference to Tilapia, Mugil. Capito and Carp. In the process, they have increased the Capito by 250% in the growth progression, but lost 50% of the Tilapia in the process. It appears that the cost to Egypt would be approximately 1,000 EL per pond. The enclosures, on the other hand, cost from 3,000 to 6,000 Egyptian pounds (EL) per pond. Intensive production costs approximately 1,000,000 EL per fedan yielding 70 to 120 tons per

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fedan. The fedans obtain 200 tons per 1,000 fedans; therefore, they work better than intensive fish farming.

A controlled enclosure yields one ton of fish per fedan. At 300 fish per fedan, one obtains 300 tons, which is better than intensive farming, cooperating in the initial estimate. Therefore, it is better to aim for horizontal rather than vertical development.

Since scarcity of fresh water is a problem, the Egyptians are progressing from fresh water aquaculture to brackish water aquaculture, and ultimately they will extend the process to mariculture (i.e. pure sea water). The obstacle, however, relates to the lack of feed, particularly in competition with chickens which represent the highest ratio of growth weight per feed input at the present time. Thus, they must seek other food such as algae, and this needs further research. In their eyes, fish farms represent the technology of the future.

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PREDICTIVE MODEL FOR SHORELINE CHANGES
ALONG THE NILE LITTORAL CELL

- Nearly 1 billion cubic meters of sediment are transported annually from the Nile Delta to the east near Haifa. This figure is reduced to 1/10 of the original amount.
- In studying the sand budget along the coast it is essential to develop a numerical model in order to predict the sediment transport.
- To develop the model it is essential to study three parameters: waves, currents and wind.
- The data for the model are collected at four stations: Haifa and Ashkelon in Israel and Ras-el-Bar and Abou-Qir in Egypt.
- The Israelis and Egyptians are currently working on the development of a wave climate in the deep waters, which is not easy. This is done by making backward refracting calculations to the deep water and from this forward calculations are made. The results obtained are then correlated with data from the 'real world'; if they do not agree, then further re-calculation is necessary.

The Egyptian Coastal Research Institute began collecting relevant data since the early 1970s, using primitive equipment. In 1980 (with the initiation of the Cooperative Marine Technology Program for the Middle East), they began using the CAS system. This allowed them to analyze the wave spectrum during the decade of the 80s. They worked on developing a predictive model in collaboration with Dr. D. Inman and his staff at the Scripps Institute. At the same time, the Egyptian participants were developing a numerical model using a different approach and different formulas. This gave them very valuable hands-on experience.

Hydrographic surveys are conducted in the fall and spring annually. Together, concentrated profiles have been made around "sensitive" places e.g. Rosetta, Burrulus and Bard-a-wil.

Wave spectra were fashioned during the first and third phases of the project. This was a time-consuming effort which has since been replaced by a system that depends on sensors, i.e. data logging.

Enormous amounts of CAS wave data have been obtained near Ras El-Bar and Abou Qir and subjected to the numerical modelling (in which variables were added). Also wave roses have been constructed on monthly bases.

Although the Nile Delta began to erode due to the construction of dams and other regulators, as a result of sand and mud storage behind these structures as far back as 1900. The erosion became more pronounced after 1964.

with construction of the Aswan High Dam. Off Ras El-Bar erosion has been estimated to be about 2 km during the last 10 years.

The littoral currents have been measured on both sides of the following regions: Rosetta, Burrulus, Ras El-Bar, El-Arish and Bard-a-Wil. The predominant current is from west to east, and the most reasonable time for measuring these currents is in winter and spring. Currents measured beyond the breaker zone have been made at depths of up to 6 meters only.

The general current pattern at the surface and along the bottom has been analyzed using Eigen-functions. These methods, incidentally, are not predictive, but statistical in nature. Another method of analyzing the data is by using the T-S diagram. A third method is to calculate erosion and accretion and from this one can derive the net sediment transport.

A number of protective measures off Edku, Rosetta, Burrulus and Ras-El-Bar have been taken as a result of the project's findings. Dr. Naeem Anwar, a newly recruited Professor in the Faculty of Engineering, Alexandria University has considerably advanced numerical modelling of sediment transport and simulation of bathymetric changes. He has constructed several models dealing with sediment transport and completed a schematic representation of a grid using the wave diffraction method. He is comparing methods to compute sediment transport and has prepared a mathematical model dealing with this transport. The results of the shallow wave height and direction at

Ras El Bar and Abou Qir obtained in October 1988 have been published. Variations of contour lines at Rosetta have been determined using the numerical model.

Dr. Iosilevsky who has joined the IOLR is contributing to the research effort by writing a computer program for wave processing data (using the data from CAS). This program is in two packages. The first is for reading the data, correcting errors and then preparing for the spectral analysis of the data collected. The second package is the spectral analysis itself.

The main problem is that the program was written a long time ago and suffered from some equipment malfunction. The Egyptians and Israelis are now reconciling methods of observation and data analyses in order to ensure homogeneity of findings and conclusions.

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EASTERN MEDITERRANEAN CIRCULATION

INTRODUCTION

Water circulation in the ocean and their adjacent seas is one of the major fields in Physical Oceanography. Many attempts have been made to find solutions for such types of motions while a series of theories has been conducted to get better understanding of the processes involved in the dynamics and thermodynamics of the ocean. The available solutions are unsatisfactory; even the simplest problems have proved too difficult to be solved. Most of these attempts have been carried out through analytical solutions and evaluated numerically. However, nonlinearity of ocean-thermodynamic equations as well as the complicated bottom and shore relief require the use of numerical methods for the investigation of a real sea in a realistic oceanic basin.

Numerical computations of the oceanic general circulation were done earlier by Sarkisyan (1969); Bryan and Cox (1967) and Friedrich (1967). Bryan (1969) developed a multilayer model for the ocean which has been applied to several areas.

The value of the hydrodynamic models is extremely high. Prediction of storm surges, tides, surface elevation, and current patterns are all essential factors for navigation, fishing, shore protection, etc. In addition, the whole dynamics of the marine system is driven by sea motion. Dispersion of nutrients or pollutants, migrations, sedimentation, and bottom erosion are conditioned by the mixing and circulation of the water masses. Therefore, a model is one step in the procedure of simulation of any physical process in nature.

The elements involved in the modelling process are shown in Figure (1), where modelling is seen as an activity, which when applied to real problems, leads to understanding, prediction and possible control of the marine system.

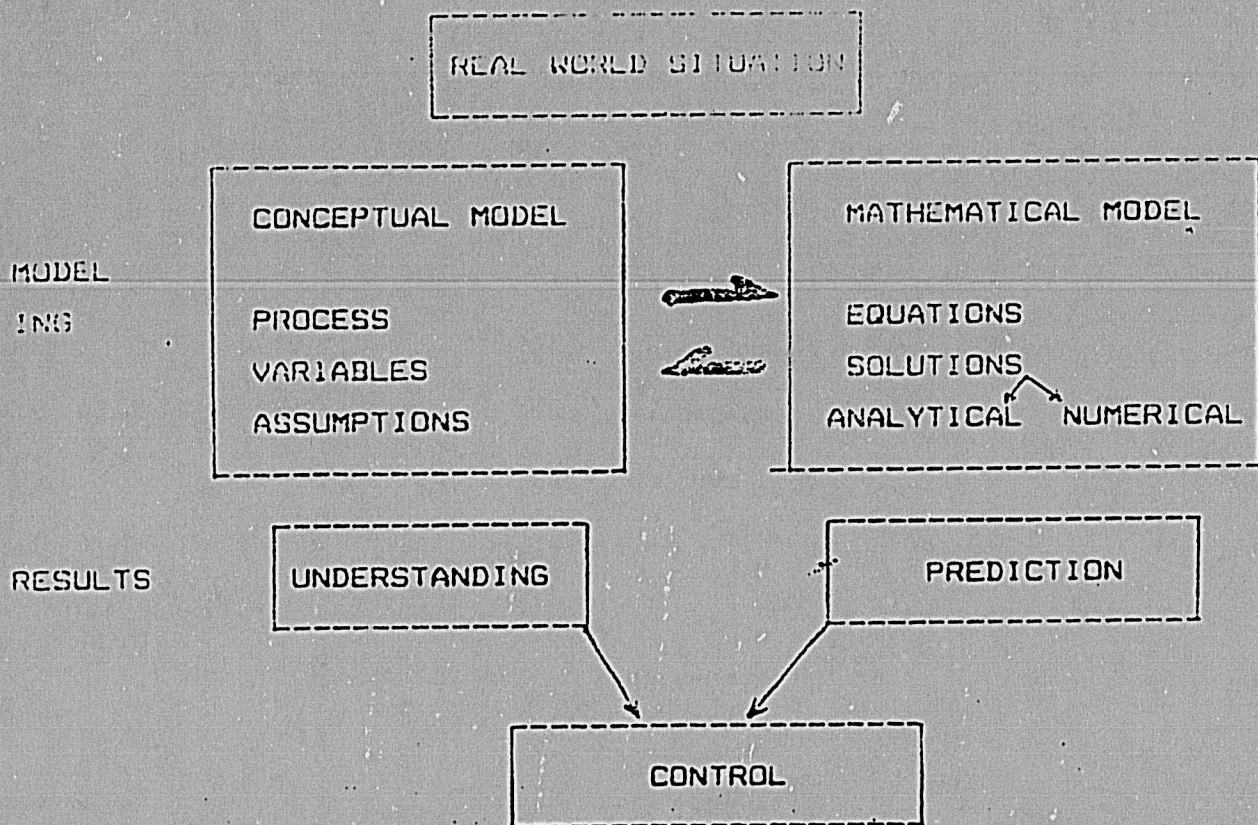


Fig. (1): Elements of the modelling process.

The starting point is a conceptual model listing relevant processes and variables. This may be quite a long list, and, for the model to be useful, a choice must be made of the important variables to be included in the model and of those whose effect can be assumed to be negligible. The mathematical techniques are employed to solve these equations (analytically or numerically) giving numerical values to the quantities of interest. These results are then interpreted in problem terms and compared with values. If the agreement between the estimated and observed results is not adequate enough, then the initial

assumptions should be modified more closely, and a new model is constructed. This process is repeated until the agreement becomes close enough and the final model reached becomes ready for application on the real problem.

In the numerical modelling of the ocean circulation, the equations of motion, equation of continuity and whenever applicable, heat and salt conservation, are put in finite difference form. All terms including the nonlinear ones, can be incorporated simultaneously, a real advantage over analytical methods. Some suitable grid in two or three dimensions is chosen. Boundary conditions, for example: wind stress, temperature and salinity, at the sea surface, and temperature, salinity and velocity on lateral boundaries are chosen. Initial conditions at time $t = 0$ must also be chosen. Often a state of rest, that is all velocities initially zero, is assumed. The temperature and salinity values may be taken to be uniform in the interior but it is more usual to prescribe a depth distribution approximating that in the real ocean. The calculation is then proceeded by stepping forward in time, one step at a time and the process is termed as time integration. In the following, the models applied to the Eastern - as well as the whole Mediterranean sea are reviewed. The model of Sarkisian (1966) is given in details in the Appendix A.

REVIEW OF MODELS APPLIED ON THE EASTERN AS WELL AS
ON THE WHOLE MEDITERRANEAN SEA

0.20 (IV) MODEL

THE LARGE SCALE WATER CIRCULATION IN THE EASTERN
AND CENTRAL BASINS OF THE MEDITERRANEAN

Dzukov (1966) used a stationary three dimensional model with real sea surface and bottom reliefs and a non-homogeneous field of density, to study the large - scale water circulation in the eastern and central basins of the Mediterranean, with x, y and z coordinates in the east-, north-, and up-wards.

The equations of motion considered are:

$$fv - g \frac{\partial H^*}{\partial x} + g^2 f^2 \gamma_z \frac{\partial^2 u}{\partial p^2} + \gamma \Delta u = 0 \quad (1)$$

$$fu - g \frac{\partial H^*}{\partial y} + g^2 f^2 \gamma_z \frac{\partial^2 v}{\partial p^2} + \gamma \Delta v = 0 \quad (2)$$

The hydrostatic equation is :

$$\frac{\partial H^*}{\partial p} = - \frac{1}{g f} \quad (3)$$

The equation of continuity is :

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial p} = 0 \quad (4)$$

where:

u, v : the horizontal velocities in the x & y directions,

w : the vertical velocity in p - system,

g : acceleration of gravity,

ν_z, ν_f : coefficients of vertical & horizontal turbulent viscosity,

f : coriolis parameter,

ρ : water density,

p : water pressure,

H^* : the height of the isobaric surface.

the horizontal velocities u, v are assumed to be composed of rotational and irrotational motions and expressed as the potentials ψ, ϕ .

Therefore :

$$u = -\frac{\partial \psi}{\partial x} + \frac{\partial \phi}{\partial y}$$

(5)

$$v = \frac{\partial \psi}{\partial y} + \frac{\partial \phi}{\partial x}$$

From equations (1), (2), & (5), we get :

$$g^2 \rho^2 \frac{\partial \psi}{\partial p} \frac{\partial \Delta \psi}{\partial p} + \gamma_2 \Delta \Delta \psi = f \Delta \psi + \beta v \quad (6)$$

$$g^2 \rho^2 \frac{\partial}{\partial p} \left(\gamma_2 \frac{\partial \Delta u}{\partial p} + \gamma_1 \Delta \Delta \psi \right) = -f \Delta \psi + \beta u + g \Delta H^* \quad (7)$$

where:

$$\beta = \frac{\partial \rho}{\partial \gamma}$$

Averaging equations (6) & (7) in the upper mixed layer

we get :

$$g \rho^2 \gamma_2 \left(\frac{\partial \Delta \psi}{\partial p} \right)_{p=p'} + \frac{p'}{g} \gamma_1 \Delta \Delta \bar{\psi} = \frac{\bar{p}}{g} (f \Delta \psi + \beta \bar{v}) - \bar{\Omega}_t \quad (8)$$

$$g \rho^2 \gamma_2 \left(\frac{\partial \Delta \phi}{\partial p} \right)_{p=p'} + \frac{p'}{g} \gamma_1 \Delta \Delta \phi = \frac{\bar{p}}{g} (-f \Delta \phi + \beta u) - \left(D_t - \frac{p}{2} \Delta (H_o^* - H_{p'}) \right) \quad (9)$$

where:

p' : the pressure at the lower boundary of the isobaric surface layer.

$$\vec{v} = \vec{v}_\gamma + \vec{v}_\zeta$$

where:

$$\vec{v}_\zeta = \bar{k} \times \nabla \psi, \quad \text{vorticity}$$

$$\nabla \cdot \vec{v} = \nabla \cdot \vec{v} \quad \text{divergence}$$

Solving equations (6) - (9), then $\Delta \psi$, $\Delta \phi$ can be obtained for the upper layer and the other levels.

Integrating the equation of continuity (4) over the upper surface layer, and assuming that $w = 0$ at the sea surface, a formula for determining the vertical velocity at the lower boundary of that layer can be obtained:

$$w_p = \dot{w}_p = \frac{\rho}{g\sigma} \Delta \bar{\phi} \quad (10)$$

while for the other deeper levels (k), the vertical velocity is determined by:

$$w_k = w_{k-1} + \frac{\Delta \phi_{k+1} - \Delta \phi_{k-1}}{2} \frac{\delta p}{g\sigma} \quad (11)$$

At the sea surface, the tangential wind stress components τ_x , τ_y are

$$\tau_x = -g \rho^2 \gamma_z \frac{\delta u}{\delta p} \quad (12)$$

$$\tau_y = -g \rho^2 \gamma_z \frac{\delta v}{\delta p}$$

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In the lower layer, the drift current disappears and the motion has only the geostrophic character. In this case, the velocities of the geostrophic current u_g, v_g are given by the following relations:

$$u_g = - \frac{g}{f} \frac{\partial H^*}{\partial y} \quad (13)$$

$$v_g = \frac{g}{f} \frac{\partial H^*}{\partial x}$$

The vorticity and divergence of the geostrophic flow give :

$$\Delta \psi_g = \frac{\partial v_g}{\partial x} - \frac{\partial u_g}{\partial y} = - \frac{g}{f} \Delta H^* - g \beta \frac{\partial H^*}{\partial y} ,$$

$$\Delta \psi_g = \frac{\partial u_g}{\partial x} + \frac{\partial v_g}{\partial y} = - \frac{g \beta}{f z} \frac{\partial H}{\partial x} \quad (14)$$

No slip conditions have been assumed at the solid boundary while at the open boundary the velocities were given.

The transformed forms of the fundamental equations are then used to compute the velocity component of the current in a homogeneous layer at the surface and at the other levels using the tangential wind stress at the surface and the density field.

Hassan (1976) used Dzukov Model (1966) to compute the horizontal and vertical current velocities at six - levels

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during spring, summer and winter seasons in the eastern and central basins of the Mediterranean Sea. He concluded that:

- 1- The surface circulation pattern is mainly wind-driven.
- 2- The general circulation pattern of the eastern - and central - basins of the Mediterranean has the same characteristics as that described by Dvtchinnikov (1966).
- 3- The northeastern part of the Levantine Sea and the western part of the eastern Mediterranean are the areas of water sinking whereas areas of upwelling exist among them with vertical velocities of the order of 8×10^{-4} cm / sec.
- 4- At 10 m depth, the vertical velocity is of the order of 10^{-4} cm / sec and reaches 10^{-3} cm / sec at 100 m depth.

Hassan (1982) used the same model to calculate the horizontal velocities in the western part of the Mediterranean in summer, assuming a stable wind field at the surface. The values of the vertical velocities were of the order of 10^{-4} cm/sec, and the maximum value was generally at a depth of 100 m. He found that, areas of water sinking appeared in the central part of the region, while these of upwelling appeared at the borders, particularly in the northwestern part of the region. Velocities in the upwelling region reached about 8×10^{-4} cm/sec.

STEADY STATE WIND DRIVEN CURRENT IN THE EASTERN
PART OF THE MEDITERRANEAN SEA.

On the basis of the transport stream function, Moskalenko (1974) calculated the steady state wind driven currents in the eastern part of the Eastern Mediterranean within the framework of Fomin's model (1969).

On using the hydrodynamical equations of motion in terms of the stream function ψ , we get:

$$r \left(\frac{\partial^2 \psi}{\partial x^2} + \frac{\partial^2 \psi}{\partial y^2} \right) + \left(\beta - \frac{r}{M} \frac{\partial H}{\partial x} - \frac{r}{M} \frac{\partial H}{\partial y} \right) \frac{\partial \psi}{\partial x}$$

$$+ \left(\frac{r}{M} \frac{\partial H}{\partial x} - \frac{r}{M} \frac{\partial H}{\partial y} \right) \frac{\partial \psi}{\partial y} - \left(\frac{\partial \tau_y}{\partial x} - \frac{\partial \tau_x}{\partial y} - \frac{\tau_y}{M} \frac{\partial H}{\partial x} \right)$$

$$+ \frac{\tau_x}{M} \frac{\partial H}{\partial y} = 0$$

where r is the horizontal viscosity, $\beta = \frac{\partial f}{\partial y}$, $f = 2\omega \sin \phi$

ω is the angular velocity of the earth's rotation and ϕ is geographic latitude, and M is a function that depends on the

depth H and the characteristic density interstratification of the water.

In the derivation of the above equation it was assumed that :

(1) - The horizontal pressure gradient vanishes on a so-called - zero surface, which was taken to be at 4000 m over the entire basin,

(2) - The distribution of density follows Shtokman's Model (1950) ,

(3) - The system of finite - difference equations is solved by alternating direction and Matrix Sweep method (Marchuk 1959, Samarskiy 1962).

The main features of the assumptions accompanying the calculations of Moskalenk's are :

(1) - The contour of the region is so selected as to approximate the coastal contour of the eastern Mediterranean quite closely,

(2) - The grid spacing is 55.6 km ,

(3) - Impenetrability of solid boundaries and free passage of the water through straits are assumed at the lateral boundaries,

(4) - The wind data needed for the calculations were taken from the Mediterranean Atlas (Midellandse Zee , 1957). The calculations were made for the summer season (June - September). The tangential wind stress averaged over the period was determined with the weighting factors of Tukey (1949),

(5) The density model assumes that the most general features of the vertical density field structure should be preserved over most of the area of the sea,

(6) transports through the straits were specified on the basis of estimates made by the dynamic method, considering that the total mass of water in the sea should remain constant in a steady state circulation,

(7) The shallow northeastern part of the Mediterranean and the islands of Cyprus were excluded in outlining the grid region,

(U) The coefficient of horizontal viscosity was assumed equal to 5×10^8 m / sec. This value was obtained by assuming an order of magnitude of 10^8 cm for the horizontal circulation scale.

Moskalenko's (1974) calculation of the steady current in the eastern Mediterranean (Figure 1) showed that water from the Strait of Tunis enter the basin along the Sicilian Coast, one part flowing clockwise around the Gulf of Gabes and leaving the basin along the African coast. The other part flows clockwise around almost the entire central basin of the Mediterranean sea, including the Ionian Sea and the Gulf of Sidra. Adriatic water enter the central basin through the strait of Otranto, moving close to the western shore of the strait, and return without exerting any appreciable influence on the current system in this basin - in the region between Crete and Africa, there are two main vortices: a cyclonic vortex at the western end and an anticyclonic vortex in the east. The anticyclonic circulation has two centers. In the Levantine Sea the motion of the water is cyclonic, and a cyclonic gyre appears distinctly in its northeastern part (THE RHODES CYCLONIC GYRE).

The current patterns obtained by Moskalenko (1974) are strongly confirmed by the results of instrumental observations and dynamic method calculations (Ovtchinnikov 1966 and Ovtchinnikov 1965). In spite of the general similarity of the circulation patterns, the basic circulation system given by Moskalenko's (1974) differs slightly in configuration. The current scheme has no small circulation centers, since his calculation was based on smooth data. Comparison of the resulting circulation scheme with the vorticity pattern of the tangential wind stress over the sea indicates that the basic circulation centers coincide with zones of the extreme values of this vorticity. Moskalenko's (1974) calculations also showed that the influence of the B effect and bottom relief are

important in this sea. They result in displacement of the circulation centers, changes in the configuration and intensity of the vortices, and intensification of the current along the coasts.

Enclosure (2)

PERSONNEL CHANGES, SALARY DATA

Few changes in personnel have taken place in Phase III - Amended since its inception in September, 1988. Dr. A.M. Eisawy, Coordinator of the Egyptian Component of the Program for the past half decade, remains in control of the Program. Although Dr. Eisawy has officially retired as Director of the National Institute of Oceanography and Fisheries (NIOF), he has retained his rank of Professor in the Academy. Further he is Vice President of the Egyptian Oceanographic Society in which the Egyptian Government has vested responsibility for the Program. Incidentally Dr. A.A. Latif, President of the Academy of Scientific Research & Technology, is the President of that Society. Mr. A.I. El Ibiary who has served as the Program's Executive Officer since its inception has also officially retired and continues to serve in the same capacity, as a consultant.

Dr. Hussein Badawi, incoming director of the NIOF has joined the steering committee.

The Egyptian project personnel remain the same as delineated in the proposal, except: a brilliant applied mathematician, Dr Naeem Anwar has joined the project on "Predictive Model for Shoreline Changes Along a Nile Littoral Cell". On the Israeli side Dr. Cohen, who assumed direction of

the Program about the same time as Dr. Eisawy, remains in charge. Mr. Dan Adar, who has served as Executive officer of the Program, has been replaced by Mr. Aharon Zvi. Dr. Carmel has been replaced by another physicist, Dr. Iosilevsky on the "Shoreline Changes" Project. Dr. Daniel Hartman, a sedimentologist, and Eng. Dov Rosen, a coastal and marine engineer, have also joined that project. Needless to say the additions of Drs. Anwar and Iosilevsky have brought up considerable improvement in that project.

It is estimated that the A.I.D. Program funds approximately 20% of the salaries of the Program's participants.

How Much \$?

RBA/mw
11/5/90

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TRAVEL AND MEETINGS

<u>Purpose</u>	<u>Who</u>	<u>When</u>
Initial Aqaba Planning	Cohen (Israel) Mahasneh (Jordan) Abel (USA)	5/88 - New York, Boston
Plans for Jordanian Cooperation in the Aqaba Program	Eisawy, El Ibiary S. El Din, Badawi (Egypt) El Sayed, Mancy (USA)	5/88 - Aqaba, Jordan
Steering Committee Meeting; Reviewing Phase III, Starting III - Amended	Eisawy, El Ibiary, Sarnagawy (Egypt) Cohen, Gordin, Kissil, Fattal Ben Nun (Israel) Mancy, El Sayed, Abel (USA)	3/89, 4/89 - Cairo, Luxor, Egypt Tel Aviv, Jerusalem Beersheeva, Israel
Plans for Saudi Arabian Cooperation	Eisawy, El Ibiary (Egypt)	12/89 - Jeddah, Saudi Arabia
Establish Common Observation, Computer & Data Analyses for E. Mediterranean Circulation	Maiyza (Egypt) Brenner (Israel)	12/89, 1/90 Princeton, NJ
Accompany/Advise Congressional Mission	Abel (USA) Eisawy, El Ibiary Walli, Naguib, Badawi, Latif Hamza, Beltagy (Egypt) Hussein, Kessem, Mahasneh (Jordan)	1/90 - Israel, Egypt, Jordan
Compare Techniques & Share Mariculture Data for Mullet & Nutrition Project	Hamza (Egypt) Zaki (Egypt)	3/90, 4/90 - Elat, Israel
Prepare for Steering Comm. Mtg. for Finalization of Phase IV Planning and Aqaba Plan	El Sayed, Mancy, Abel (USA)	4/90 - College Station, Texas

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TRAVEL AND MEETINGS

<u>Purpose</u>	<u>Who</u>	<u>When</u>
Steering Committee Mtg.- Review of Phases III and III Amended , Finalization of Phase IV Planning & Aqaba Plan	Latif, Eisawy, Beltagi, Maiyza, El Ibiary (Egypt) Cohen, Gordin (Israel) Abel, El Sayed (USA)	5/90
Workshop on Wastewater Project	Eisawy, El Ibiary, Zain, Latif Badawy (Egypt) Cohen, Fattal (Israel) Wahbeh (Jordan) Abel, El Sayed, Mancy (USA)	8/90 Suez, Egypt
Workshop on Mullet, Nutrition, and Shore Processes Projects	Eisawy, Badawi, El Ibiary, Khafagy Fanos, Anwar, Hamza, Zaki (Egypt) Cohen, Gordin, Golik, Fattal Iosilevsky, Lopatch (Israel) Abel, El Sayed (USA)	8/90 Haifa, Israel

10/26/90
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COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

Report Steering Committee Meetings

October 22 - November 2, 1989

During the period October 22 - November 2, 1989, a number of meetings were held with Egyptian and Israeli officials engaged in several functions related to the program. Most directly relating to the program, however, were the following conferences:

- A. Steering Committee, October 29th
- B. Steering Committee, Morning of October 30th
- C. Meeting with President Goldmark of the
Rockefeller Foundation, Afternoon of October 30th
- D. Meetings with officials of U.S. Agency for
International Development, All Day, October 31st

During October 22-25, the Egyptian delegation led by Drs. A. A. Latif (President of the Egyptian Academy of Scientific Research and Technology) and A. M. Eisawy (Director of the National Institute of Oceanography and Fisheries) met with officials of the National Marine Fisheries Service in Woods Hole, Massachusetts. The purpose was to discuss the possibilities of

transferring the research vessel ALBATROSS IV to the Egyptian government on a loan basis.

The Egyptian delegation included, in addition to its leaders, Drs. A. I. El Ibyary, Ali Beltagy, Ibrahim Maiza, W. A. Hafez, and engineer T. El-Latif.

Officials of the Northeast Center of the National Marine Fisheries Service included Dr. John Pearce, Associate Center Director; J. Grosline, and Cmdr. Michael Albertson of the NOAA Corps. The NOAA officials escorted the Egyptians throughout the ship and briefed them thoroughly on its characteristics and capabilities.

The scientists then left for the University of Michigan Water Quality Laboratory, leaving the engineers with the ship.

On October 29th, the steering committee met at the Penta Hotel in New York City, joined now by Drs. Yuval Cohen and Hillel Gordin from Haifa and Elat respectively, Sayed El Sayed of Texas A & M University, and K. H. Mancy from the University of Michigan. The steering committee was now in full session.

Inasmuch as the meeting at the Rockefeller Foundation on the following day would be quite crucial to the Program, especially the Aqaba Program, most of the discussion focused on that Program and the order of precedence for the following day's meeting. The consensus was that we ought to discuss

briefly what we have done in the regular A.I.D. Program so far and what our priorities ought to be for the Aqaba Program. Discussion then centered on the meetings in Cairo and Aqaba last spring where priorities were agreed on and the ensuing meeting at Haifa where the Israelis, in essence, ratified those agreements.

It was agreed that without thorough understanding of the characteristics of and processes in, the Gulf of Aqaba, purely applied research would be expensive and inefficient. Accordingly, the first priority would have to be given to a multidisciplinary investigation of the Gulf of Aqaba, the motivation for which would be various types of applications, and the parallel bilateral technique ought to be quite effective. Agreement on proceedings and specific techniques to be used was reached easily and quickly.

It was further agreed that second priority should be given to preservation of the environment, including coral reefs, motivation for which would be largely tourist revenue oriented. The next priority should be fisheries and aquaculture, for both domestic consumption and export.

It was agreed that the figure suggested at the American Embassy last May was probably on the right order of magnitude, i.e. \$9,000,000. It was also felt that to ask the Rockefeller Foundation for more than one-third of this would be unrealistic. Accordingly, it was agreed that if asked for a figure, we ought to suggest \$3,000,000 for a three or four-year study, to begin with.

It was also noted that Mr. Goldmark was interested in the development of a methodology for coordinating the work in the Gulf of Aqaba and for bringing about at least incipient discussions aimed at eventual cooperation among all of the surrounding countries. Dr. Latif reiterated his ideas for using the new Suez laboratory as a center for Middle East cooperation in marine science.

The agenda proposed for this meeting and for the following meeting on October 23rd are attached as Enclosure I.

The next day, October 30, Dr. Latif opened the meeting by noting the fact that in spite of the pressure of his duties as President of the Academy, he was devoting nine days to being with the group as indicative of his support for the program. He discussed his views of the relative roles of political and nonpolitical officials. The non-political participants must support political issues; on the other hand, without the non-political activity, we would have to start all over again, from the beginning. He, himself, is both a specialist in marine science and, of course, a leader by virtue of his position, as President of the Academy.

Dr. Latif stressed this to show that he must be objective in his treatment of all of the sciences and technologies under his command. He must consider the entire Academy of Scientific Research and Technology. Accordingly, he must ask, "What are the technical inputs to any program, including our own?" "What impacts can be expected?" "What benefits will accrue to the people, particularly in Egypt?" In the developing countries, this

is always a problem. Pressure is on the scientist. Accordingly, Dr. Latif looks to increasing professional cooperation with Israel. He noted that at this point in time there are no more sensitivities in our dealings with each other; we meet purely as partners. He hopes we will come up with some really outstanding projects in the immediate future.

Dr. Cohen responded with some words of appreciation for Dr. Latif's remarks. He expressed his hope that what we intend for the Gulf of Aqaba is identical to President (of the Rockefeller Foundation) Peter Goldmark's own objectives. At the moment, of course, we can't know precisely what they are. He handed out the proposals which his staff had prepared relating to the projects agreed upon between the Egyptians and the Jordanians at Aqaba and Cairo.

Dr. Cohen noted again that Mr. Goldmark wants some sort of "Authority." This can be translated into techniques of cooperation to protect the environment, especially the practical aspects.

Cohen noted further that we have already agreed to begin with an interdisciplinary, but practically-oriented program of the three items previously mentioned. Abel agreed that it is vital that the applications must be clear and important if we expect to have Rockefeller Foundation support. Discussion among Cohen, Abel, Wahbeh, Eisawy, and Mancy related to the types of science that would bear upon protection of the coral reefs, the human impact on coral reefs, examples of accidents that take place, and the evidence of the need for better management in, for instance, Ras Mohammed.

Mancy noted that the next step has to be blending the Israelis', Egyptians', and Jordanians' proposals. Cohen, agreeing, expressed the need to develop common methodologies, data bases, and models.

Abel noted that there will be three programs, in essence: 1) Israel/Egypt under the A.I.D. Regional Cooperation Program; 2) Egypt/Jordan, under the regular A.I.D. Program, and 3) participation by all countries in one form or another, supported by the Rockefeller Foundation. It is thus necessary to determine how best the funds can be distributed among the three parties. Following discussion of Abel's remarks, it was generally agreed that it is too early to be worrying about who supports what, and how the funds should be distributed; the most important thing is to develop a clear presentation for the Rockefeller Foundation.

Gordin and Eisawy asked about the format for the proposals and dollar levels. Dr. Latif mentioned that Aqaba must be treated as a program rather than a project. We should also come to terms with the required duration of this program. Base lines will be important for development. Areas of priority have to be determined for mariculture. All of the mentioned projects are important; some may have to be deferred for later work. Some students may have special interests that have to be noted at the same time. Dr. Latif noted that geology, which is extremely important in this case, had seemingly been omitted from the proposals. Accordingly, we need much wider vision. Dr. Eisawy added that a number of national organizations had met in Egypt to discuss the Aqaba Program; they had come up with a "Menu" of ten projects.

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Dr. Mancy asked whether the European Economic Community (ECC) might be involved as well as a number of United Nations programs; Dr. Wahbeh added that the Saudis also should be involved. Dr. Latif responded that we need a comprehensive shopping list. The future of the Program depends on the way we start.

Dr. Sayed mentioned the possibility of a causeway being constructed between Egypt and Saudi Arabia. This would be an interesting project for us to examine in terms of the possibility of an Environmental Impact Statement.

Dr. Cohen, commenting on the need for a comprehensive strategy, agreed with Dr. Latif about a shopping list. We should ask the Rockefeller Foundation for seed money, but not mention at the time the other funding agencies, unless asked. Therefore, we need a dollar figure for the new Phase IV; also we should describe to Rockefeller the need for a wide view, long term program. Once we get the seed money, then we can improve our case. We should describe two separate programs to A.I.D., the Aqaba Program and the regular Regional Cooperation Program. After all, we still need money for Phase IV. Only after we get the money for Phase IV should we worry about support for the Aqaba Program from A.I.D.

Dr. Latif reminded the group of the need to come up with some kind of regional commission idea, in which the Rockefeller Foundation would be interested. There was general agreement on the need for an ambitious, long-term, program, with a minimum of five years. We have to decide on what will be most attractive to the Foundation for assistance, and then construct the mechanics of the Program around it. Dr. Eisawy mentioned the possibility of attracting other American agencies.

Abel's question as to how to treat Harvard in the matter evoked much discussion. Dr. Latif suggested that Dr. Hausman should be involved in the Program only for his very specific part in it. Dr. Cohen agreeing, stated that we already have a steering committee, and this steering committee should remain intact. Harvard should be involved only for their participation in the Aqaba Program. Accordingly, we should not raise the issue of Harvard's participation with the Rockefeller Foundation, but with Harvard we have to firmly state that we have made promises in which we must deliver on and so must Harvard.

Dr. Latif suggested that Dr. Abel explore the possibility of involving other agencies in the Program, after which we should reconvene, check our progress, and inquire about these agencies. This began intensive discussion of the types of agencies in the United States government that could be involved.

Dr. Latif suggested that in our presentations we must stress cooperation, and in this connection, the fact that we have come this far is in itself a success story. Even though we started with few agencies, a larger number have now joined the Program; the cooperative aspect is attracting more scientists in Egypt; and there is a definite impact on both the scientists and on the economy itself.

Dr. Abel introduced the matter of Dr. El Sernagawi's project. In 1988, the Israelis and Egyptians had agreed to include a fish disease project in the Phase IV Program package. Dr. El Sernagawi and the Israeli scientists had mapped out the project at Luxor last spring. Most of the other projects

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are finished and ready for final editing prior to submitting to A.I.D. Dr. Sernagawi had subsequently visited Duke University and had worked with the team of Joseph and Celia Bonaventura, procuding a very comprehensive project proposal, but not on fish disease. Another project involving Dr. El Sernagawi had been received from an Edward Noga from North Carolina State, and Dr. Abel understood a third was in preparation at the University of Maryland. Accordingly, Abel was uncertain as to how to proceed. Abel stated, however, that Dr. El Sernagawi had indicated clearly and strongly that no project proposals in which he would be involved, could be processed without Dr. Eisawy's approval. Dr. Eisawy stated that we have already agreed to include a project on fish diseases in Phase IV. Dr. Cohen, agreeing, suggested that within a week following the meeting, he and Dr. Eisawy should speak to their respective principal investigators to ensure that the fish disease project would be finished; following this, it should be immediately sent to Drs. Abel and El Sayed. All agreed that this would be a useful deadline.


Dr. Cohen brought up the matter of the format in which the fish decontamination project had been composed. He suggested that it was important that we all adhere to common formats. For instance, the fish decontamination proposal included cost sharing, and considerable "boiler plate," i.e. information about the institutions and scientists. He felt that all of the projects should be standardized. Dr. Mancy responded that the arrangement of the budget presented no problem, and that they could eliminate cost sharing. Abel suggested that the cost sharing aspect would actually enhance the proposal rather than derogate it. Cohen responded that for the

Israelis, it would simply take too long to start to include cost sharing for all of the projects. Dr. El Sayed stated his desire to have the entire proposal package finished by the end of this year, and that some of the Egyptians' projects were not totally in the standard format that he had laid out during a previous meeting of the steering committee.

Dr. Mancy stated that his colleagues had all worked very hard, and that their project did, in fact, conform to El Sayed's format. Dr. Latif suggested that the Wastewater project was the most important project. As Academy President, he considered that this is the principal project for the Program. Further, he felt that it was necessary to finalize the paperwork on the proposal package as soon as possible.

In response to Abel's question, as to whether the proposal package should be submitted in the winter or next spring, the consensus was it should be submitted as soon as possible, preferably this winter. Also, everyone agreed that cost sharing should be eliminated at least for the time being.

Abel then introduced the matter of the Seafood Toxin project and the international symposium that is currently in planning stages. Dr. Eisawy responded that Dr. Chayria Naguib was now amenable to visiting Israel with several of her colleagues, and was also willing to have the project announced and conducted as a cooperative affair with the state of Israel. Abel mentioned that Dr. Sam Page of the U.S. Food and Drug Administration would join the group at the A.I.D. meeting on the following. Accordingly, that project could be discussed in greater detail at that time.



With this, the meeting adjourned in order to permit the steering committee to meet at the Rockefeller Foundation.

At 2:00 in the afternoon of October 30th, Drs. Latif, Eisawy, El Ibyary, Mancy, El Sayed, Cohen, Gordin, and Abel met with Mr. Peter Goldmark (President of the Rockefeller Foundation) and Dr. Joseph Romm, his Assistant.

At Dr. Abel's suggestion, Drs. Latif, Eisawy, and Cohen offered their views on the following subjects:

- a. The manner in which our Program has been conducted to date;
- b. Our principal achievements with particular emphasis on the cooperation obtained among the institutions in the two countries;
- c. The nature of the Gulf of Aqaba and its amenability to useful scientific projects;
- e. The fragility of the environment in the Gulf;
- f. Long term prospects for economic development among all of the countries bordering the Gulf;
- g. Our cooperative aims for the Aqaba Program;
- h. Dr. Latif's objective of creating a regional commission to ensure cooperative effort in the Gulf.

Dr. Latif's opening overview was similar to his remarks at the previous meeting. He stressed progress achieved since the very first meeting in San Diego in March of 1980. He, himself, had attended that meeting, and the present meeting was only the second time that he had been personally involved in the Program planning. He reiterated his faith in the Program and his belief in its accomplishments, reconfirming his interest as evidenced by his willingness to give up two weeks of his time to attend these meetings personally.

Dr. Eisawy outlined his goals for the cooperative program between Israel and Egypt and how he felt it was succeeding, and would further succeed in bringing together not only persons and institutions in the two countries, but a number of institutions in other countries as well.

Dr. Cohen brought the conversation into sharper focus on the Gulf of Aqaba itself. He described its characteristics as known to this time, and outlined the need for much greater understanding of these properties and characteristics before the applications could be deduced intelligently. He essentially brought forward the morning's conversation into the context of the meeting by describing the principal priorities for the Program, including initially a broad multidisciplinary study of the Gulf's characteristics in terms of practical application. These applications would include first, protection of the fragile environment, especially the coral reefs. Inasmuch as the principal revenue to be derived from the Gulf would be recreational, protection of these resources was paramount. Following this, fisheries and aquaculture would be very important for both internal consumption

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and export purposes. President Goldmark asked a number of questions concerning the manner in which the countries cooperated and how they felt they could conduct the study of the Gulf of Aqaba, to which the scientists responded, based mainly on progress and results achieved to date and the manner in which this would be extrapolated to the future.

President Goldmark concluded by stating that the Foundation had not come to any decision concerning the possibility of providing further support to this Program. It would be necessary to see the proposals themselves before such decisions could be arrived at. The group responded by stating that the proposals were in process now and could be expected to be completed in the immediate future. President Goldmark asked whether it would be possible to have them completed and submitted within sixty days, to which the group responded that they would make every possible effort.

The steering committee reconvened at the State Department in Washington, D.C. at 9:00 a.m. on October 31st. They met Mr. Richard Brown, Director of the Department of Egypt Affairs of A.I.D.; Mr. Bert Porter, his assistant; and Mr. Thomas Stephens, of the A.I.D. Contracts Department.

Following introductions, Abel opened the meeting by stating that our visit was largely rhetorical in that we did not have a completed proposal package to offer A.I.D. at this time. Rather, we had come together in order to:

- a. permit ranking Middle East executives the opportunity to offer their views on the Program;
- b. discuss projects to date;
- c. offer our aspirations for the future;
- d. discuss various aspects of Program philosophy, execution, and logistics, with particular reference to finance, which was critical.

Mr. Brown announced that owing to an emergency meeting to consider transfer of funds to Israel, Drs. Adelman and Blackton would be unable to attend the meeting.

Abel summarized the purposes of the Program, and of the meetings held over the past several days.

Dr. Latif, as during the previous meetings, offered a general overview of the Program. Generally speaking, his discussion followed that of the previous day. Dr. Latif emphasized, however, his complete confidence in all of the participants being sincere, enthusiastic, and courageous.

Dr. Latif then departed from his previous theme to discuss what he felt to be major issues. First, he talked about milestones. Ten years ago when he attended the first meeting in San Diego, no one knew what to expect. The fact that the program has survived these ten years and has accomplished what it does, symbolizes the sincerity of the participants. Second, when the project began, there were few projects, and those were participated in reluctantly. Now, increasing numbers of scientists are requesting admission to the Program. They reflect many specializations and disciplines. They represent a will toward discussions between institutions and between countries. Third, the subjects being covered are increasingly important.

Dr. Eisawy then described the types of projects that are ongoing, and how his government looks to his colleagues and him for pioneering. Fish farming, for instance, is extremely important. When he joined the Program, the connections were mainly between coordinators. Now, many scientists travel between the two countries, limited only by available funds. The way is now open for scientists of all descriptions to travel freely between the two countries in cooperation. Sixty Egyptians are now working on the Program. They want more of this work. Dr. Eisawy concluded that this is a most important direction for the United States to take.

Dr. Cohen made reference to charts that had been prepared by U.S. A.I.D. and were hanging on the walls. They identified the laboratories participating in all of the Regional Cooperation programs. Dr. Cohen suggested these maps convey our progress better than words. If we overlay these maps on earlier ones, they would show the milestones, particularly the increasing number of institutions joining the program. Interest is actually growing exponentially. For instance, his visits to Egypt have attracted greater and greater interest in both countries. The coordinators must now exert hard controls on the Program to filter out all except the best aspirants. In almost cases, the Egyptians and Israelis no longer need American participation except for some forms of technical assistance. Thus, Americans are now included only in the Shore Protection and Circulation Process Projects. The social relationships are very exciting. The Program, however, is still fragile in many ways, and Dr. Cohen referred to this in showing how it has been developing. Some of the expectations are naturally unrealistic; and there still exists some differences among the Programs and participants.

Mr. Brown responded that success is measured in many ways. A.I.D. now, for instance, confronts far too many proposals to be able to fund. Congress, however, wants to increase the Program. Compared to the regular A.I.D. Program in those two countries, which included 1.8 and 1.2 billion dollars respectively, this Program is achieving monumentally for its size. The outcome is positive. His own office now includes, in

addition to Egypt, Poland, and Hungary. Mr. Brown also offered the interesting remark that Regional Cooperation has been brought about between Israel and Egypt who had been enemies for thousands of years. In comparison, countries such as Ireland and Cyprus have not yet achieved this form of cooperation.

At Abel's request, Dr. Cohen listed the current projects and briefly described the progress therein, from the Israeli perspective. The objective of the Shore protection project is to develop a model, data base, and hydrographic information to be able to predict changes in shorelines and profiles. The predictive model will enable decision makers in both countries to build structures and develop useful codes of practice. Dr. Cohen related that considerable retraining is needed. Both countries have recruited many new people to the Program. They have rebuilt new wave measuring systems. Last March, both Israel and Egypt sent the project scientists to the Scripps Institution of Oceanography for further study of new techniques in both measuring and processing. The Egyptian and Israeli scientists worked together at Scripps to develop the project in partnership.

The aim of the Easter Mediterranean Circulation project relates to air/sea interaction. The objective is to predict rainfall and also to enable more efficient designs for waste disposal at sea. In August, the Egyptian, Israeli, and American principal investigators met in Israel to

divide the work load. From this meeting, Dr. Ibrahim Maiyza will proceed directly to Princeton University, where he will spend the next three months working with Dr. Mellor at Princeton and (part of the time) Dr. Brenner of the Haifa Institute.

Hillel Gordin discussed the Mariculture projects. He offered a synopsis of previous work (reported in previous documents). He noted that, proceeding from previous discussion, only a few of the fatty acids are essential. Fish cannot synthesize omega - 3. A goal is to obtain better diets for the fish in the production experiments. Gordin and his Egyptian colleagues are worried about the pollution effects on aquaculture. The ultimate aim of the aquaculture program is to obtain a one:one weight gain per food intake, i.e. to attain a pound of weight increase for a pound of food. The Israelis noted that Dr. Bayoumi had made aquaculture the number one priority when the Program first started.

Dr. Eisawy continued the discussion in terms of the expense of nutrition for the creatures under culture. Two Egyptian scientists have been assigned to work in the Israeli laboratories starting next week. Dr. Eisawy noted that following Dr. Maiyza's working with Drs. Brenner and Mellor, the Egyptians need to order the special computer equipment and, in fact, had already given the request to Dr. Abel. Eisawy mentioned that Egypt had extended a couple of the projects which they are just now finishing up.

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There followed a discussion of the International Seafood Toxins Conference at which about 250 delegates are expected. The money has been carefully preserved in the budget, and the no-cost extension for the additional two year was requested recognizing that the political climate for such a meeting would be far more acceptable in 1990 than in 1988 or 1989. It is understood that the leader of the project, Dr. Charia Naguib, of Egypt's National Research Center, will visit the Haifa Institute with her colleagues to formulate the final plans for the seminar.

Dr. Beltagy is now finishing up the Lakes Management project, enabling the Egyptians to deal in a practical manner with Lake Burullus. This lake covers about 65,000 fedans (about 15,000 acres or about 24 square miles). Half the lake is being treated experimentally; the other half is being let alone for comparison purposes.

The Egyptians consider the Wastewater Recycling project the most important in the Program owing to the importance of acquisition of new sources of fresh water. They aspire to a level of 4,000 cubic meters per day. The plant is now complete, and ultimately they hope it will be able to treat the entire wastewater output of the city of Suez.

Mr. Porter observed that Regional Cooperation has been run in a rather loose manner for ten years; it is now necessary to tighten up the rules

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and regulations. Price Waterhouse has reviewed the Program for A.I.D., and the results are being disseminated to all of the contractors and principal investigators.

Dr. Eisawy remarked that it is extremely critical to resolve the "funds-out" problem. He is extremely distressed that the New Jersey Marine Sciences Consortium has been tightening controls on the amount of money permitted to lie un-spent, i.e. in the banks, for operational use by the Egyptians at any one time. Mr. Thomas Stephens, representing the A.I.D. Contracts Office, remarked that a maximum of three days' operational funds is permitted the Domestic Programs and 30 day's for Foreign Programs. Dr. El Ibyary asked why a limitation could not be assigned to a project rather than an entire Program, to which Galloway added that the minimum should allow a total of about 45 to 60 days operational funds.

Following a discussions between Drs. Brown and Latif, it was agreed that a small separate meeting would be held following the main meeting in order to come to agreements, or at least understanding of the necessities of the system.

Dr. Mancy continued discussion of the Wastewater Recycling project. He mentioned that it had been the brainchild of Dr. Latif a long time ago, and he named the participants in Egypt and Israel who were conducting

the work. The city of Suez is now very much interested owing to the possible benefit to its economy. Dr. Eisawy, discussing the project further, noted that it not only aims to develop a new recycling technique, but is being used as a laboratory comparison of the American, French, and British techniques.

He hopes that this Program will enable development of techniques for purifying lakes, particularly Manzellah and Kiryut. Dr. Latif added that this is the only comparison Program, and it's being prosecuted at the Red Sea Branch of the Institute of Oceanography, which is the largest marine institution in the entire Middle East region. This Institution will also be used for large-scale education programs, and it is hoped that it will attract colleagues from all of the Middle East countries!

Dr. Al Pohlen (US FDA) picked up the conversation on the Seafood Toxins International Symposium. The overall program was a three-phase proposition, including:

- a. A survey of seafood for pesticides, industrial chemicals, and heavy metals;
- b. Investigation of the same seafood for toxins;
- c. The international conference just under discussion which would be co-sponsored by the International union of Pure and Applied Chemistry, in addition to U.S.A.I.D.

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The subject areas of the symposium, which will be essentially an international symposium and workshop on seafood safety, will include:

1. Assessing risks;
2. Microtoxins;
3. Phycotoxins;
4. Pesticides and heavy metals;
5. Food safety and maintenance;

There may also be several workshops, including e.g. one on immunoassay methods. Abel then offered some remarks about the importance of this symposium in perspective of recent proposals put forth by several Latin American nations to the Food and Drug Administration for American help.

Dr. Cohen mentioned the extreme urgency of financial support from phase III-Amended. He noted that the Israelis simply cannot wait until the next calendar year for funds, and if they don't get the money until next March, they'll simply have to get out of the business. The current freeze on funding for their work, gives them very severe "people" problems.

Galloway noted that six weeks ago we were advised that no more money would be forthcoming until March. We immediately spread the word to all of our colleagues. Porter discussed the financing difficulties in A.I.D.; there followed a discussion of possible interim funding. The Congressional resolution runs out on November 15th; after that, nobody knows what kind of funding will be available. He mentioned that what is needed is a strong letter of emergency from the Consortium concerning

the Israelis' plight. Dr. Brown reconfirmed the necessity of extending the current available funds to next March.

Dr. El Sayed offered his views on the needs of the Region and our aspirations for the future in fulfilling them. We are putting major emphasis on the fisheries programs as a major food source. All of the proposals are for brand new work. They involve real interactions between the countries. Dr. El Sayed then offered a synopsis of the projects currently being considered for the composition for the Phase IV proposal package:

1. Derivation of Carotenoids from marine products
2. Advanced mariculture
3. Fish decontamination

Dr. Eisawy and Abel then initiated discussion of the goals of the Aqaba Programs and the status of project proposals. Dr. Latif noted that these are not only marine projects, but cover all forms of aquatic activity. Many of them can be considered very important in terms of the ultimate peace objectives.

Dr. Brown observed that A.I.D. cannot respond without the proposals, and the proposals should be prepared as a package of pieces which can be excised for individual response. The Regional Cooperation Program is available to only Israel and Egypt. Therefore, we should suggest the mechanisms in terms of what kinds of projects need what kinds of funds.

Abel responded that, as previously mentioned, this section of the presentation was entirely rhetorical, and no response was expected at this time. The Steering Committee hoped to complete the proposal by the end of Calender 1989.

Dr. Latif noted that we will probably need a special retreat to finish preparation of the documents. The following discussion developed common consensus of the need to protect the Gulf of Aqaba and to prepare an excellent program toward that purpose.

The meeting then adjourned to enable Drs. Latif, Eisawy, Cohen, Gordin, and Abel to meet with Dr. John Blackton, Deputy Assistant Administrator of A.I.D. for Europe and the Middle East.

Dr. Blackton was extremely supportive and encouraging, noting the value of the program toward our objectives in common, i.e. peace in the Middle East. he spoke of his recognition of the progress we have been making with particular reference to interesting the other Arab nations. The discussion ended on a very optimistic note for the future.

jwb

11/29/89

SUGGESTED AGENDA FOR STEERING COMMITTEE MEETING

1. Agenda for meeting at Rockefeller Foundation
2. Aqaba program proposal
 - a. AID Cairo/Amman
 - b. Rockefeller Foundation
3. Agenda for meeting at USAID
 - a. Proposed agenda consideration
 - b. Probable participants
4. Proposal for Phase IV
5. Dr. Wahbeh's schedule
 - a. Washington, D.C.
 - b. Texas A&M University
6. Washington, D.C.
 - a. Itinerary
 - b. Social events
7. Logistics
 - a. hotel reservations
 - b. airline reservations
 - c. per diem
 - d. etc.
8. Finances
 - a. State of budget
 - b. meeting with Galloway
 - c. meeting with AID finance officers
9. Dr. El Sernagawi's projects
10. Seafood Toxin Symposium
- 11/ Miscellaneous
 - a. One page program description
 - b. Ibd Nasser
 - c. Martin Shreibman

PROPOSED AGENDA FOR MEETING AT U.S.A.I.D.

- A. Introductions - AID, Abel
- B. Preamble - our philosophy of the Program - Eisawy, Cohen
- C. Highlights and Achievements of Phase III - El Sayed
- D. Current Progress of Phase III: Amended - El Sayed
- E. The Aqaba Plan - Nancy, Eisawy, Cohen
- F. External, matching funding - Abel
- G. Program Evaluation - USAID, Abel
- H. Audit Procedures and Costs - USAID, Galloway
- I. Methodology of Program Conduct - Abel, El Sayed

COOPERATIVE PROGRAM FOR THE MIDDLE EAST

Report of Visit to the Middle East
In Association With a Congressional Delegation
January 2-15, 1990

-- Robert B. Abel

On January 2nd I departed New York, arriving in Jerusalem on January 3rd where I met the Congressional Delegation led by Representative James A. Scheuer of New York. Mr. Scheuer was accompanied by the Staff Director of the House Subcommittee on Energy and the Environment, Dr. Michael Rodemeyer and Dr. Regina Gorman of the Technical Staff. We were also accompanied by Dr. Charles Lawson, Scientific Attache at the American Embassy, Tel Aviv. We proceeded directly from the airport to Israel's Foreign Office where we met with Israel's Foreign Minister, Moshe Arens.

At Mr. Scheuer's request I offered a rather detailed explanation of our Program to the Foreign Minister who had previously been unacquainted with it. He expressed pleasure at, and admiration for the Program's accomplishments, and assured us of his future support.

On the next morning (January 4) we met the Director of the Israeli Foreign Office, North America Division, Dr. Nevil Landan, who also discussed the Program, inter alia. Dr. Landan was interested in events on the Egyptian side.

We next met with Prime Minister Yitzhac Shamir, who remembered the Program from our previous meeting with Admiral Ben Nun, seven years earlier, although it did not come up for discussion, per se. The next meeting was with Deputy Prime Minister/Finance Minister Peres, who remembered our

previous meeting with Dr. Eisawy in Haifa early last year. (It should be understood that up to this time the Marine Program occupied a minuscule portion of the sessions, which were naturally concerned with Chairman Scheuer's interest and prominent roles in various international affairs, government organization, and family planning.)

The next meeting was with Minister of Energy and Infrastructure, Moshe Shahal, who has supervisory authority over Israel Oceanographic and Limnological Research Ltd. He is very familiar with the Program, but wanted to hear the latest details. He repeated his earlier congratulations and continued support for the Program.

The next meeting was with the Director General of the Ministry of the Environment, Dr. Uri Marinov. There followed intensive discussions of various aspects of environmental protection in the region, with particular emphasis on the clouds of phosphate dust perpetually hovering over the Port of Aqaba in Jordan.

On the next day, January 5th, we departed for Elat where we toured the National Center for Mariculture (IOLR) with its Director, Dr. Hillel Gordin. The principal achievements of the center since our last visit were the addition of another wing for tanks and automation of analyses of tank water. We were also accompanied by Dr. Yuval Cohen, Director General of the IOLR.

Dr. Gordin brought us up to date on the latest experiments with sea bream and mullet. The Israelis are able to grow the bream to market size in a few months. On the day of capture, the bream is brought from the water, frozen, processed by the affiliated kibbutz, and shipped to its French or Italian destination, all within twenty-four hours. Thus, the consumer will be eating fish which is fresh in every sense of the word. The Israelis culture bream mainly for export. Mullet is being developed jointly between the Israelis and Egyptians under the auspices of the Cooperative Program. It is in many ways the "Third World fish" since it proliferates and grows rapidly, has high protein content, and is relatively immune to disease and other problems of rearing.

The next day we met with Mr. Rafi Hochman, Mayor of Elat and Mr. Abdullah Fuad Haffez, Egyptian Consul, at Elat. Mayor Hochman conveyed to Chairman Scheuer his ideas for increased tourist revenue, including for the Jordanians. He explained that dozens of plane loads of Europeans arrive in Elat every week. They generally enjoy Elat, but a large number of them would have liked to have visited Aqaba and Petra. This, of course, is not convenient under the present circumstances, unless they take the trouble to go to Egypt, and then take a ferry to the south part of Aqaba. This, however, is arduous, especially when compared with a five-minute automobile ride theoretically possible from Elat directly to Aqaba. He asked the Congressman to explore with the Jordanians the possibility of a second "Allenby Bridge" at the Elat/Aqaba border to enable easy transit for non-Israelis for purposes of enhancing their vacations. While Israel might lose some revenue, it would be more than made up in the overall attractiveness of the combined package and the friendship aspects of such a move.

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At the present time it is difficult for Israelis to visit Taba, and prohibitions against rental cars practically deny the route to Europeans.

On the next day, January 7th, we departed for Cairo, Egypt. Upon arrival Cairo, we met with Ambassador Frank Wisner for an overview of the situation with particular reference to Congressman Scheuer's interests in government structure and family planning and review of the Cooperative Marine Program. From this point, we were joined by Mr. John Barger, Assistant Political Officer to the Ambassador. Here too, as on previous occasions, discussion of the Cooperative Marine Program was incorporated in Chairman Scheuer's overall agenda of the moment, which also emphasized population growth and bureaucracy in general. He introduced discussion of the Marine Program by asking the Foreign Minister's opinion concerning the possibility of using that Program as the basis upon which to increase regional cooperation generally as an aid to the peace movement. The Foreign Minister concurred, adding the hope that American assistance could be expanded for that purpose. I was then asked to describe the Marine Program in enough detail so that the Foreign Minister and his assistants and colleagues would have an adequate grasp.

This particular meeting was augmented by the merger of two Congressional Delegations, i.e. the House Foreign Affairs Committee, including Representatives Edward Feighan (D-OH) and David E. Skaggs (R-CO). In separate conversations, I agreed to furnish their offices with more detailed information about the Program.

The next meeting was with Deputy Prime Minister Yousef Walli, who is known

as the principal proponent of technical cooperation with Israel. We exchanged views on the merits of both the agriculture and marine programs respectively. The Minister is extremely pleased with the progress made in both of these programs, and expressed the hope that the United States would see fit to expand its assistance in this direction. He is particularly concerned with the aquaculture programs owing to Egypt's stated need for increased food supplies from this important source. At the moment, Egypt projects a need for 300,000 tons of farmed fish per year, an extremely ambitious goal, but which is highly desirable if Egypt is to feed its burgeoning population.

The last meeting on that day was with Dr. A. A. Latif, President of the Egyptian Academy of Scientific Research and Technology. Dr. Latif was one of the original authors of the Marine Program, and has maintained support, encouragement, and sponsorship ever since. It was at this point we learned the disappointing news that Dr. Eisawy had broken his hip just the previous day, and would be unable to participate in any of the functions. Aside from the obvious harm to Dr. Eisawy and his family, this was extremely damaging for purposes of the Delegation's visit since, owing to his extraordinary articulation, the Egyptian marine community pretty much depends on Dr. Eisawy as their spokesman in this Program. That evening, the Congressman and I visited Dr. Eisawy at the hospital, where surgery was scheduled two days hence.

On the next day, we visited Alexandria, stopping first at the National Institute of Oceanography and Fisheries, Alexandria Branch. In addition to

ourselves, the meeting was attended by Dr. Ali Beltagy, the newly appointed Director of the Alexandria Laboratory; Dr. Hussein Badawy, who is scheduled to replace Dr. Eisawy later this month as Director of the National Institute of Oceanography and Fisheries; Dr. Ahmed Ibrahim, Head of the Marine Environment Division; D. A. K. Hamza of that Division; and Dr. Magdi Zaki, Principal Investigator for Egypt's part of the cooperative mariculture project. Following brief discussions of the Eastern Mediterranean Circulation and Lakes Management projects, Dr. Zaki offered a detailed and technical description of the methodology of the mullet culture research.

The last visit was to the Coastal Research Institute where we were met by Drs. A. A. Khafagy, Institute Director, Alfi Fanos, Deputy Director, and Hani El Wani, Co-Principal Investigator on the Shore Processes/Shoreline Planning project. Dr. Khafagy's excellent description of the project in terms of needs and accomplishments was cut short by timing problems, but he was able to convey a useful sense of how far the project has come and what it is about to accomplish. Dr. El Wani went into some detail on the status of development of the computer program which will be used to predict the tenure and efficacy of structures placed in or near the Mediterranean waters.

The following day, January 10th, we arrived in Amman and met immediately with Ambassador Roscoe Suddarth, Deputy Chief of Mission, Patrick Theros, and ECO/COM Officer, Harvey Lee, who would be our contact point for the next several days. The Ambassador reported that although the Crown Prince was out of the country, an intensive series of meetings had been planned for the Congressional Delegation, culminating with King Hussein.

Chairman Scheuer explained the triple purpose of his mission which concerned population growth (Jordan's is the highest in the world), exploration of informal relationships between Israel and Jordan, and the Cooperative Marine Program. The Ambassador had arranged a meeting with the Queen Alia regarding Jordan Social Welfare Fund regarding the first item; he expressed doubts as to the timing for the second; and conveyed a sense of his appreciation of the progress of the Cooperative Marine Program.

With particular reference to the Marine Program, the Ambassador said that the Crown Prince was personally interested, especially owing to the participation of Dr. Dureid Mahasneh, who is a key player in the Jordanian community. Accordingly, he assigned three executive assistants to meet with us to discuss the Program in some detail. These included Drs. Ahmed Mango (Economic Advisor to the Crown Prince); Sawaad Annani, previous Minister and currently Counselor to the Crown Prince; and Dr. Abdullah Toukan, Secretary General of the Higher Council for Science and Technology.

Following Chairman Scheuer's brief descriptions of his perspective of family planning, he inquired as to the possibilities of opening some sort of transit between Eilat and Aqaba for European and American tourists. Jordanian representatives expressed doubts that it could be accomplished directly at this time, i.e. more easily than the Taba-Nuevo route. At the request of Chairman Scheuer, I then described the progress of the Marine Program.

The meeting was foreshortened by a summons to the Royal Court where Chairman Scheuer discussed the same items with King Hussein. The King,

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in turn, offered his vision of the possibilities for useful collaboration with Israel once a condition of peace were attained in the region.

That evening Chairman Scheuer, General Bassam Kakish (Chairman of the Aqaba Regional Planning Authority), Mr. Karim Kabarity (Minister of Tourism) Dr. Dureid Mahasneh (Secretary General, Aqaba Authority) and I debated intensively various ways and means by which Jordan might capitalize on the healthy and rapidly growing tourist trade at Elat.

The next day, Thursday, January 11th commenced the Jordanian weekend. Accordingly, the Delegation departed for Petra. Immediately following the tour, I separated from the party to continue to Aqaba for discussions with the marine scientists. The Congressional Delegation departed Amman for Vienna.

I was met that evening by Dr. Mohammed Wahbeh, Director of the Marine Science Laboratory. We engaged in a detailed discussion of the present status of preparation for the Aqaba Program and probable points of departure thence. On the next morning, Dr. Wahbeh conducted me on an interesting tour of the marine laboratory, including a session aboard their sampling vessel. The Jordanians are in early phases of a small, but highly sophisticated mariculture program, very similar to that of the Israelis in Elat. They are specializing in sea bream for export purposes, and sea bass for both export and internal consumption purposes. Their cage culture project for sea bass is considerably smaller than that of the Israelis, owing to funding shortages, but at least as sophisticated in many ways.

That afternoon, January 12th, I met with Dr. Dureid Mahasneh, Secretary General of the Aqaba Development Authority. We discussed the status of the Cooperative Marine Program, and its possible futures. I related that I had clear instructions from our Embassy to work closely with him, and that he is considered our principal contact for matters relating to marine science, technology, and development. In view of our past relationship, this was, of course, most welcome and entirely reasonable. Further, I noted that Ambassador Suddarth had related to me his intention to make available a sum of \$40,000 to enable the Jordanians to develop a workable marine technology plan, under which they could enter the Program from both A.I.D. and private foundation aspects. I agreed to Dr. Mahasneh's request to collaborate with him in developing the outline for the plan.

Dr. Mahasneh expressed some misgivings concerning the nature of our plans in that he felt that they were too scientific research oriented, at the expense of applied technology, advanced development, and socioeconomic aspects which would be in Jordan's best interests as a means of producing revenue and more effective utilization of its coastline. I agreed to orient the plan outline to a degree in favor of those properties.

Dr. Mahasneh offered a detailed description of the Jordanian government organization insofar as our Program would be concerned. It is a fairly centralized government, in which everyone ultimately reports, of course, to King Hussein. Generally speaking, Crown Prince Hassan seems to have ultimate authority in matters relating to science and technology. The Royal Scientific Society appears to be a combination of the American National

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Academy of Sciences and the Cabinet Departments in that, in addition to exercising the functions of the Council, it controls many research laboratories and monitoring facilities, rather more like the Egyptian Academy.

The Higher Council for Science and Technology is formed for the purpose of advising the King and Crown Prince in matters relating to science and technology and their roles in advancing the country's economy. It is the principal advisor to the Court and appears to overlap the functions of the American Council for Science and Technology Policy and the President's Science Advisory Committee.

Dr. Mahasneh, himself, is the Secretary General of the Aqaba Development Authority, which appears to encompass approximately 12% of the Jordanian acreage, and, of course, all of its coastline. The Aqaba Development Authority, in turn, reports to the Prime Minister. The Aqaba Marine Station itself is a jointly-operated facility of the Universities of Jordan and Yarmouk. They, in turn, report to the Ministry of Higher Education. Accordingly, it is necessary for purposes of our program, that several ministries be apprized of our major activities and future plans.

Dr. Mahasneh strongly recommended that I visit the Royal Scientific Society to meet, if possible, with Drs. Ramadan and Bino and to return to the Higher Council for Science and Technology to continue the conversation with Dr. Toukan, if only to pay a courtesy call. While it was entirely probable that these meetings might last only a few minutes, at least, in Dr. Mahasneh's view, they would serve to acquaint them with the fact that there is, in fact, an Aqaba Program in the planning process.

The following morning, January 13th, Dr. Mahasneh and I returned to Amman. I proceeded directly to Ambassador Suddarth's home for a meeting with the Ambassador, Harvey Lee, Ludwig Tennari (a member of the Board of Harvard's Middle East Institute) and Dr. Leonard Hausman, who had recently arrived in Amman and had requested the meeting. Unfortunately, Dr. Hausman was an hour late and had to leave almost immediately for Cairo; accordingly, discussion was limited to about 15 minutes.

In that time, however, Dr. Hausman conveyed the information that the Rockefeller Foundation had decided against supporting the Aqaba Program in its presently conceived form. Rather, the Foundation was more interested in supporting projects relating to derivation of public policy, i.e. the kind of work that Harvard's Middle Institute (Dr. Hausman himself) is engaged in. Hausman's ensuing discussion was too short to enable us to determine what this meant, and he departed thence, to the airport. In the discussion that took place in the Ambassador's home following Dr. Hausman's departure, it was the general consensus that although it was impossible to interpret precisely either the Rockefeller Foundation letter or Dr. Hausman's description of it, it was generally felt that Dr. Hausman has worked out an independent agreement with the Rockefeller Foundation. A copy of the Rockefeller Foundation letter is attached as Enclosure 1 to this report. In any case, the Foundation's interests appear allied to advanced development with particular reference to socio-economic aspects.

Following Dr. Mahasneh's recommendation, I made appointments to meet with Drs. Ramadan and Bino at the Royal Scientific Society and to return to Dr.

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Toukan's office to continue the previous discussion. Accordingly, following departure from Ambassador Suddarth's home, I visited Drs. Mourad Jabay Bino, Director of the Scientific Society's Environmental Research Center and Subhi A. Ramadan, Director of the Water and Soil Division. The visit, intended as a courtesy call, developed into a fascinating discussion of ways and means which lasted almost the entire afternoon. The extremely broad capabilities and interests of the Royal Scientific Society are described in Enclosure II. Following departure from the Society, I met again with Dr. Mahasneh to develop the framework of the plan on which we had worked independently during the preceding hours. It is attached as Enclosure III.

Dr. Mahasneh pointed out that the Rockefeller letter corresponded closely to suggestions he had offered during our previous meeting and reconfirmed his expressed doubts concerning the track on which the Aqaba Plan appears to be embarked. He feels that there is opportunity to develop a two-part program in which the scientific program sponsored by A.I.D. will complement the structural cooperation plan envisioned by the Rockefeller Foundation. I related the nature of my conversation with Drs. Ramadan and Bino, with which he expressed satisfaction.

On the following morning, January 14th, I revisited the Higher Council for Science and Technology and met again with Dr. Abdullah Toukan, Secretary General of the Council. Dr. Toukan had replaced Dr. Adnon Badran, with whom I had met previously and who had been appointed successively Minister of Agriculture, and then Deputy Secretary General of UNESCO, in Paris. (My

personal impression is that owing to Dr. Badran's enormous intellect, personality, and understanding of people and groups, his appointment will prove highly beneficial for UNESCO.)

Dr. Toucan was joined by Dr. Khaled El Shuraydeh, Director of Health and Environmental Sciences, who was directly assigned as our future contact. He was also joined by Dr. Fawwaz El Karami, Director of the Energy Technology Sector of the Council. Although the meeting had originally had been scheduled as a courtesy call, it turned out that we spent most of the day at the Council. Our interactions and discussions will be reported separately.

Following the meeting at the Higher Council, I had final debriefing sessions with Harvey Lee, and (by telephone) Dr. Mahasneh who had returned to Aqaba.

I departed the next morning for the United States.

1/22/90

jwb

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PROPOSED GUEST LIST

Total: 30

DINNER IN HONOR OF CODEL SCHEUER

DATE: Wednesday, January 10, 1990

TIME: 8:30

PLACE: Ambassador's Residence

HOST: Ambassador and Mrs. Roscoe S. Suddarth

-
- 1. Congressman James Scheuer
 - 2. Ms. Laura Scheuer
 - 3. Mr. Michael Rodemeyer, Staff Aide
 - 4. Ms. Regina Gorman, Staff Aide
 - 5. Dr. Robert Abel, President New Jersey Marine Sciences Consortium
 - 6. ~~Dr. Leonard Hausman, Director Center for Middle East Studies, Harvard University~~
-
- 1. A General and Mrs. Bassam Kakish, Chairman Aqaba Regional Planning Authority
 - 2. A Dr. and Mrs. Dureid Mahasneh, Secretary General Aqaba Regional Planning Authority
 - 3. A H.E. and Mrs. Abdul Karim Kabarity, Minister of Tourism and Antiquities (Kabarity is the Member of Parliament from the Maan-Aqaba District) *and she's a gorgeous American!*
 - 4. A Mr. and Mrs. Nasri Atullah, Director General, Ministry of Tourism and Antiquities
 - 5. A Dr. and Mrs. Abdul Salam Al-Majali, Director National Medical Institute
 - 6. A Mr. and Mrs. Faris Napulsi, Member of Parliament
 - 7. A Senator and Mrs. Kamel As Shair
 - 8. A Dr. and Mrs. Mohammed Al-Akil, Secretary General Queen Alia Fund
 - 9. A *Dr. and Mrs. Ahmed Mungo, Economic Advisor to Crown Prince*

From: R. B. Abel
To: Steering Committee, Cooptive Team
Subj: Trip Report - forwarding of

Enclose
Trip Report
not the Jordan Supplement.

The enclosed report of my trip (Jan 2-15) is enclosed herewith, in draft. Following review at the respective embassies, it will be edited and resubmitted.

Please advise ~~when~~ when you believe we should meet again. More discussion is needed on the:

- a) Agoba Program - for which the ground rules have changed somewhat
- b) Phase IV for which Dr. El Sayes is still missing some component
- c) Finances, which to my ~~do~~ surprise and distress, did not get settled in Washington.

Please accept my personal apologies for whatever part of (a-c) is my fault. There's nothing wrong that can't easily be corrected, once we've identified the problems.

COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

Meeting of Steering Committee, Washington, D.C. May 21-25, 1990

EXECUTIVE SUMMARY

Preliminaries:

Subject meeting was convened by the Program Manager, Robert B. Abel, at 9:00 am, May 21, 1990 in the State Plaza Hotel, Washington, D.C. Participants included: Drs. A. M. Eisawy and A. I. El Ibyary (Cairo, Egypt); Drs. Yuval Cohen and Hillel Gordin (Israel); and Dr. S. Z. El Sayed (USA). Visitors on the first day included Dr. Mohammed Al Orabi (Egyptian Embassy, Washington); and Dr. Meier Yogev (Israeli Embassy, Washington). Copies of the week's schedule and the meeting agenda are attached as Enclosure 1 to this report. The agenda was accepted unanimously, without change.

Dr. Eisawy has achieved an agreement with the Saudi Arabian Government similar to that obtained with the Jordanians last year.

The USAID representative (Mr. Eugene Westlake), upon reviewing the difficulties encountered by Dr. Eisawy in conforming to a 30-day operating fund restriction, agreed to extend the limitation to 90 days. They also advised that the letter-of-credit permitted retroactive draw.

Drs. Leonard Hausman and Peter Rogers, representing Harvard University stated that:

AB

1. The Rockefeller's contribution to the Aqaba Program wouldn't be much more than \$100,000, mainly for socioeconomic studies;
2. A Japanese Foundation is interested;
3. Harvard is very much interested in joining the Program. The Committee's consensus was that Harvard's participation risked loss of control for too little material advantage. Dr. Eisawy summed up for the Committee:

Dr. Eisawy proceeded further to describe the Gulf of Aqaba aspirations of the Steering Committee. There are many needs besides merely planning; further basic studies are necessary. Economists assist us in planning, but we are, after all, the marine scientists. Because of our positions in our respective countries, we are able to recruit to the Program the right people to do the necessary work. The Committee's original expectation of a large sum from the Rockefeller Foundation, perhaps \$1,000,000, looked extremely attractive, and governed the manner in which we conducted our planning. A level of \$100,000 offers us no hope for development of our plans.

The Committee met with the following representatives of USAID:

1. Mr. Eugene Westlake (Finance Department);
2. Mr. Leland Voth (Agriculture Bureau);
3. Mr. Bert Porter (Bureau of Europe and Near East Affairs);
4. Mr. Tom Stevens (Contracts Branch).

Dr. Eisawy offered the USAID representatives his views of the overall Program and of the Aqaba enterprise in particular. He summarized his views of the current status of the Program. He and Dr. Cohen had entered the Program together three years ago. The aim of the Program is not yet fulfilled. Their success in no way equates to the amount of dollars available. The Program has had enormous impact. It has changed procedures. It has strongly altered the social life among the participating scientists and their affiliates. The effects on other organizations and scientists has been dramatic, in that large numbers of scientists from other institutions who had previously avoided participation are now clamoring for participation. More than 50 scientists from other Egyptian institutions are currently trying to join this Program.

Accordingly, the problems have inverted in a curious way. Since more and more scientists want to join the Program, and particularly to visit Israel, we are now as hampered by lack of these kinds of funds as formerly we were hampered by the lack of the best scientists to utilize them!

These circumstances have resulted in the opportunity given the Steering Committee to amalgamate the very best projects into an optimal proposal. The Steering Committee has filtered a large number of them following careful examination. We are now in position to expand the scope of the Program to include other countries, and strongly desire to do so. The Aqaba Program offers us the opportunity to do things that no other organizations in the world seem able to do in this area. At the same time, we deem it very necessary to maintain our original Mediterranean Program.

The current questions are very complicated, e.g. how to bring the Jordanians and Saudis into the partnership. The scientists badly desire contact with one another. This circumstance was chiefly responsible for Dr. Eisawy's ability to start the Aqaba Program, culminating in the famous document signed on May 15, 1989, at Aqaba. This document represented the meeting of the minds of extremely high ranking individuals in both countries, including a Senior Cabinet Minister in Jordan and the Presidents of the two most prominent Jordanian universities.

That achievement now enabled him to achieve similar success in Saudi Arabia, where he achieved another signed agreement last January. The Saudis have signed this document indicating total cooperation in all aspects of the Program, understanding completely that the Israelis are operating actively on the other end of the Program. Dr. Eisawy explained the document in detail, and gave copies to Mr. Porter and the other USAID representatives.

Mr. Porter offered a comprehensive treatment of the USAID perspective:

1. AID faces a large number of competing proposals;
2. We should emphasize new faces and groups;
3. Aqaba represents a special case in that it will need examination by many AID branches;
4. Agriculture has and has always had, priority in AID;
5. Phase IV and Aqaba should be submitted separately;
6. Our Program is highly unusual.

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The Committee feels it necessary to intensify its fund raising efforts. They agreed to organize the Aqaba proposal around Oceanography (including hazard effect modelling) mariculture, coral reef protection, and socio-economics. Principal investigators must be identified in each country, sent the project outlines, and asked to complete their proposal-components for steering committee amalgamation in September.

The Seafood Toxin Symposium presents many problems. The Egyptian Academy has assumed major funding role. The Israelis are nearly excluded. Abel recommends AID withdrawal.

The Phase IV proposal should be complete and submitted in June.

The next meeting will be held in Haifa and Cairo during the first week in September. The Steering Committee meeting will be augmented by workshops on, e.g. Lakes Management, Mariculture, and/or Eastern Mediterranean Circulation.

The Steering Committee met at NOAA to consider cooperation with the agency. This was followed by a special invited tour of the Smithsonian fish exhibit.

6/12/90

jwb

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COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

Meeting of Steering Committee, Washington, D.C.

May 21-25, 1990

Preliminaries:

Subject meeting was convened by the Program Manager, Robert B. Abel, at 9:00 am, May 21, 1990 in the State Plaza Hotel, Washington, D.C. Participants included: Drs. A. M. Eisawy and A. I. El Ibyary (Cairo, Egypt); Drs. Yuval Cohen and Hillel Gordin (Israel); and Dr. S. Z. El Sayed (USA). Visitors on the first day included Dr. Mohammed Al Orabi (Egyptian Embassy, Washington); and Dr. Meier Yogev (Israeli Embassy, Washington). A copies of the week's schedule and the meeting agenda are attached as Enclosure 1 to this report. The agenda was accepted unanimously, without change.

Dr. Eisawy opened the meeting by discussing his recent (last January) agreement with the Saudis. He distributed copies of the agreement, which had been translated from the Arabic by Dr. Mancy. In essence, the document represents an extension of the parallel bilateral program to the Saudis, with the Egyptians as the vertex of the triangle with the Israelis. Dr. Eisawy stated that the Saudis intend to contribute 2,000,000 rials (the equivalent of \$600,000) to the Program, which also includes personnel and ship sharing. Further discussion was deferred to a later point in the agenda.

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Pending arrival of Dr. Pohland from the Food and Drug Administration on Thursday, the meeting participants decided to try clarify some of the issues in the Seafood Toxin project, with particular reference to the International Seminar. Dr. Cohen noted that Dr. Khayria Naguib has never responded to Dr. Krungalz' letters. Dr. Eisawy responded that, as of a month ago the Conference is supported mainly by the Egyptian Academy of Scientific Research and Technology, rather than USAID. Dr. A. A. Latif, President of the Academy, has apparently agreed to contribute \$50,000 to the operation of the conference, thus allowing reduction of A.I.D. support to about \$10,000. Accordingly, the Egyptians want to reduce the A.I.D. budgeted amount for the conference from \$60,000 to \$10,000, thus releasing \$50,000 for equipment for the project.

The conversation revealed further that Dr. Krungalz has not been invited to share a session or to submit a paper of his choice; rather a paper title has been assigned to him, not in his field. On the other hand, Dr. Eisawy noted that Dr. Naguib is ready to send her students to Israel for a workshop on the project. It was agreed to defer further conversation until Dr. Pohland's arrival.

Finances:

Dr. Eisawy introduced the subject of finance for the Program. He has recently incurred nearly \$100,000 in purchase debt, particularly for the

Waste Water Reuse Project. Accordingly, he has financial obligations which cannot be handled by the operational funds available to him. He further described the other immediate financial needs of the projects under Phase III and Phase III Amended. (Editors note: a detailed discussion of the Egyptian finances and current needs is included as a separate appendix to this report for Dr. Eisawy. It will also include discussions during his follow-up visit to the Consortium on May 29th.) Abel acknowledged the immediacy of the need, noting that he had no prior knowledge of those particular purchases. Dr. El Ibyary produced the documentation relating to the purchases, which were accepted by Abel.

Rockefeller Foundation and Harvard:

The participants were joined by Drs. Peter Rogers and Leonard Hausman from Harvard University's Institute of Applied Science and Institute for Political and Economic Studies of the Middle East, respectively. Their purpose was to explore with the Steering Committee the possibility of close cooperation in order to attract funds from private foundations for the Program. They stated that Deans Putnam (School of Government), Perkins, and Schelling (Harvard Institute for International Development) had arrived at a point of agreement where Harvard would be able to offer specific plans for such cooperation.

In response to the Steering Committee's question, Hausman stated that it was 90% sure that Peter Goldmark, President of the Rockefeller Foundation, would approve a project for at least \$100,000, and we probably could ask as

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much as \$250,000. In answer to the Steering Committee's next question, he stated the purpose of the project would be to facilitate a process ultimately enabling the countries bordering the Gulf of Aqaba to fund their own research.

Hausman further related that during his recent visit to London, he obtained a commitment to examine the Program from Dr. Takahashi, Head of the Sasakawa Foundation. This foundation is interested in global issues such as global warming. It is also interested in issues relating to economic growth and environmental protection, with particular reference to the Middle East. Dr. Takahashi is apparently quite serious, which could be important because the Foundation's assets approach \$400,000,000. Apparently, the Foundation would like involvement in the Middle East, including Japanese scientists as well.

Dr. Hausman stated that Dr. Takahashi would like a proposal by June 15th, for funding by April 1st., 1991. There might be even greater possibilities ahead, with, for instance, some smaller funding available on a short-term basis.

Dr. Hausman also indicated that the new President of the Pew Memorial Trust is a personal friend of his, who would also probably be interested in funding the Program. He noted that he had previously met at A.I.D. that morning with Richard Stone, the previous Senator from Florida.

There ensued an intensive discussion of the interrelationships with

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U.S.A.I.D. Dr. Cohen noted that the Aqaba Plan has proved very successful so far, particularly in achieving regional cooperation. He praised the uniqueness of the arrangement which Dr. Eisawy had brought about. Drs. Rogers and Hausman indicated the interest of Harvard professors and their desire to help, particularly in the relationship with A.I.D. He mentioned the possible collaboration of Dr. Ralph Mitchell, who has done previous work in the Gulf of Elat with the Israelis.

In response to several questions from the Steering Committee, indicating confusion concerning the Rockefeller Foundation interests, Dr. Hausman stated that the Foundation is primarily interested in the economics, rather than the technology, of environmental protection. The Foundation is not interested in supporting science. They would entertain a paper on how coordination might devolve in the area, as well as possibly financing blue-prints for discussion by authorized people. Apparently, the President, Peter Goldmark, is establishing an Environmental Fund and an institute on non-governmental relations, which could be affected by our plans.

The ensuing discussion, primarily led by Dr. Cohen, reflected the Committee's lack of understanding of Rockefeller's intentions. Hausman agreed that the committee is certainly at liberty to attempt any approach to the Rockefeller Foundation; all he was trying to do is guide them from his own previous contact. Gordon opined, clarifying the intent of the steering committee, that our project ought to be aimed at developing environmental monitoring procedures. He added that El Sayed, Abel and Mancy had prepared a preliminary outline, or framework of needs, to be developed on the Aqaba

proposal. Accordingly, parts of the proposal are already in place. He had personally written the framework for mariculture for all of the countries.

Before we can attempt the economic sector of the proposal, we have to know what material is available and what is needed. Rogers replied that it is necessary to approach this challenge in a simultaneous rather than a consecutive manner. In other words, the scientific and economic models must be developed at the same time, rather than one succeeding the other.

El Sayed, noting the lack of money available from Rockefeller for science, (contrary to the Steering Committee's original expectations), reminded Hausman that Mr. Goldmark had also offered to help with other foundations. Hausman responded that Mr. Goldmark is confined by his knowledge, and since his flexibility has certain limitations, after all, there must eventually be compromises. He replied negatively to El Sayed's question as to whether Rockefeller might provide funds for a socioeconomic workshop. It was mentioned that Abel had been working with Professor Theodoro Panayotou of Harvard on the framework for the socioeconomic project.

In response to Cohen's question, Hausman tried to forecast the nature of Harvard's cooperation in the Program referring to Professors Panayotou (Deputy Director of Harvard's Institute for International Development) and Rogers (in the Applied Science Institute). Rogers noted that he had originally worked partly in the Kennedy School prior to merging his work into the Applied Science Institute; accordingly, he was familiar with both sides.

Dr. Eisawy summarized the conversation by noting that we are already dealing with several American Universities; he could not discern any particular advantage in adding to this inventory. The principal question concerning all of us is how to get more total dollars into the Program. Certainly \$100,000 from the Rockefeller Foundation for the single project would be nowhere near enough even for that project considering the number of participants in Regional Cooperation. If the Harvard representatives want to share in the Program, then considerably more support would be necessary.

Dr. Eisawy proceeded further to describe the Gulf of Aqaba aspirations of the Steering Committee. There are many needs besides merely planning; further basic studies are necessary. Economists can assist us in planning, but we are, after all, the marine scientists. Because of our positions in our respective countries, we are able to recruit to the Program the right people to do the necessary work. The Committee's original expectation of a large sum from the Rockefeller Foundation, perhaps \$1,000,000, looked extremely attractive, and governed the manner in which we conducted our planning. A level of \$100,000 offers us no hope for development of our plans.

Dr. Cohen expressed his complete agreement with Dr. Eisawy's summary. Harvard is an excellent group with an unsurpassed reputation. For instance, Dr. Alan Robinson operates at the top level of his science. In view of these recent developments, however, it is necessary for the

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Steering Committee to rethink its goals, how to achieve them, what help we need, and how, if at all, Harvard can be concerned in our future planning. Possibly we can benefit from Harvard's cooperation, but we certainly have to reconsider the entire situation. Probably we would need another meeting with Goldmark if possible. In response to Hausman's interpretation as to what Goldmark would fund, Cohen cited Ambassador Brown's recent observation that the last things that are needed are more environmental funds!

Abel summarized the series of dialogues in explaining that in a tactical sense, the meeting with the Harvard representatives was slightly premature. He apologized for that necessity, noting that this was the only day Hausman was able to attend. Harvard was evaluating us one day too early in the sense that we had not had opportunity to discuss the Aqaba Plan framework and to develop our strategy and tactics therefrom. On the other hand, we need to evaluate Harvard in terms of: (1) Rockefeller Foundation support; (2) the type of assistance and leverage we might expect from Harvard in approaching other foundations; and (3) the possibility of reducing administrative costs. In other words, each of us needs a document from the other.

Abel reminded Hausman that last July he had submitted a bill of particulars to him outlining what he felt would be the requirements for a cooperative arrangement with Harvard, and although Dr. Hausman had agreed in principal verbally, responsive literature had not yet been forthcoming. Accordingly, Harvard needs a firmer outline of the Steering Committee's aspirations and operational plans; the committee, in turn, needs some sort of prospectus

from Harvard proposing specific terms of cooperation with the Steering Committee.

Rogers replied that Harvard is extremely enthusiastic, even at the highest levels. They are still evaluating ways and means. They all appear to like the idea. Harvard indeed can bring something substantial to this party.

Following departure of Drs. Hausman and Rogers, the committee entered into intensive discussion as to how to respond to Harvard's offers. Abel reiterated the pros and cons, as related above.

Cohen responded that sometimes we have to compromise. He noted, however, that:

1. Harvard is very complicated, and we have already made commitments to some outstanding scientists, such as Tom Bright of Texas A & M, for cooperation in the Gulf of Aqaba Program. The Princeton participation under George Mellor is working very well, and Mellor can contribute heavily to the Program. He and Alan Robinson at Harvard, however, are not on the closest of terms.
2. Cohen definitely wants Mellor's participation in the Gulf of Aqaba Program. Harvard University is state-of-the-art technology; we are certainly not at that level ourselves. Alan Robinson's technology is world class; the question is whether it can be translated to our needs and aspirations, which Mellor has already demonstrated his capability of doing.
3. Harvard professors have absolutely no obligation to abide by our

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rules; this suggests a very grave concern of whether the steering committee would have any control whatever over Harvard's participation given the Committee's unusual -- perhaps unique -- ability to control its affairs, we had to consider very carefully the possibility of yielding autonomy.

4. Hausman has already indicated a pronounced predilection for public relations and publicity in general; as the Steering Committee well knows, we have eschewed this in the past, and have maintained our Program in very low profile.

Dr. El Sayed expressed his agreement with all of Dr. Cohen's points.

Gordin, agreeing, stated he is very leery about Harvard. While they could obviously lend great technological strength to the Program, it might be accompanied by a change in the Program's appearance, to a Harvard enterprise. Cohen added that Harvard would have no reason to care about the various communications problems that the Steering Committee has been so careful to handle in a sensitive manner.

El Sayed opined that while we could accept individual projects from Harvard, at this stage it is unlikely that we would benefit from their full-scale participation. Cohen related that a lot more American scientists are interested in the POEM Project (Physical Oceanography of the Eastern Mediterranean) but the National Science Foundation won't accept enlarged participation.

Eisawy expressed the Committee's consensus, noting that Harvard's contribution would be extremely small in return for the rewards that they would

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reap from the Program; alternatively, we would receive little reward for a large contribution to the cooperation.

Abel and El Sayed agreed that it would be important to advise A.I.D. as soon and comprehensively as possible concerning our plans for the Aqaba Program. In response to Abel's question of whether we should submit our socioeconomic component to the Rockefeller Foundation, Gordin suggested that we probably can't lose in the process. Cohen suggested that the socioeconomic framework as developed by Abel represented an oceanographer's viewpoint, rather than that of a socioeconomic, and it should be submitted to a team of economists selected from each country. Each should be asked for his input, and we have to clarify what we have been talking about.

U.S.A.I.D. Participation:

Following intensive discussion, we agreed that our discussion with U.S.A.I.D. representatives on the following day would include the following components:

1. An overview of the present program, by El Sayed;
2. A discussion of the pioneering efforts in the other Arab countries by Dr. Eisawy;
3. The severe limitations of the current A-110 regulations respecting allowance of operating funds outside the continental limits of the United States.
4. The question of the forthcoming letter of credit being retroactive,

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specifically honoring costs incurred by the participants going back to last January.

The meeting adjourned to permit Mrs. Carlyn Ring to host the group, (which now included Mrs. Celia Von Oesen, Chief Financial Officer of the New Jersey Marine Sciences Consortium) at dinner that evening.

On the following day, Tuesday, May 22nd, the Steering Committee was joined by several representatives of U.S.A.I.D., including Messrs. Eugene Westlake (Finance Department), Leland Voth (Agriculture Bureau), Bert Porter (Bureau of Europe and Near East Affairs), and Tom Stevens (Contracts Branch).

El Sayed described the annual report for the period 1988-89 which had been submitted to U.S.A.I.D. in March. He mentioned briefly the results obtained from the various projects, principally as outlined in the Executive Summary preceding the document. Abel had contributed the Foreword and Management chapter.

Sayed then outlined the contents of the proposal for Phase IV in its current stage, concentrating mainly on living resources and development of carotenes (biomedicinals) from marine organisms. He emphasized that this proposal involved considerable participation from organizations and personnel new to the Program.

Porter responded that it might be useful to offer priorities, i.e. relative importance of the projects to the Steering Committee. Inasmuch as it would

be unlikely for there to be more than \$1,000,000 available for the Program, A.I.D. would welcome the guidance of the Steering Committee in the selection process. He added that it would be useful to identify the new people just now being introduced to the Regional Cooperation Program, with particular emphasis on students. He reminded the group that students and their participation outside of their own countries required special treatment and special forms. He further emphasized that the proposal should refer -- and be handled -- as a follow-on, rather than additional, to Phase III Amended, because there would be no funds for overlapping activities. Following some discussion, there appeared to be unanimous understanding of, and approbation for, Mr. Porter's suggestions.

Operating Fund Limitations:

Abel introduced the severe problem of limitation on operating funds. According to current regulations, grantees outside the country are permitted to hold locally no more than 30 days' operating funds. This fails to take into consideration Dr. Eisawy's special problems of dealing with contractors and officials in seven different projects and in relating to counterparts in three different countries. The current limitation imposed severe limitations on his ability to negotiate, plan, and generally operate his Program.

Eisawy added that under Egypt's local rules, contractors must have the money on hand, the tender must be immediately available. He has to pay for considerable equipment purchases, but currently does not have the funds.

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Right now he is facing a \$100,000 request for equipment which has been purchased locally. The problem is that when they buy equipment locally, they have to pay immediately.

There are different rules in Egypt. If the money takes three days to process from American to Egyptian banks, another 21 days is required for the Egyptian bank to convert into the appropriate account! Whereas the running cost for salaries stays approximately stable each month, enormous differences are encountered in construction and contracting. Abel added that appearance is extremely important in these cases, and that psychologically, it is almost impossible for Dr. Eisawy to continue with the type of unique and advanced planning that has characterized his recent achievements.

Eisawy added that among seven projects he has sustained simultaneous and serious expenses. The Comptroller must allow up to 90 days available funds for him to be able to maneuver.

Mr. Westlake responded that as Chief of the Letter-of-Credit Branch of A.I.D., he was not specifically authorizing a 120 operational fund limitation; however, he would be willing to entertain issues and rebuttal arguments from participants. He wants to be informed on all relevant issues, including whether the money is drawing interest.

Eisawy replied that the interest, when it becomes "interest" must be returned to the United States; everyone understood that. However, there

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had been considerable discussion on the subject of use of interest. The bank apparently had made a mistake, and is now maintaining the principle that under Egyptian law, such accounts bear no interest; accordingly, the bank is, in effect, able to use the money for its own purposes.

Porter interjected that the fundamental principle was, who was getting the money? Westlake stated that the law requiring its return to the Treasury of the United States only applies to the United States banks. Accordingly, the United States would have no hold on the Egyptian banks, if, in fact, they are conforming to national law. Westlake further indicated that he will have no problems with extension of the thirty day limitation, especially now knowing that the Egyptian banks require so much time to convert incoming funds to the usable accounts. It is necessary that we adjust our needs as we go along, and explain the need for this adjustment to our auditors. In the long run, we should be able to achieve financial harmony, in effect.

In response to the Steering Committee's question, Stevens and Westlake mentioned that the Letter-of-Credit had been approved and was currently in process. Everything is now automatic, and it should be received by the Consortium within two to three weeks. This would include the processing time in the U.S. Treasury of about ten days. (Editor's note: It was received on June 8.)

Stevens added that if we are able to look three months ahead, we should transmit estimated needs to A.I.D. immediately. Westlake added that

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Treasury refers to this as the "flow."

Westlake responded to Porter's specific question, he will, in fact, authorize a 90-day allowance for operational funds; he will supplement the letter that he had just passed to Mrs. Von Oesen. He stated that "A 90-day limitation does not bother me."

Retroactivity of the Letter-of-Credit:

The next question, raised by the Israelis, concerned the retroactivity of the Letter-of-Credit. Stevens responded to Cohen's question that all of the participants would be able to draw upon the Letter-of-Credit back to last January's costs. This is not a general rule, however; we happen to be saved by the current circumstance that the Letter-of-Credit relates to an amendment to a previous grant. Were this a new grant, it probably would not be retroactive, thus disallowing all the costs incurred since exhaustion of the previous Letter-of-Credit.

Porter explained why the shift in the Consortium's cycle to March would obviate a lot of the problems that had been caused by the September cycle. Rather than having to depend on left over monies from the previous year, which these days is highly problematical and risky, and then having to wait until new appropriated funds could be available in the following year, it would be assumed that all those actions would have taken place effectively by March of the following year, coinciding with the new cycle. Therefore, the Consortium should experience no further difficulties in obtaining these

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funds and the new Letters-of-Credit.

Porter and Stevens reiterated the necessity for the Consortium to submit its request for an A-110 correction to them immediately. It is not included in the current Letter-of-Credit; accordingly, the funds to repay the Consortium for its extraordinary expense in contracting for the extra auditing depended on an early receipt of the letter. Otherwise, the Consortium would simply have to wait until the following fiscal year. Stevens added that they are somewhat concerned over the indirect cost aspects, and might suggest some cost sharing on the part of the Consortium. Abel responded that the Consortium had absolutely no intention of requesting the full amount of authorized indirect costs and would be delighted to oblige, by cost sharing, i.e. absorbing some of these costs. Porter summarized by stating the need to arrive at the proper formula as quickly as possible in order to obtain current fiscal year money.

In response to Eisawy's question, Porter and Stevens explained the apparently large increment in the grant letter -- that it was simply cumulative, as an amendment to the previous Letter-of-Credit, rather than representing a much larger amount in the current Letter-of-Credit that we had expected.

Commemorative Book:

At Abel's request, El Ibyary outlined his ideas for a special report, designed and prepared by the Steering Committee as a book. This report would describe the history and development of the Cooperative Marine Tech-

nology Program for the Middle East. It would be printed in Arabic for distribution in Egypt, in Hebrew for distribution in Israel, and in English for distribution among the other countries. Porter responded that the idea would be of interest to many people. In all likelihood it would be enjoyed within A.I.D., and that if the Steering Committee needed to use A.I.D. funds under the current grant, that A.I.D. would certainly welcome a request to that purpose. However, he advised the Steering Committee against using the report as a public relations document in the United States. While such material is apparently quite appropriate and allowable overseas; A.I.D. is precluded from utilizing these projects as public relations apparatus domestically.

Dr. Eisawy's View of the General Program and the Aqaba Program:

Eisawy then summarized his views of the current status of the Program. He and Cohen had entered the Program together three years ago. The aim of the Program is not yet fulfilled. Their success in no way equates to the amount of dollars available. The Program has had enormous impact. It has changed procedures. It has strongly altered the social life among the participating scientists and their affiliates. The effects on other organizations and scientists has been dramatic in that large numbers of scientists from other institutions who had previously avoided participation are now clamoring for participation. More than 50 scientists from other Egyptian institutions are currently trying to join this Program.

Accordingly, the problems have inverted in a curious way. Since more and

more scientists want to join the Program, and particularly to visit Israel, we are now as hampered by lack of these kinds of funds as formerly we were hampered by the lack of the best scientists to utilize them!

These circumstances have resulted in the opportunity given the Steering Committee to amalgamate the very best projects into an optimal proposal. The Steering Committee has filtered a large number of them following careful examination. We are now in position to expand the scope of the Program to include other countries, and strongly desire to do so. The Aqaba Program offers us the opportunity to do things that no other organizations in the world seem able to do in this area. At the same time, we deem it very necessary to maintain our original Mediterranean Program.

The current questions are very complicated, e.g. how to bring the Jordanians and Saudis into the partnership. The scientists badly desire contact with one another. This circumstance was chiefly responsible for Dr. Eisawy's ability to start the Aqaba Program, culminating in the famous document signed on May 15, 1989, at Aqaba. This document represented the meeting of the minds of extremely high ranking individuals in both countries, including a Senior Cabinet Minister in Jordan and the Presidents of the two most prominent Jordanian universities.

That achievement has now enabled him to achieve similar success in Saudi Arabia, where he achieved another signed agreement last January. The Saudis have signed this document indicating total cooperation in all aspects of the Program, understanding completely that the Israelis are

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operating actively on the other end of the Program. Dr. Eisawy explained the document in detail, and gave copies to Porter and the other A.I.D. representatives.

Abel then added a description of the origin of the Aqaba Plan and described his interactions with Jordanian officials.

Porter responded that A.I.D./Jordan is about to start an environmental program. The Program also clearly affects Egypt and could utilize the U.S./Egypt bilateral Program. Regional cooperation is limited to whomever co-signs documents, and unless the Jordanians would co-sign a document with the Israelis, the Regional Cooperation Program would be unable to fund them. It is necessary for us to proceed carefully, because the opportunities we are presenting are fantastic.

A Ship for the Egyptians:

The discussion then veered to the ship that the Americans are trying to make available to the Egyptians. Porter advised that it is necessary to identify clearly the sources of the operating funds for this ship. This is rather critical in that the Egyptians have to know where how their operation and maintenance costs are going to be borne. It is necessary to live up to the various documents of transfer. Abel responded as to how the ship would be used in the Eastern Mediterranean Circulation Project in Phase III Amended, and the Trophodynamics Project in Phase IV. El Ibyary indicated his understanding of these requirements and assured the A.I.D.

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representatives of his and Eisawy's intent to discuss the operating costs thoroughly in Cairo, particularly with Dr. Latif.

A.I.D. Support:

There then ensued an intense discussion of ways and means of support for the Aqaba Plan. In response to Sayed's original question, Porter responded that it is very difficult to assess how much money and what kind of money might be currently available. He agreed with Sayed that the Aqaba Plan must in no way intrude on the funding for the regular program. He noted, however, the intense competition for the regular program funds, including a Mariott Agriculture Program, KALAR, Nubiseed, NIH, NAS Infectious Disease, and the University of Michigan Water Reuse Plan for Irrigation. Accordingly, new proposals and new areas with new players has appeal and will fare better in the competition than the older ones.

It is difficult to know whether A.I.D. has the resources to handle all of these programs successfully; it may be difficult to reduce each of them or to disapprove some of them. We have to realize that there is a financial crunch overall. Had it not been for our Program and our people's ability to persuade Congress to add \$2,000,000 more to the Program, there would be no way in the world for A.I.D. to recognize appropriately all of the meritorious competing projects.

Cohen asked several questions relating to the agriculture projects to which Porter responded that agriculture obviously dominates the Regional

Cooperation Program, as it has in A.I.D. all along. The projects are all different, and in most cases the recipients are different. Minister Walli is one of the strongest members of the Egyptian Cabinet, and he is certainly the strongest advocate of cooperation with Israel. This lends strength to the various agriculture programs.

Porter then offered an extremely thorough explanation of the A.I.D. review process. He noted the "mixed bag" contents of the various proposals offered A.I.D. His office examines them from the political viewpoint and Voth's office from the technical viewpoint. The review and problems are going to be further complicated over the coming months owing to the significant changes in A.I.D. personnel at all levels.

Cohen responded that it would be unfortunate for the marine program to lose momentum at this point. We badly need Porter's advice and help to make this program work. Abel agreed that we need some sort of "agent" to help and advise us in A.I.D. concerning all levels and sectors. Clearly, the Aqaba Program transcends any one or another program or office in A.I.D.; the question is whether there is a level or person in the organization with broad enough authority to be able to look at the whole program holistically, rather than at its individual components.

Porter, responded by reminding us that Dr. Brown last fall had recommended our submitting the proposal in funding modules to enable each of the relevant sectors of A.I.D. to examine it in its own perspective. Since Regional Cooperation cannot fund the Jordan-Egypt and Saudi-Egypt portions,

these funding modules must go elsewhere. Porter suggested that perhaps the Egypt-Jordan project could be thought of as Jordanian funds drawn from the environmental program currently being established in Amman. This is part of the U.S.-Jordan bilateral program. The degree to which this is coordinated will strengthen the entire proposal. On the other hand, Egypt probably thinks of Egypt-Jordan as Egypt's program. In response to Abel's question concerning general floor management in A.I.D. overall, Porter mentioned the impending arrival of a Ms. Vicka Moldrum, who would be replacing an official at a relatively high level of A.I.D.

Sayed recounted his last visit in Cairo last May where Marshall Brown (AID/Cairo) had referred them to AID. in Washington. Porter responded that because of the program's complexity, there is a tendency for everyone to try to help, but in the process refer the program to someone else. AID will probably want to refer it to the Cairo Mission. The various Ambassadors to the Middle East have independently requested AID to approve the Aqaba Program owing to its importance. The State Department is apparently bucking their requests among various sections. The difficulty is compounded by the current attitude of Congress in reducing AID funds. In summary, we appear to have a fabulous Program in being, but we will need considerable assistance at various hierarchal levels of the United States Government.

The Steering Committee unanimously thanked the AID representatives, and

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especially Porter for their willingness to take so much time with such detailed and clear explanations of the possibilities.

The first action of the Steering Committee during that afternoon was unanimous approval of Cohen's resolution of congratulations to Dr. Mancy on becoming a grandfather.

Aqaba Program Strategy:

Cohen asked to continue the Aqaba discussion from the morning. He suggested that in rethinking the Rockefeller situation, they were really offering very little money for what we were proposing; accordingly, it might be a felicitous move to start with the socioeconomic project and submit that sector of the proposal. In so doing, however, we would involve Harvard, risking loss of control of our Program. Therefore, it is important that we locate other funding sources.

Cohen suggested that we should respond to Hausman that we would like to defer action on the socioeconomic project, but that we're still interested in the Japanese proposition. However, we can become involved with Harvard if we can forecast a degree of success with the Harvard connections to these foundations. Cohen felt that Abel ought to renew efforts to obtain funding from private foundations. We need that kind of support. Perhaps it would be possible to find another source, i.e. a person who could open doors with credibility, such as Ambassador Sam Lewis, currently the President for the Institute for Peace. Cohen felt that Abel had been right all

along, i.e. we must get to the top levels of the various agencies. Also we shouldn't waste any time in so doing.

Respecting the content of the proposal, we should all review the document in its present form and modify the oceanography section to embrace hazard monitoring, i.e. the modeling of oil spill trajectories, etc. Further, we ought to invite the persons respectively responsible for the socioeconomic aspects to meet separately. In response it was generally agreed that the mariculture framework prepared by Hillel Gordin should also be sent out to each country on which to build its respective mariculture proposal.

El Sayed recommended focusing our efforts on USAID for the time being inasmuch as private foundations probably will not have enough funds for our technical program. He observed further that Tom Bright's proposal for the Coral Reef Science would cost too much money, and Gordin, agreeing, asked why so much of the money appeared to be directed to American scientists, in view of the basic principles of Regional Cooperation.

In response to Cohen's suggestion to subdivide the proposal according to the scientific basis for management, management of Coral Reefs and Mariculture, Eisawy asked that where physical and chemical oceanography would fall inasmuch as biological oceanography appeared to be featured? There ensued much discussion of the contents of the proposal.

The next question related to who ought to perform the oceanography? El Sayed felt that Steve Murray's experience and reputation in the Gulf of

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Aqaba made him the best American coordinator. He felt that Mellor and his colleagues were too sophisticated for useful technology developed in the Gulf. Cohen and Eisawy disagreed, observing that the Mellor/Maiza/Brenner team appears to be working superbly together, and that the Middle Eastern partners appeared to have little difficulty in following Mellor's lead. They all agreed, however, that the proposals must be distributed as soon as possible. The Israeli component of the physical oceanography chapter appears to be finished, and is in the current volume prepared by El Sayed.

As Cohen pointed out, Dr. Ahmed A. Khafagy of Egypt's Coastal Protection Institute is working with Dr. Hassan Mustopha to elaborate on the physical aspects, and this will prove of considerable assistance in that part of the project. It was agreed that Eisawy will handle the physical oceanography and that Maiza would complete that chapter and distribute it to Brenner as soon as possible (c/o of Yuval Cohen since Brenner will be away for the Summer).

It was also agreed that Coral Reef technology will not be treated as part of oceanography, but rather as a separate subject.

It was agreed that Gordin's treatment of mariculture offered an excellent base on which to formulate the proposals. It would be necessary to select species of common interest to all of the cooperating countries. It would also be necessary to arrive at a common infrastructure to optimize cooperation in management. Gordin responded to questions that it would be possible to integrate bivalves and crustaceans into the project quite

easily. Other subjects must concern the water body itself. For instance, the process of aquaculture entails disposal of considerable amounts of foreign matter into the water, and this must be accounted for in dealing with this fragile environment.

Eisawy noted that Dr. Ahmed Gamal had completed a proposal for aquaculture. He will be at the next meetings in Cairo. They plan to focus their operations at Sharm El Sheikh under Suez University. He further stated that Dr. Wahbeh must elaborate on his previous framework to contribute a cooperative proposal in mariculture as well. The little money available for the Program has been used mainly for motivation so far. It was agreed by all, in summary, that it will probably take a few months for the Aqaba Proposal to reach the point where it can be submitted to A.I.D. or any other prospective sponsor.

The next discussion concerned the nature of Jordanian cooperation. Dr. Eisawy summarized by suggesting that Abel should ask Dr. Mahasneh whether he is willing and able to prepare the Jordanian portion of the proposal.

El Sayed observed that two models appeared to be left for discussion. First of all, the socioeconomic chapter was still valid and viable, but needed considerable treatment. He suggested that the existing framework in its elementary form be distributed to the persons who were selected for... this participation, and that they should communicate with one another. Dr. Baranaya in Cairo would necessarily be the focus of communications at this point since he was able to communicate with all parties within existing

diplomatic limitations. They should exchange briefs. Finally, to the degree possible, they should all meet in Cairo at the next meeting. This entails an immediate mail-out of the socioeconomic chapter.

El Sayed then discussed the management section. It is necessary to determine who will manage the Program, who will preside at the meetings, and who will pay for everything. What is necessary is for us to agree on action lines.

Summarizing intensive discussion, Eisawy opined that it is probably most feasible at the moment to maintain the present system of management. This involves communication between the New Jersey Marine Sciences Consortium and the cooperating countries. In Cairo, -however, a newly formed National Oceanographic Society proposes to manage the Program for Egypt to ensure its stability. The Society has been formed and the two presiding officers are Dr. Latif, as President and Dr. Eisawy, as Vice President. The fact of their retirement will not change positions and authorities of either of these gentlemen with respect to the Program. This conversation, in turn, led to a discussion of Abel's own situation.

Seafood Toxin Project:

The session opened on Thursday, May 24th, with Dr. Albert Pohland, Director of Research of the Food and Drug Administration participating. The subject concerned entirely the Seafood Toxin project, with particular reference to the international symposium.

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Abel synopsised events leading to the point of current discussion. The project had started several years ago as part of Old Phase III. It had been preceded by a visit of Dr. Khayria Naguib to the United States, at which time she had made a superb speech to A.I.D. relating to the merits of technological cooperation between Israel and Egypt. It had been understood by all concerned that the International Symposium would be the culmination of the project.

Unfortunately, communications under the project's auspices left much to be desired, and there appeared to be no collaboration between the two countries in managing the Symposium. This left Abel in an awkward position because A.I.D. had given him instructions (which, in fact were hardly needed in view of the original A.I.D. doctrine for Regional Cooperation) that the Symposium would have to be demonstrably cooperative in order to receive A.I.D. funding.

Dr. Pohland brought the Steering Committee up to date in stating that the project is excellent. 80% of of the persons contacted have already responded affirmatively to invitations for participation in the Symposium. He displayed three brochures which had been designed in succession. Unfortunately, none of them satisfied A.I.D. or the Program requirements. Summarizing, Dr. Pohland remarked that Dr. Naguib simply does not agree to include Krungalz in the symposium in the form of management or leadership of sessions. She did suggest that Dr. Pohland's decision would be final; at the same time, he was naturally hesitant to try to impose his will on

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the Symposium for fear of cancellation.

Dr. Naguib does not, at this point, want either Egyptians or Israelis on the program as managers, and she does not desire either herself or Krungalz as speakers. The Steering Committee agreed, however, that this simply would not work, i.e. it is far too unconventional in presenting any such symposium. It is absolutely necessary for Dr. Naguib, as the Manager of the entire program, to have a prominent role in the conference itself.

Eisawy remarked that Naguib is agreeable to Krungalz sharing a session, which conflicted with Pohland's information. There followed, intensive discussion of Krungalz participation in the conference.

Eisawy announced that there has been a very significant change in the conference management in that the Egyptian Academy of Scientific Research and Technology had apparently decided recently to provide the primary funding for the conference. Specifically, the Academy would provide \$50,000 of the \$70,000 needed. Combining this with \$10,000 from the International Union of Pure and Applied Chemistry, this would relieve A.I.D. of financing responsibility of all except \$10,000.

This ought to put a new face on the problem in that since the Egyptian government was sponsoring it, the necessity for Israeli participation ought to be obviated. Abel stated that under the circumstances, the simplest way of meeting the problem would be for A.I.D. to withdraw officially as a sponsor. This led to intensive discussion of A.I.D.'s position and role in the

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conference. Pohland stated that he would advise Naguib that Krumgalz must share a session. The date has been fixed for mid-November, which critically shortens Krumgalz preparation time.

Abel suggested that we have three options:

1. We should inform Dr. Naguib now to accept Dr. Krumgalz as a session chairman and accept the risk that Krumgalz may or may not be able to put together a session in time;
2. The conference could be postponed to next year;
3. A.I.D. could simply withdraw as a sponsor. Abel recommended the last option.

El Sayed observed that pursuant to Dr. Naguib's own letter she must share a session. Krumgalz also ought to share a session. The Steering Committee unanimously felt that Dr. Pohland ought to both chair a session and act as keynoter.

Cohen, reviewing the previous discussion, observed that the conference is on an extremely important subject. He expressed his pleasure that the Academy of Scientific Research and Technology has agreed to sponsor the conference. Scientific progress appears to be excellent. Cooperation, on the other hand, is zero. Naguib's promises throughout the duration of the project have come to nothing. Samples that she had promised to send to Israel had never materialized, except for three vials that Dr. Beltagy had given Dr. Abel to carry, which, owing to lack of preservation, turned out to be worthless.

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Cohen further observed that the lack of cooperation in this project is all the more dramatic, when compared to that in the other projects which had been so excellent, under Dr. Eisawy's guidance. He, Cohen, had originally proposed the compromise to the effect that although Krumgalz had never been part of the management and planning of the conference, that as long as he could chair a session and put the session together, the Israelis would accept that action as sufficient good faith on the part of the Egyptians for cooperation in the Program. This lay behind his original suggestion that Dr. Krumgalz chair and organize the respective session. Abel expressed his disappointment that Naguib's superb remarks at the Agency for International Development several years ago did not appear to be followed by commensurate cooperative activity.

Eisawy noted that Naguib had stated the previous year that she was cooperating, and that she felt that she had fulfilled her obligation by giving the samples to Dr. Abel to take to Haifa. Abel responded that he had been given only three samples, and not by her but by Dr. Beltagy. Further, no preservation was provided for the samples. Still further, the question could be raised regarding the necessity for Abel coming all the way to Alexandria from the United States to carry three vials to Haifa. Finally, the vials turned out to be totally worthless for the analysis as originally suggested.

Eisawy responded that Naguib had stated her willingness to participate in a follow-up workshop in Israel; accordingly, her position has changed drama-

tically in this Program. She is satisfied that the conference is not an output of the Program, only her side of it. Therefore, she doesn't need any other sponsors. In choosing the speakers, she aimed for the best scientists in her field, worldwide. It is perfectly all right for anyone else to share in her decision.

Abel suggested that as a solution, he will write a memorandum as follows:

1. The conference must go on;
2. It is an excellent idea, and given Madame Khayria's past experience and reputation, she will do an excellent job of managing it;
3. It must be managed and conducted by Egypt with the Academy of Scientific Research and Technology as the major conference sponsor (involving \$50,000);
4. Since A.I.D. wants regional cooperation, A.I.D. need not be a sponsor of this conference, but
5. Egypt has proposed a follow-up workshop in Haifa which would subscribe to the principles of Regional Cooperation.

El Sayed suggested that it should be the sense of the Steering Committee that each co-principal investigator should chair a session. Other than that, management should be left up to Madame Khayria.

Dr. Pohland, in closing, observed that Dr. Mancy also probably ought to chair a session as well. The discussion closed on that note with Dr. Pohland's departure.

Phase IV Proposal:

The Steering Committee then discussed the Phase IV proposal. El Sayed had completed it except for the Egyptian chapters on fish disease, some minor changes in some of the other chapters, such as management, and the inclusion of some missing resumes. He noted that the fish disease situation appears to be resolved. The proposal is, therefore, practically complete. The covering letter ought to highlight the new institutions as Porter suggested. It was agreed by all of the Steering Committee members that uniform procedures are necessary so that among other things, bibliographies ought to be kept to at least reasonable limits on a common standard.

Cohen suggested the following, respecting the proposals:

1. The Trophodynamics budget should be reduced to below \$1,000,000 for at least psychological reasons;
2. We should defer listing priorities, (although Porter had so suggested) until after A.I.D.'s scientific review;
3. Mancy's treatment of cost sharing should be stricken from his project; the alternative would have to be treatment of cost sharing in all the rest of the projects;
4. El Sayed should include various aspects of cooperation such as the workshops, directly in the Executive Summary, following the treatment of science.

Completing the discussion, it was agreed that cost sharing ought to be deleted, and Cohen's other suggestions could be adopted as well. (Editor's

note: This subject should be pursued separately; it would be helpful to acquaint U.S.A.I.D. with amount of cost sharing being borne by the grantees.) Abel would have to finalize the budget, and prepare the master consolidated budgets for all countries for the three years. El Sayed agreed to amalgamate the fish disease proposals and add a note on social interaction in the Executive Summary. Cohen and Eisawy agreed to review the proposal with their colleagues over the next two or three weeks, and submit their comments by June 15th.

Jellyfish:

Cohen introduced a new subject. The IOLR scientists at Elat had noticed a new bloom of jellyfish apparently transported through the Red Sea and Suez Canal. Approximately 700 kilograms of jellyfish had landed on one beach at Elat. It is a new species, relatively mobile, and capable of stinging. Following custom, new species introduced into host waters increase exponentially until nature's equilibrium takes over, at which point they level off. Accordingly, he feels that the problem badly needs monitoring.

Abel suggested that the problem may be more serious than the scientists might realize because of the ability of jellyfish to proliferate; the fact that they are of such a low order that anything that kills jellyfish will kill everything else; and that the probability of their proliferation may close down the beaches and drastically affect the revenue coming into Elat and Aqaba. Eisawy responded that something similar had been observed on the Egyptian shore of the Red Sea two years ago. Cohen suggested,

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therefore, that an informal exchange of information be instituted, and that it be conducted as an Appendix to the Trophodynamics project. Eisawy opined that the problem would probably be more severe in the Mediterranean than in the Red Sea. This concluded discussion of Phase IV.

There followed intensive discussion of to Abel's position. Rising indirect costs of the Consortium were noted with some concern, but it was felt that the freedom of the Consortium and Abel's authoritative position within it gave the Program mobility that might be sacrificed by any other form of management. At least, this appeared to be the general consensus at the moment; it's clear that everyone on the Steering Committee is deliberating this problem, and will advise Dr. Abel at a later meeting.

The Next Meeting:

Intensive discussion of the next meeting highlighted the following factors:

1. It would be very nice to have some workshop components at the Cairo meeting during the first week of July;
2. Unfortunately, this would be far too soon to develop any of them adequately; in addition, some of the major participants such as Brenner et. al will be away during the summer;
3. The most likely subjects for discussion could be mariculture, lakes management, circulation, and seafood toxins. The Israelis, however, are somewhat loathe to discuss seafood toxins, in view of the situation regarding the symposium.
4. Because of the apparent change in the Rockefeller Foundation situa-

1/8

tion, it might be preferable to postpone the Cairo conference insofar as it concerns planning for Aqaba;

5. Abel could explore the possibilities of obtaining a planning grant from A.I.D., but this possibility is probably rather dim;
6. All things being considered, the Steering Committee confronts a chicken and egg problem in that it will be impossible to obtain funds without a proposal, but at the same time it is difficult to prepare all aspects of the proposal without some form of support.

It was the sense of the participants that the first week in September would be optimal because El Sayed's presence would be needed during the first week of classes at Texas A & M University in last August, and Cohen would be unavailable after mid-September owing to holidays and military service. Abel and Eisawy appeared more mobile than the others. It is therefore likely that the next meeting should begin in Haifa on or about September 3rd, for about three days, following which the participants should move to Cairo for the rest of the discussions, particularly the Aqaba Program. The conference should terminate about the 12th or 13th of September. The most likely candidates for workshops would be Circulation, Seafood Toxins, or perhaps some of the other projects.

Cohen suggested the Taba Hilton as a place where for the conference, but there was general agreement that Cairo might be more efficacious for the purpose. Although this concluded discussion of the next meeting of the Steering Committee, it was noted that Dr. Latif appears to be planning for some sort of meeting in Cairo during the first week in July in connection

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with the dedication of his new building. Abel assured Eisawy that he would plan to attend, and asked to be informed in time for airline reservations, etc.

The final issue for the Steering Committee concerned Program management and the budget. It was agreed that conference management should be uniform between Israel and Egypt. The two representatives should agree on who pays for each cost, e.g. hotels, meals, internal transportation, etc. Cohen and Eisawy appear to think identically on this subject, thus obviating the need for further discussion.

Abel introduced the subject of follow-through on behalf of Dr. Eisawy. He and El Sayed agreed that it would be necessary for everyone to be totally supportive of the Aqaba Program and Eisawy's movements toward its design and coordination. Dr. Eisawy should inform everybody concerned in the other countries that things move very slowly in the United States (as elsewhere) and that without proposals, no form of program support is possible. Accordingly, it would be necessary for everybody to prepare his/her project components and for these to be amalgamated in an excellent proposal which will be highly competitive and draw the necessary funding. In the meantime, the Steering Committee should encourage maximum correspondence between all existing and prospective partners.

On this note, the conference adjourned in the current locale.

NOAA Meeting:

The Steering Committee then transferred to the headquarters of the National Oceanic and Atmospheric Administration where they met with Dr. Ned Ostenso, Chief Scientist of NOAA and Assistant Administrator for Research and Ms. Barbara Moore, Director of International Operations for NOAA.

Abel briefly reviewed the circumstances leading to this meeting. He then asked Cohen to enumerate the projects, describing each briefly, to give Dr. Ostenso and Ms. Moore a sense of what the Program was all about. Cohen did so briefly, adding sufficient detail for understanding.

Abel then asked Dr. Eisawy to discuss his achievements with Jordan and Saudi Arabia and to offer his doctrine concerning the Program's fundamental goals and how we had been going about achieving them. Dr. Eisawy responded with a comprehensive but succinct assessment of the program and its social achievements.

There ensued discussion of NOAA's view of this Program and the possible corporate attitude of the Administration toward some sort of involvement in it. It was agreed that Dr. Ostenso would discuss this with Dr. Knauss, NOAA Administrator, and his other colleagues before responding to the Steering Committee as to how NOAA involvement or participation might be effectively brought into being.

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Tour of the Smithsonian:

The Steering Committee's final activity was a tour of the fish collection of the Smithsonian Institution, the largest in the world. This was arranged by Mrs. Carlyn Ring through her friend, Dr. Lewis Strauss. Dr. Strauss, in turn, obtained the personal services of Dr. Victor Springer, Curator of the Fisheries Division of the Museum, who very graciously offered us a two-hour tour of the Fish Exhibit.

Following the tour, the participants broke up to go their separate ways, thus ending the conference.

6/12/90

jwb

COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR
MIDDLE EAST
LISTING OF THE STEERING COMMITTEE MEETING'S ACHIEVEMENTS,
May 21-25, 1990

1. Completed Phase IV proposal for the Cooperative Marine Technology Program for the Middle East.
2. Established procedures for developing the Aqaba plan.
3. Reached compromise on the International Sea Food Toxins Conference.
4. Completed and reconciled financing for the Egypt Program.
5. Established procedures with U.S. A.I.D. for extending current limitations on operational funds overseas.
6. Met with the Representatives of National Oceanic & Atmospheric Administration regarding possible cooperation with that agency in various functions.
7. Met with Representatives of Harvard and explored the possibility of collaboration with that University.
8. Deliberated new techniques and ideas for transferring a ship to the Egyptians, and met with the NOAA Corps of the National Oceanic & Atmospheric Administration for guidance.
9. Agreed on sites and dates for the next Workshop and Steering Committee meetings.
10. Reached agreements on several management and communications procedures.
11. Deliberated and accepted the Egyptians' suggestion for a book describing the history and philosophy of the Program.
12. Evaluated future options for the Program Manager.
13. Achieved reconciliation and agreement of all of the program budgets, accounts, and financial tabulations.

RBA/mw
6-8/90

COOPERATIVE MARINE TECHNOLOGY PROGRAM
FOR THE MIDDLE EAST

Steering Committee Meeting
State Plaza Hotel, Washington, D.C.

May 22-24, 1990

D-R-A-F-T A-G-E-N-D-A

1. Housekeeping Arrangements

Confirmation of airline reservations. Per diem. Meeting Place.

Agreement on the Agenda. -- Abel

2. Finances

Originally a relatively secondary issue, the question of finance now appears to dominate the Program. The two principal problems are:

a. Although Year I, Phase III - Amended terminated last August, we have still not received the money from USAID. I am advised that the problem related to:

1 Delayed release of the funds by the President's Executive Office;

2 Unacceptability of our fiscal tables at USAID.

I'm doing my best to determine the cause of this disastrous delay, but it's a difficult process with Bob Galloway in the hospital. Also, financial reports have become increasingly important in the funding process.

b. We somehow failed to achieve understanding of the operational funding limitation at last Fall's meeting. It is crucially important that we do so at this meeting. Accordingly, I have requested meetings with:

- a. Dr. Carol Adelman - Associate Administrator of USAID for Near East Affairs;
- b. Leland Voth and Bert Porter - our Project managers;
- c. Thomas Stevens - our AID Contracts Officer.

Also, I will bring Mrs. Ceil Von Oesen to the meeting with me. She has assumed Bob Galloway's position at the Consortium.

We must devote as much time to this issue as is needed, before moving on to other topics. -- Von Oesen, Abel

3. Ongoing Progress

This will be a series of brief discussions of ongoing projects in Phases III and III-Amended (Old and New Phase III). It must be understood that Phase II is completely over, and that all no-cost extensions have been used up. While some of the Old Phase III work has been completed, other projects continue. We can discuss operational achievements and problems, such as,

- a. The successful interaction in the mariculture projects;
- b. International Symposium on Seafood Toxins. We seem to have reached a successful compromise on the brochure.

The recent Annual Report omitted the Grey Mullet project. This error is being corrected. -- El Sayed, Eisawy, Cohen

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4. Phase IV Proposal

At the April 13-15 meeting at Texas A&M, El Sayed, Mancy and Abel completed the Phase IV proposal. It now awaits only the Fish Disease section from Egypt. It is understood that this has been mailed from the American Embassy in Cairo to El Sayed. Copies of the proposal were sent to Eisawy and Cohen for review.

We must reach final agreement on this proposal in order to submit it to USAID within a month or two. -- El Sayed

5. Aqaba Plan

This is the second topic on which we must spend time until the issue is finished. Admittedly, this ^{is} a complicated Program, since the Proposal components have to be split up.

At the Texas meeting, we refined the Proposal to:

- a. Oceanography
- b. Mariculture
- c. Hazard Monitoring and Response
- d. Socioeconomic Aspects
- e. Management

El Sayed and Mancy were to draft and send the oceanography section to the Steering Committee for review.

Mancy was to do the same for Hazard Monitoring and Response

Abel was to do the same for Socioeconomic and Management

We agreed to ask Hillel Gordin to coordinate for Mariculture

The Socioeconomic and Management sections have been mailed. It is understood that the Oceanography and Hazard Sections will be mailed this week.

I have invited Jordanian representation at our meeting, especially to collaborate with Dr. Eisawy on the plan. -- El Sayed

6. Rockefeller Foundation

I do not have a clear understanding of the Rockefeller Foundation requirements, but will try to improve the picture by the time of our meeting. So far, they appear to want to emphasize socioeconomics over science. This is why I've invited the Steering Committee to nominate representatives to handle these technologies. All of us appear to have responded; the meeting will give us excellent opportunity to compare notes.

I have invited Dr. Leonard Hausman of Harvard to meet with us on one morning, to discuss the Rockefeller and other foundation prospects.

-- Abel

7. Reports

The demand for reports seems to grow as funds become scarcer. We should review briefly, all the reports that are required, and discuss ways to simplify the process

- a. Program completion reports
- b. Annual progress reports
- c. Monthly pipeline reports

d. Trip reports

e. etc.

-- El Sayed, Von Oesen

8. January Meetings

As you know, a Congressional delegation visited Israel, Egypt, and Jordan in January. I will discuss our "adventures" as well as the follow-up meeting in Washington. -- Abel

9. Follow-up Meeting

Holding this meeting in Washington proves very convenient in some ways (e.g. discussions with USAID), but inconvenient in other ways. We should plan follow-up meetings for Cairo and perhaps Haifa for several purposes, including the Aqaba Plan and such events as the Egyptian delegation may have in mind. The follow-up meeting should take place as soon as designated by Dr. Eisawy. -- Eisawy

10. Social

As can be observed from the previous paragraphs, this will be an exceptionally busy working meeting. Nonetheless, it may be useful to take advantage of some opportunities, since we get together so seldom.

- a. I have requested a meeting with Dr. John A. Knauss, Administrator of NOAA, to continue the discussions begun at Elat a year ago.
- b. We should plan to have a small party for one of the evenings.
- c. Any other suggestions will be welcome.

NEW JERSEY MARINE SCIENCES CONSORTIUM



Reply to Executive Office

Details of Week's Schedule

Sunday	May 20	4:00	Egyptians Arrive. Abel meet plane. Register at State Plaza Hotel.
Monday	May 21		Abel meet with Egyptians. Abel leaves 4:00.
Tuesday	May 22	12:00 11:00 2:15 3:00 3:30 6:00	Israelis arrive State Plaza Hotel. El Sayed arrives State Plaza Hotel. Establish Dr. Eisawy's suite as Formal Meeting Place. All meet at State Department. Honorable Thomas Pickering, US Ambassador to the United Nations. Continue with Agenda. Meet with Dr. Hausman (Harvard) Dinner (to be announced).
Wednesday	May 23	9:00 9:30 12:00 1:30 6:00	Continue Agenda. Meet with U.S.A.I.D. Representatives: 1) Tom Stevens (Contracts) 2) Leland Voth (Agriculture) 3) Bert Porter (Egypt) Ceil VonOesen (NJMSC - Finance) will join us Lunch (to be announced) Continue with agenda Dinner (to be announced)
Thursday	May 24	9:00 3:00 4:00 5:00	Continue Agenda Meet at National Oceanic & Atmospheric Administration 1) Dr. Ned Ostenso, Chief Scientist of NOAA and Assistant Secretary of Commerce 2) Dr. Carmen Blondin, Deputy Assistant Secretary of Commerce 3) Mrs. Barbara Moore 4) Dr. John Knauss, Administrator of NOAA and Undersecretary of Commerce El Sayed Departs Israelis Depart

Friday	May 25	9:30	Depart State Plaza Hotel
		10:30	Arrive Admiral's Office, NOAA Corps meet Captain David Yeager; discuss status of ALBATROSS IV and/or other vessels
			Lunch with Dr. Mohamed Al-Orabi, Counselor to Ambassador El-Reedy of the Egyptian Embassy (Counselor Al-Orabi may also accompany us to NOAA)
		3:00	Tour of Washington
Saturday	May 26		Egyptians Depart

Cell von Oesen

Asimirok

MEMO

From: Judy
To: Dr. Abel
Subject: Hotel Reservations - Washington, D.C. - May, 1990
Date: April 20, 1990

Reservations were made at the State Plaza Hotel, 2117 E St. N.W. as follows:

<u>Name</u>	<u>Dates</u>	<u>Confirmation #</u>
A. Eisawy	5/20 - 5/25	B49441EA
A. El Ibyary	5/20 - 5/25	B49414EB
Y. Cohen	5/20 - 5/27	B49414F7
H. Gordin	5/21 - 5/27	B4941510
R. Abel	5/22 - 5/24	B4941511
K. Mancy	5/21 - 5/25	B4941513
S. El Sayed	5/21 - 5/25	B4941516

The Consortium's American Express Corporate Credit Card #3783 628124 23000 is holding the above reservations. I spoke with "Rozio."

Enclosure (6)

NEW JERSEY MARINE SCIENCES CONSORTIUM



Reply to Executive Office

MEMORANDUM

From: R. B. Abel *Bus A*

To: Members of the Steering Committee -
Cooperative Marine Technology Program for the Middle East

Subject: Report of Workshops, Steering Committee Meetings, and Various
Discussions and Tours, August 20-30, 1990

Date: September 26, 1990

The enclosed reports of the transactions of the period August 20-30, 1990 are transmitted herewith. Admittedly, several sections of the report are extremely sketchy, reflecting either my absence from the discussions, sophistication of the reports themselves, or (most probably) my lack of understanding of the technology.

Accordingly, I crave your indulgence, ask for your patience, and solicit your cooperation in editing, adding, correcting, amending, deleting, and in many other ways making the enclosed report readable and useful to our committee and to the sponsors that we serve. In particular, the principal investigators should personally edit the paragraphs reporting their respective discussions.

Finally, I would be dishonest were I to fail to acknowledge the marvelous environment in which all of these meetings were carried out. I am informed by our Ambassadors and their staffs that our Program is unique in what we do and what we have achieved, and the steering committee is responsible for all of this. Accordingly, please accept my thanks and my congratulations for what you accomplished in these two weeks and previously.

jwb

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COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

REPORT OF STEERING COMMITTEE AND WORKSHOP MEETINGS
AUGUST 21-30, 1990

Executive Summary

Under the auspices of the Cooperative Marine Technology Program for the Middle East, several meetings were held during the period August 21-30, 1990, starting in Egypt.

The initial conference took place on August 22, at Egypt's new Marine Science Institute at Suez, and was the first scientific meeting held in that building. Representatives of nearly every related institution in Egypt assembled to discuss aquatic resources with the Israeli delegation, with particular reference to the Program's project on Waste Water Recycling. Participants are listed in Appendix A.

The meeting was followed by a tour of the Waste Water Recycling Plant established outside of the city. On-site descriptions were given of the American and French Plans, both of which are being tried.

On August 23, the Steering Committee, Dr. Fattal and the Egyptian participants in the Waste Water Recycling Project visited the Suez Canal University in Ismailia. We were hosted by President Khodair and Vice President Dewedar, respectively, of the University, following which we were shown the University's extensive water recycling and hydroponics projects.

Later the same day, we met with Dr. A. A. Latif, President of the Egyptian Academy of Scientific Research and Technology. During this meeting, another at the hotel that night, and a third on the following day, again at the Academy, the Steering Committee redrafted and refined the Aqaba Plan. The principal points of refinement included:

1. Ensuring that all projects dovetailed into a coherent plan;
2. Developing the initial three year plan into a decade plan of three phases;
3. Ensuring that each phase capitalized on the results of the preceding phase, thus displaying a truly systematic approach.

Dr. Latif approved the refined plan and confirmed the Academy's support. The Plan Package is attached as Appendix B in eight sections.

On August 26, we adjourned to Haifa for Workshops on the shore processes and mariculture projects and continuance of the Steering Committee meeting. Participants are listed in Appendix C.

On that afternoon we were conducted on a tour of the IOLR, featuring the chemistry and biology departments and the algae culture ponds.

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The Shore Processes workshop on August 27 featured new technological advances; introduction of an Egyptian mathematician, Dr. Anwar, and an Israeli physicist, Dr. Iosilevsky, who had recently joined the project; and plans to further harmonize the Egyptian and Israeli data analyses.

Following completion of that workshop, i.e. on the afternoon of August 27, the Steering Committee held our final meeting at the IOLR, while the Egyptian and Israeli scientists involved in the Shore Processes and Mariculture projects respectively met to compare and work up existing data, and to formulate the next steps in their projects.

The Steering Committee confronted problems and opportunities of considerable significance:

- a. Phase IV has been submitted to USAID. Concern was unanimous that sufficient overlap between Phases III-A and IV be allowed, to overcome the titanic problem created by shifting of the grant cycle ahead from September to March;
- b. Abel assured the group that retrospective charging from Year 3 to Year 2 in Phase III-A would be permitted;
- c. The process of refining the reconciliation of Egyptian and Israeli

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Shore Processes data would surely require more time than allowed by the project. Precedents existed, however, for requesting small and specific increments;

- d. The "Management" project really ought to be subdivided into: 1/ costs incurred in the actual management of projects and 2/ costs affiliated with the process of blending the participating countries aims and aspirations, including the various and increasingly frequent get-togethers;
- e. Discouragement with increasing auditing costs is unanimous. Draconian imposition, of Regulation A-110 and A-133 will result in total "Management" costs amounting to over a third of the total budget;
- f. Some changes were made to the Aqaba Plan verbiage, but the Committee's principal actions respecting the plan were to agree on roles and responsibilities. Coordinators and deadlines were agreed upon for each project of Phase I;
- g. It was recognized that the new auditing rules imposed special responsibilities upon the principal investigators to ensure that their expenditures remained in alignment with approved budgets;

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- h. Unanimous approval was reached on a tenth anniversary report. Abel agreed to draft an initial outline for the Committee's review;
- i. The group agreed to meet again at Taba during the last week of February.

On August 28 the group visited Dr. Tom Berman's kibbutz which specializes in the design and manufacturer of pumps and filters used in all aquatic processes. We also visited Israel's only export-fish-products processing plant. That afternoon, we visited Dr. Dan Mires' kibbutz which operates some of the most sophisticated aquaculture ponds in the region.

The Mariculture Workshop took place at the IOLR on August 29. The Egyptian and Israeli presentations demonstrated enormous progress in the culture of species important not only to the two countries, but throughout the Third World. The mullet project is currently the principal activity, but bream was also discussed. The main topics concerned: importance of hormones; induced spawning; and optimum feeds.

Dr. Eisawy highlighted this workshop with a lecture on the practical aspects of converting fish culture science into a paying proposition.

On August 30, the group met Dr. Yuval Ne'eman, the new Israeli Minister of Energy and Infrastructure, and briefed him on the Program.

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That same afternoon we were given a tour of the Weizmann Institute by the Vice President, Dr. Mordhay Avron. Dr. Avron is the prospective principal investigator of the beta-carotene project proposed under Phase IV.

That was the final event of the meeting, which was judged by its participants to be one of the most productive in the Program's history.

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COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

(Report of Steering Committee and Workshop Meetings)

Egypt and Israel, August 21-30, 1990

Under the auspices of the Cooperative Marine Technology Program for the Middle East, Phase III-Amended, I arrived Cairo late afternoon, Tuesday, August 21st. I was met by Dr. A. M. Eisawy, Coordinator of the Egyptian Program and several participants in the Program. The evening was devoted to preliminary discussions of the plans for the next two weeks.

On Wednesday, August 22nd, the entire group drove to Suez to visit the new Institute of Oceanography, Suez Branch. The group consisted of Drs. Yuval Cohen (Oceanographic Institute-Haifa, Israel), Badri Fatal (Hebrew University of Jerusalem), A.M. Eisawy, A.I. El Ibyary, and several members of Egypt's National Institute of Oceanography and Fisheries.

Dr. Eisawy had assembled representatives of almost every academic institution in Egypt as well as from several government agencies. The occasion was a round table discussion of our Program's Wastewater Reuse Project, primarily between the Hebrew University of Jerusalem and the Egyptian Academy of Scientific Research and Technology, in association with Universities of Cairo, Ain Shams, and Suez Canal.

As the originator of the project, Dr. Khalil Hosny Mancy was asked by Dr. Latif to open proceedings by explaining the original intent of the project and the manner in which the two countries were approaching the scientific

goals. Dr. Mancy did so, outlining the project approximately in the manner in which it had been laid out in the original proposal to A.I.D.

The Egyptian investigators then discussed the project in their particular perspectives. Dr. Somra, new director of the Suez Laboratory, gave an overview of the laboratory and the general importance of the Wastewater Project. Dr. Sharif from Ain Shams University discussed concentrations of lead, iron, zinc, cadmium, and copper in the town's wastewater.

There then followed a general comparison of the French and American systems, which appear to differ mainly in the manner in which the wastewater is circulated and allowed to cleanse through natural processes of sun and sedimentation.

Dr. Ezzat Awad discussed the phytoplankton in the water. Dr. Aiza discussed the pathology of the fish as studied at the University of Cairo, concentrating mainly on Mullet and Tilapia. He discussed relative concentrations of various pollutants in the liver, gills, stomach, and skin respectively. His point was that Tilapia appears to be best for these ponds owing to its relative resistance to changes in the environment.

Following the Egyptian scientists' presentations, Dr. Badri Fatal of the Hebrew University discussed the health aspects on which he and his colleagues have concentrated. He discussed bacterial and viral penetration of

fish. The scientists have apparently found less pollution in the fish residing in their growing ponds than in the Nile River itself. He discussed mainly Tilapia, Carp, and Trout, with particular reference to skin, intestines, liver, spleen, and muscle.

The ensuing discussion concerned coliform bacteria, enterotoxins, and bacterial phages. Three papers have been co-published on the project by the Israelis and Egyptians.

There was considerable discussion of the possibility of polychlorinated biphenyls (PCBs) in the water and fish, but in response to Dr. Abel's question, the Egyptians replied that they hadn't yet begun relevant studies. There was also considerable discussion of an organism called Eromonus described by one of the Egyptian scientists as an "opportunistic human pathogen" which I was lead to believe meant that it resided in the local waters and could be dangerous to human health.

The meeting was presided over by Dr. A. A. Latif, President of the National Academy of Scientific Research and Technology, who is personally interested in the marine program. In opening the session, he explained that although an official opening had been held two weeks previously, this was the first scientific meeting held in the institution, and was one of the reasons why all of Egypt's institutions and agencies were represented. All in all it appeared to be a rather special and significant occasion.

At that point we were joined by Dr. Ahmed Dewedar, Executive Vice

President of Suez Canal University, and we adjourned the meeting for lunch and a tour of the Institute.

From there we went to the recycling plant itself where Drs. Latif and Eisawy escorted Drs. Mancy, Cohen, El Sayed, and me on a tour of the various types of ponds and the pumping station. The essential principle of the treatment plant is leading the sewage in, allowing it to sit under the influence of sun, and allowing the sediment to settle. Then, through bacterial action, the water will gradually clarify to the point where it can be used for irrigation over again. The ponds were quite extensive, and the pumping station in excellent operating order. The plant and machinery had been set up in record time under Dr. Eisawy's personal supervision.

We returned to Cairo that evening. On the next morning, August 23rd, the entire group visited Ismailia, site of the University of the Suez Canal. We were welcomed by Prof. Dr. Ahmed Dewedar, Executive Vice President of the university, who discussed the origin and activities of the university, which is the newest in Egypt. It includes 12,000 undergraduate and 3,000 graduate students. It is thus not only the newest, but the smallest of the universities, and enjoys what is possibly the prettiest of the campuses. The university carries out several specialities, one of which has to do with agriculture and irrigation.

We then visited Dr. Ahmed Ismail Khodair, President of the University. Drs. Khodair and Dewedar were both scientists who had advanced through

professorial ranks to become President and Vice President respectively. They were very much interested in the recycling project, particularly owing to the rather extensive irrigation and recycling experiments being conducted at their own university.

Following the meeting with the President, we were escorted on a tour of the experimental irrigation facilities which are largely hydroponic, i.e. the wastewater is led through crushed stones in which are planted several vegetables, primarily sorghum. Accordingly, the plants are rooted through the gravel, essentially in the water itself, and appear to be growing very well. The various techniques of hydroponic planting were explained. The tour ended with lunch with the President.

We drove back to Cairo that afternoon, and at 5:00 p.m. convened the first meeting of the Steering Committee which Dr. Latif chaired personally. Following brief discussion to acquaint Dr. Latif with our progress, we launched into a ways and means session for the Aqaba Plan.

Dr. Latif began by inquiring into our goals and objectives. He stated that the Academy would not be interested in participating in what might be merely a collection of projects; to the contrary, he felt that to be effective, the Aqaba Plan should refer to a Program in which all of the component projects interrelated both technologically, geographically, and chronologically. In other words, there should be a general goal, i.e. the reason for our activities in the gulf of Aqaba. The goal should be divisible into several supporting objectives and toward which we could create

projects. The projects should all be interwoven and mutually supportive. Furthermore, the goal ought to be long range, because we could not possibly accomplish what was necessary in the Gulf of Aqaba for its protection and wise development, in three years.

Following discussion with Dr. Latif, we returned to Shepheard's Hotel for continued discussion to ensure that we all understood what was needed, and our individual responsibilities thereto.

This highly structured meeting enabled me to compose a package immediately following. This package is enclosed as Appendix A to this report and consists of a general statement of an overall goal (which had been developed at several previous meetings) and a "battle plan" for our work in the Gulf of Aqaba (essentially an overall plan for the Program). This is followed by the history of development of our plans; a section of specific tasks to be accomplished by the Egyptian delegation; a copy of the historic "Aqaba Agreement" of May 14, 1989; a copy of the "Program Instructions" issued April 6, 1990; and finally a group of proposals and/or outlines for oceanography, environmental monitoring, mariculture, socioeconomic aspects of tourism/recreation and coral reef development. The next section is the management plan as developed at the May 6th, 1990 meeting and a bar chart timetable of proposal development and project accomplishment through the decade of the 90s.

On the following morning, August 24th, I displayed the package to the rest of the Steering Committee members who made a few changes, following which

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we met again with Dr. Latif. He expressed his complete approval of the package in its current form and offered the full support of the Academy. He apparently intends to spearhead the Academy effort personally, now as President and again next year following his retirement.

Later that afternoon I met with Ambassador Wisner to update him on the progress of the Program. This will be reported separately.

On Sunday, August 26, the Egyptian party, Dr. El Sayed, and I went to Israel to continue the workshop sessions and Steering Committee meetings. At this point, the Egyptian delegation included Drs. Eisawy, Badawy, El Ibyary, Fanos, Khafagy, Anwar, Beltagy, Zaki, and Hamza. Dr. Magda Zaki and Ahmed Hamsa are mariculturists from the National Institute for Oceanography and Fisheries, Alexandria Branch. Drs. Ahmed Khafagy, Naim Anwar, and Alfi Fanos are from the Shore Protection Research Institute and represent the Shore Processes project.

The afternoon of August 26th was occupied in a tour of the National Institute of Oceanography (IOLR) in Haifa. The tour of the institute was highlighted by briefings offered by the Directors of the Chemistry and Biology Departments respectively, including Dr. Nurit Kress, Chairperson of the Chemistry Department and the following people in the Department of Biology: Dr. Asaf Suknik, who discussed production of lipids in microalgae; Dr. Esther Lubzens, who covered cryopreservation of organisms in aquaculture; Dr. Bruria Fungenstein who discussed genetic engineering in fish; and Dr. Michael Friedlander whose project has to do with microalgae

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cultivation, i.e. cultivating particular types of seaweed for their high agar concentration. The agar is then sold to chemical processing companies where it is used in a number of manufactured products. We were shown the ponds where the culturing was described in detail.

The next morning was occupied by the Coastal Processes workshop. Dr. Yuval Cohen, Director of the IOLR, welcomed the participants and invited guests to the workshop and introduced Dr. Ahmed Eisawy, former Director of the Institute of Oceanography and Fisheries, Academy of Science and Technology of Egypt. Dr. Eisawy expressed on behalf of the Egyptian scientists visiting Israel, his gratitude to Dr. Yuval Cohen and members of his staff for the warm reception they received. He expressed great delight in meeting, for the first time, Dr. Colette Serruya, former Director of the IOLR.

Dr. A. Golik gave an overview of the research conducted on coastal processes at IOLR. Highlights of his presentation follow:

- Nearly 1 billion cubic meters of sediment are transported annually to the east near Haifa. This figure is reduced to 1/10 of the original amount.
- In studying the sand budget along the coast it is essential to develop a numerical model in order to predict the sediment transport.

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- To develop the model it is essential to study three parameters: waves, currents and wind.
- The data for the model are collected at four stations: Haifa and Ashkelon in Israel and Ras-el-Bar and Abou-Qir in Egypt.
- They are currently working on the development of a wave climate in the deep waters, which, he added is not easy. This is done by making backward refracting calculations to the deep water and from this forward calculations are made. The results obtained are then correlated with data from the 'real world'; if they do not agree, then further re-calculation is necessary.

Dr. Golik was then followed by Dr. Ahmed Khafagy, Director of Shore Protection Institute, Alexandria, Egypt

Dr. Khafagy gave an overview of the research activities of his Institute, which are summarized below.

- Data Collection: this aspect of research plays a major role in the development of a predictive model. He noted that members of his Institute began collecting relevant data since the early 1970s, using primitive equipment.
- In 1980 (with the initiation of the Marine Technology Program for the Middle East), they began using the CAS system. This allowed

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them to analyze the wave spectrum during the decade of the 80s.

- He and his colleagues worked on developing a predictive model in collaboration with Dr. D. Inman and his staff at SIO.
- At the same time, the Egyptian participants were developing a numerical model using a different approach and different formulas. This gave the Egyptian scientists very valuable hands-on experience.
- Dr. Khafagy then described the Nile Littoral Cell. He indicated that the littoral currents have been standard since 1984. He then presented a summary of all the data collected.
- He then discussed the hydrographic surveys which are conducted in the fall and spring annually. Together, concentrated profiles were made around "sensitive" places e.g. Rosetta, Burrulus and Bard-a-wil.
- Wave spectra were fashioned during the first and third phases of the project. This was a time-consuming effort which has since been replaced by a system that depends on sensors, i.e. data logging.
- Dr. Khafagy presented some of the CAS wave data obtained near Ras El-Bar and Abou Qir.

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- He then discussed the results of the numerical modelling (in which variables were added).

Dr. Khafagy then introduced his colleague Dr. Alfy Fanos, who discussed how since 1900 the Nile Delta began to erode due to the construction of dams and other regulators, as a result of sand and mud storage behind these structures. The erosion became more pronounced after 1964 with construction of the Aswan High Dam. Off Al-Barg erosion has been estimated to be about 2 km during the last 100 years!

Dr. Fanos then discussed the wave data collected (mainly direction and height) and noted that wave-roses were made on monthly bases throughout the year.

He indicated that the wave direction is predominately in a northwest direction and that wave measurements were made during winter, spring/summer.

He then discussed the littoral currents which were measured on both sides of the following regions: Rosetta, Burrulus, Ras El-Bar, El-Arish and Bardaweel. He noted that the predominant current was from west to east, and that the most reasonable time for measuring these currents was in winter and spring. He added that currents measured beyond the breaker zone were made at depths of up to 6 meters only.

He then discussed the general current pattern at the surface and along the

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bottom. Analysis of the results obtained was done using Eigen-functions. These methods, incidentally, are not predictive, but statistical in nature. Another method of analyzing the data was by using the T-S diagram.

A third method was to calculate erosion and accretion and from this one can derive the net sediment transport.

He then cited several examples of accretion/erosion ratios for different zones along the Nile Delta coast from 1982-1988.

Finally, he discussed protective measures off Edku, Rosetta, Burrulus and Ras-El-Bar.

Dr. Fanos was followed by Dr. Naeem Anwar, Professor, Faculty of Engineering, Alexandria University, who discussed: Numerical Modelling of Sediment Transport and Simulation of Bathymetric Changes.

He discussed several models that dealt with sediment transport.

He also discussed a Schematic Representation of a grid using the Wave Diffraction method.

Following, he discussed methods to compute sediment transport and described a mathematical model dealing with this transport.

He then showed some of the results of the shallow wave height and direction

at Ras El Bar and Abou Qir obtained in October 1988. He used the data collected to feed his model. He then showed variations of contour lines at Rosetta using the numerical model.

Dr. Iosilevsky (IOLR) described his contribution to the research effort, i.e. the writing of a computer program for wave processing data (using the data from CAS). This program is in two packages. The first is for reading the data, correcting for mistakes and then making spectral analysis of the data collected. The second package is the spectral analysis itself.

He discussed the problems of data analysis and indicated that the program was written a long time ago and suffered from some equipment malfunction. The first version of the program, however, was finished not too long ago.

He then compared the Egyptian and the Israeli Models. Dr. Khafagy interjected the requirement that both countries should use the same methods (approach) in the analysis of the data.

Ing. Dov Rozen

He presented the results of the data analysis and showed examples of the wave energy and energy flux _____ (of Dado Beach).

He also discussed the long shore energy flux vs frequency for Dado Beach obtained on 12 April 1989.

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Finally he discussed the cumulative longshore energy flux at Dado Beach taken in July 1990.

The workshop was then adjourned to permit the scientists from the respective projects to work together and to hold the steering committee's final meeting in the Middle East, owing to Dr. El Sayed's departure, scheduled for the next day.

The agenda is attached as Appendix B to this paper.

Phase IV:

Abel related that the proposal had been submitted officially to USAID in June. In accepting, Bert Porter had mentioned that it might not be possible to fund Phase IV until Phase III-Amended had been completed. Abel had responded, citing the necessity of a minimum of six months overlap owing to the financial dilemma caused by the change in the grant cycle. By shifting the grant starting date ahead from August to March, AID had, in effect, required that the program be conducted in 3-1/2 years, with only three years' funding. Abel noted that while he could not speak for his Egyptian and Israeli partners, the Consortium's management funds would be exhausted long before the end of the period; accordingly, some sort of help would be needed. Abel had cited the Department of Commerce handling of the same situation in which an automatic six-months bridging fund would be furnished to the grantee.

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Cohen's principal concern was that back-charging would be permitted from 1990 to 1991 as it had been from 1989 to 1990. Abel responded that this would probably present no problem inasmuch as since Phase III-Amended was simply a continuation of Phase III, the money was, in effect, no-year money, and backcharging would be almost automatic. The problem would occur at the end of the Phase when there would be no six months funds to which to back charge.

Cohen reminded the group that earlier that morning, Dr. Iosilevsky during the coastal processes project briefing, had mentioned the need for reviewing all of the previous eight years work in order to achieve better reconciliation of Egyptian and Israeli data. This would be entirely possible according to the programs he had written, but it would take time, and it would be manifestly impossible to finish this work during the current three-year phase. Accordingly, at least an additional year would be needed. Abel responded that the same situation prevailed with respect to the Eastern Mediterranean Circulation Project, i.e. that it would be impossible to complete in three years.

Ensuing discussion referred to the various precedents. For instance, the Primary Productivity, Lakes Management, and (in part) Mariculture Programs had been continued an additional three years consecutive to the first three years. The special case of the Wastewater Recycling Project had allowed an additional partial year following the regular three-year project.

Following discussion among all of the members, it was agreed that extensions of these two projects should be requested after the AID decision had been made on Phase IV. The alternative would be to either amend Phase

IV in its existing shape or to submit an entirely new proposal. Another suggestion (which will probably be adopted) was that in the case of the Eastern Mediterranean Circulation, Princeton University submit its own proposal with itself as the project manager.

Dr. Eisawy mentioned two projects recently originated by Dr. Khayria Naguib having to do with Seafood Toxins. Abel had conveyed them to Cohen who was perfectly amenable to reviewing them for possible collaboration with one of the Israeli institutions. Unfortunately, the time he had spent during these current two weeks away from his institution had come at a bad time in the affairs of IOLR; consequently, he would be unable to travel for several weeks, possibly even months. Accordingly, while Dr. Naguib would be extremely welcome at IOLR at any time, now or in the future, it would probably not be possible for him to re-visit Egypt in the foreseeable future. Abel and Eisawy agreed to convey this to Dr. Naguib.

El Ibyary asked whether the "Management" project might actually be broken down into its two primary characteristic activities:

- a. Time spent by the coordinators/steering committee members in actively coordinating and otherwise administering the various projects;
- b. Expenses incurred incidental to carrying out the other AID mandate, i.e. effecting cooperative activities between the Egyptians and Israelis. This would include travel time, cost of tours of various

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establishments, etc. Consensus of the committee was generally positive in this respect.

This led to general discussion of finances. Abel described the impossible situation in which increasing severity of government regulations is requiring an escalating proportion of the total grant costs assigned to the accounting and reporting functions. From an original 5% of program costs, the cost of accounting alone will probably exceed 25% over the next project period, and total management costs appear to be about 40% of the total program. Discouragement was unanimous.

Aqaba Plan:

The package prepared by Abel the previous week for the Steering Committee in session with Dr. Latif was reintroduced for general review and discussion. At the same time Dr. Eisawy introduced a companion document which was essentially Abel's document, amended, edited, and slightly rewritten by Dr. Mancy. Both documents were studied by the group. Drs. Eisawy and El Ibiary suggested returning to Abel's original language as amended by Dr. Eisawy who had introduced "monitoring" as compromise language. After some discussion, the committee unanimously adopted Abel's language as amended by Eisawy.

Cohen suggested that the first project be retitled simply "Oceanography," but agreed to revert to the original language when Eisawy pointed out the value of specific definition of chemical, biological and physical

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oceanography to demonstrate the interrelationships in pollution monitoring and coral reef protection. After some discussion it was decided to adopt "Ecosystems of the Gulf of Aqaba" as the general program title with three subprojects:

1. Physical, Chemical, and Biological Oceanography of the Gulf;
2. Mariculture;
3. Socioeconomic Aspects of Tourism and Aquatic Recreation.

Considerable discussion of Phase II resulted in adoption of the terms:

- a. Assessment of Pollution Impacts on Living Marine Resources and the Marine Environment; and
- b. Development of a Framework Concerning Collaboration for Preventative and Abatement Measures.

Following discussion of the continuation of the Aqaba Program into Phase III, the consensus was that Phase II should be retitled "Pollution/Human Activities;" then Phase III could be entitled "Continuation of Human Activities," providing an elegant transition from Phase I, through II, to III. Then Phase III would be entitled "Continuation of Human Activities," "Shoreline Activities," and "Impact of Maritime Activities." It was also agreed to delete "Tectonics" in favor of a less esoteric term. Coastal

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Management would then be divided into "natural causes" and continuation of "human impacts." The revised Aqaba Plan is now shown as Appendix C to this report.

Cohen suggested that the section in Abel's package entitled "History of the Aqaba Plan" did not begin far enough back into the true history which should commence with El Ibiary's original statement, drafted at Hurgada in January of 1988. It was agreed to revised the "history" section accordingly. Dr. Eisawy recalled, however, that he had been contacted by Abel for the beginning of the Program as far back as October of 1987.

In response to Eisawy's question, Abel brought the group up to date on relationships with Harvard and the Rockefeller Foundation. He reminded the group that pursuant to the Washington meeting, their original expectations of sizeable funding from Rockefeller had dematerialized when Dr. Hausman estimated one or perhaps two hundred thousand dollars maximum contribution from that foundation. Inasmuch as Dr. Panayoutou's proposal had been for \$450,000 of which Harvard would retain \$175,000, the maximum that could be expected from the Rockefeller Foundation for the three actual participants would be \$30,000 which would not go very far to fund real work. Abel discussed his efforts in contacting and working with other foundations. It was agreed that this aspect of program planning would have to be stepped up.

Dr. El Sayed asked that the committee go no farther with its deliberations until it had been firmly decided who would be specifically responsible for

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each sector of the Aqaba Plan and the deadlines accepted by all concerned. Dr. Eisawy reminded the group that during the Cairo meeting in March it had been agreed that Dr. Gordin would be responsible for amalgamating all of the contributions to the Mariculture section. Gordin agreed to update, but asked that each Principal Investigator write his own section to begin with. It should then be possible for them all to meet, for instance at Taba, for a period of three days, to come up with a common, well-integrated proposal. While the proposal would necessarily refer to work carried on in three countries, the goal would be common to all and the interrelationships would be clearly established. Drs. Badawi and Eisawy stated that Dr. El Gaman would be the Principal Investigator for Egypt. Deadline dates of December were adopted for completion of the individual sections of the proposal, February for the meeting at Taba, and April 1991, for submission of the integrated document to Dr. El Sayed for final amalgamation into the full proposal.

Israel's portion of the Ecosystem of the Gulf is completed but it will be updated by December. Steve Brenner will be the Israeli Principal Investigator and in Egypt the leader will be Hussein Badawi, himself. Dr. El Sayed will be responsible for amalgamating these proposals.

Drs. Badawi and Eisawy nominated Dr. Ahmed Barrania to be the Egyptian Principal Investigator as well as the coordinator for the project on "socioeconomics of tourism and aquatic recreation." Dr. Cohen nominated himself as the Israeli representative but assured everyone that a professional socioeconomist would be assigned to the task in the immediate

future. Dr. El Sayed summarized as follows: All of the Principal Investigators must send their original proposals to him in December. He will review them and redistribute them to the respective coordinators. Each of the respective project groups will meet at Taba during January or February of next year. The steering committee will also meet at Taba, during the end of February or March. While it would not be necessary to have all three meetings at one time, at least the socioeconomic group should meet with the other groups to ensure relevance and a healthy interrelationship of doctrine between them.

(Editor's Note: Every effort will be made to achieve agreement on whether the next meeting will be in February or March, and arrangements will be begun almost immediately for that meeting.)

Logistics:

Abel invited comments concerning logistics aspects of the Program. He mentioned Beltagy's request for a polarograph as a classic example of the impact of the A-110 and the A-130 regulations. Beltagy had requested the polarograph nearly two years ago. Owing to his knowledge of the subject, Abel had personally selected the proper apparatus from available catalogs and had personally drafted the procurement order.

The order had actually been issued to the supplier when the auditors determined that it would be invalid owing to dramatic overbudgeting in that sector of the Program. For instance, while the sum of \$35,000 had been

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allocated to equipment under the Lakes Management project in Egypt, over \$115,000 had actually been spent that year. Under the imposition of new regulations this would no longer be possible; accordingly, all procurement action was stopped until the following year's funding could be obtained. All that was needed now were Dr. Eisawy's recommendations for transfer of appropriate funds from either another object class in that project or from another project for that purpose to enable Abel to move ahead with the procurement action.

A second horrible situation had developed concerning the procurement of Dr. Maiyza's computer equipment. Since it was necessary for this equipment to be compatible with those of Dr. Mellor and Dr. Brenner, the procurement should have been relatively straight forward. Unfortunately, AID had notified us of the necessity of going out on bids. Since no one else had been available to write procurement specifications owing the scientific nature of the gear, Dr. Abel had had to do this by himself, an activity for which he was not professionally prepared. It was then necessary to allow the usual bidding response time, following which, as expected, only the Sun Company, which manufactures this gear specific to Dr. Mellor's operation, was able to come in with an appropriate response. Accordingly, the project had lost eight months in the Egyptian sector, thus throwing the entire program out of synchronization. This was considered a major setback to the project.

Tenth Anniversary Report:

El Ibyary described in detail the book he envisioned as a result of ten

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years of cooperative effort between the participating countries. He suggested the following components:

1. Forewords, signed by Minister Walli in Egypt and Minister Schachal in Israel (Editor's note: it might also be advantageous to ask the head of AID to contribute a similar paragraph)
2. A non-scientific, i.e. semidocumentary discussion of the Program's development including what we're trying to achieve, our accomplishments to date and where we believe we're going.
3. A series of impressions of the Program from the major (and minor?) participants. It was unanimously agreed that the book would be worthwhile.

Abel had remarked that the AID enthusiasm had been unexpected and while AID had offered to allow the use of Program funds for the purpose, we would still explore the possibilities of acquiring external funding for this book.

Other Country Participation:

This will be covered in an addendum to this report.

El Sayed mentioned that if the Gulf of Aqaba Program is to be accomplished effectively, at least one ship would be needed for the purpose. The sense

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of the ensuing discussion was that this was entirely true, but that all of the participating countries had small craft available to them, and certainly if the Program were finally approved, appropriate vessels could be leased for the purpose. In any case it would be necessary to first obtain funding for the Program before worrying about the ship.

Mariculture Workshop, 8/29/90

IOLR, Israel

Dr. Cohen introduced the workshop by reviewing the project categories' origination back in 1980 and his satisfaction at the degree of cooperation achieved by both countries.

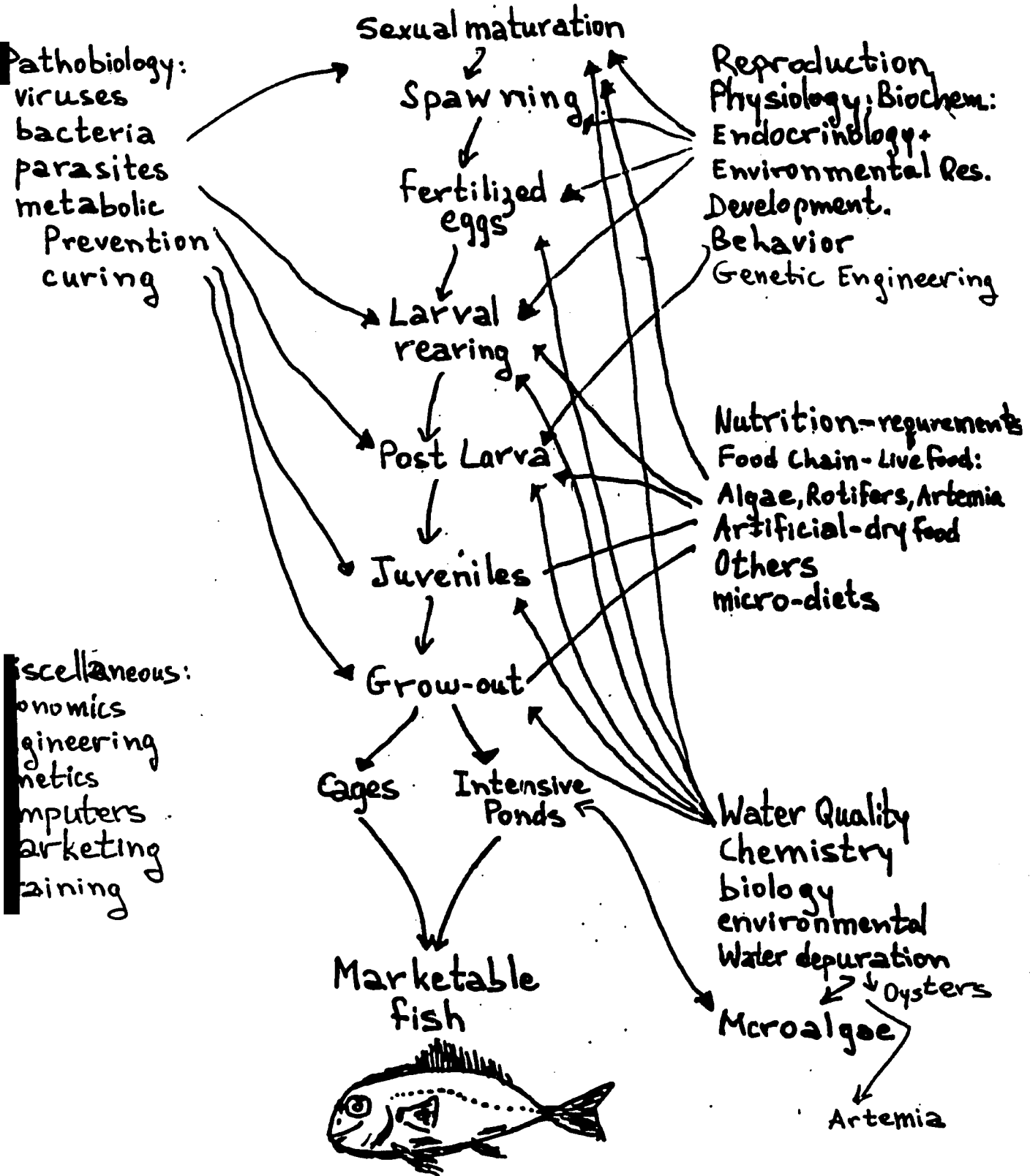
He was followed by Dr. Eisawy, who disclosed his original dissatisfaction with progress achieved in mariculture at the time he assumed his responsibilities as program coordinator. However, the pace of activity does appear to be increasing significantly, and both the technical work and its cooperative aspects appear to be proceeding satisfactorily.

Hillel Gordin was the first participant. He discussed the nutrition and the mullet projects. Mullet is an excellent subject for fish culture. It can exist satisfactorily in a wide variety of environments, and on a low protein diet. It feeds on phytoplankton of which there is an abundance. He noted that the goal of the program was essentially to make a chicken out of a fish. In some ways, however, mullet is difficult to farm and there has been no commercial success recorded to date. The problem relates mainly to reproduction, i.e. spawning.

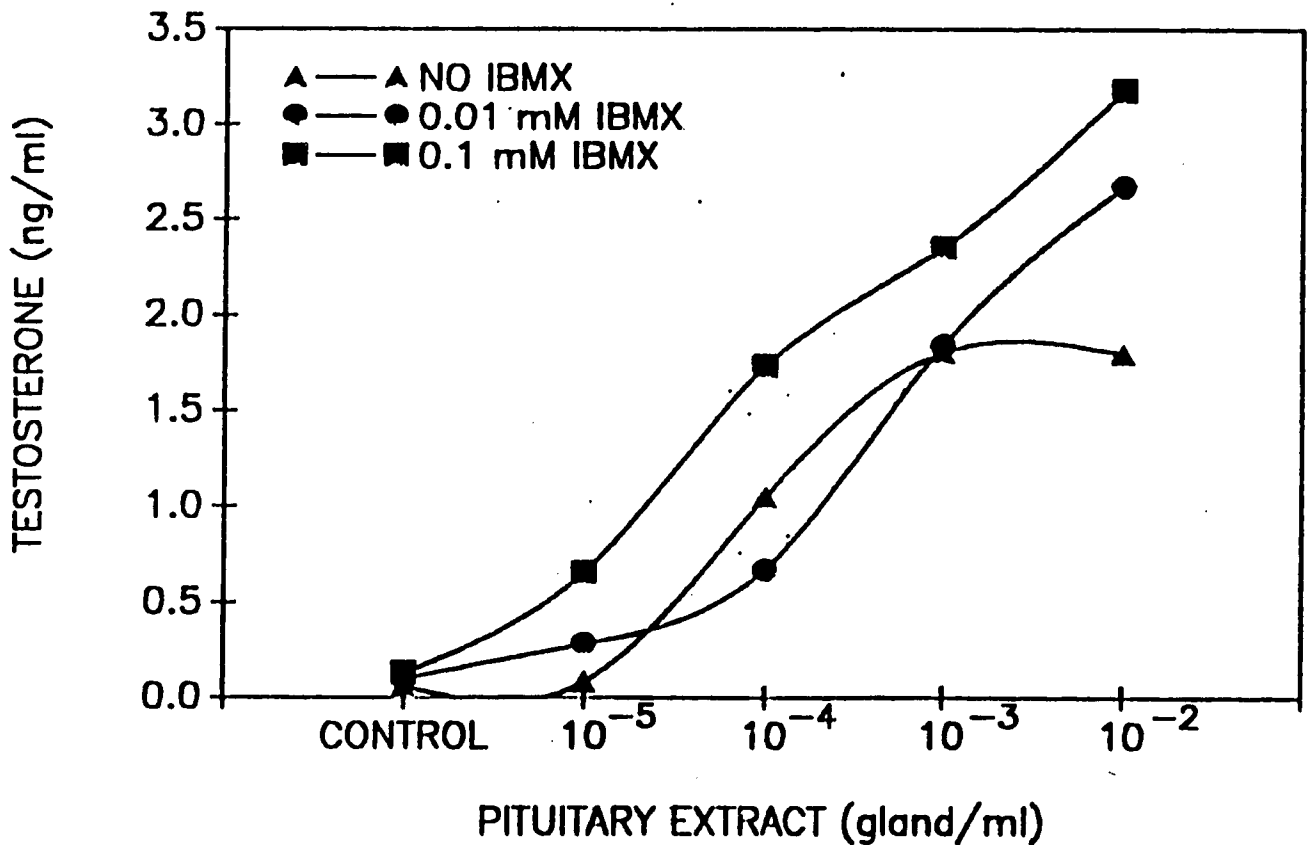
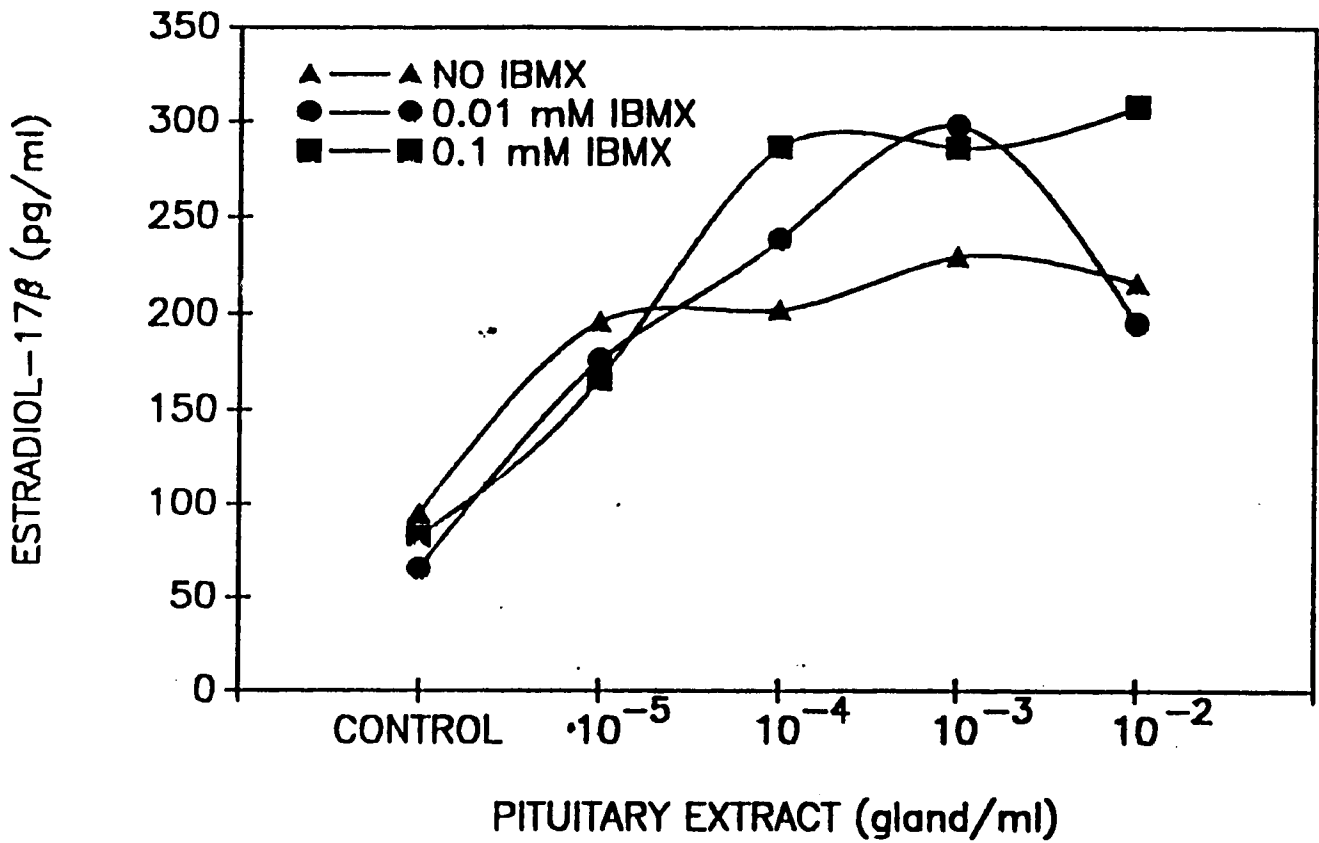
Dr. Gordin illustrated the problems and opportunities with a sequence sketch that he has used on other occasions. (See Figure 1 on the following page.) For this project he is concerned mainly with reproduction control, sexual

National Center for Mariculture

IOLR - Concepts of Research and Development

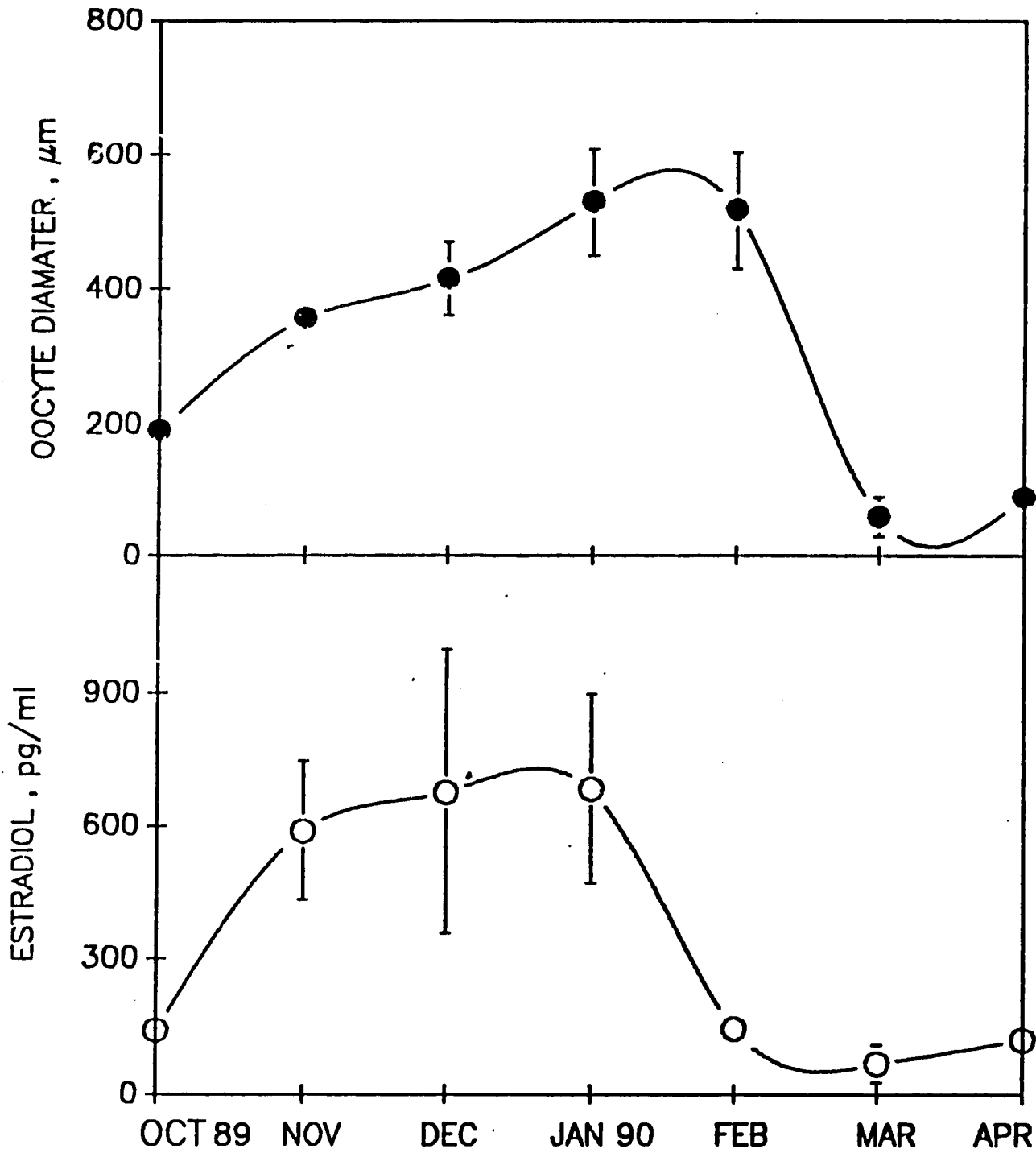


BIOASSAY OF MULLET GtH PREMATURAL OOCYTES - JAN 1990



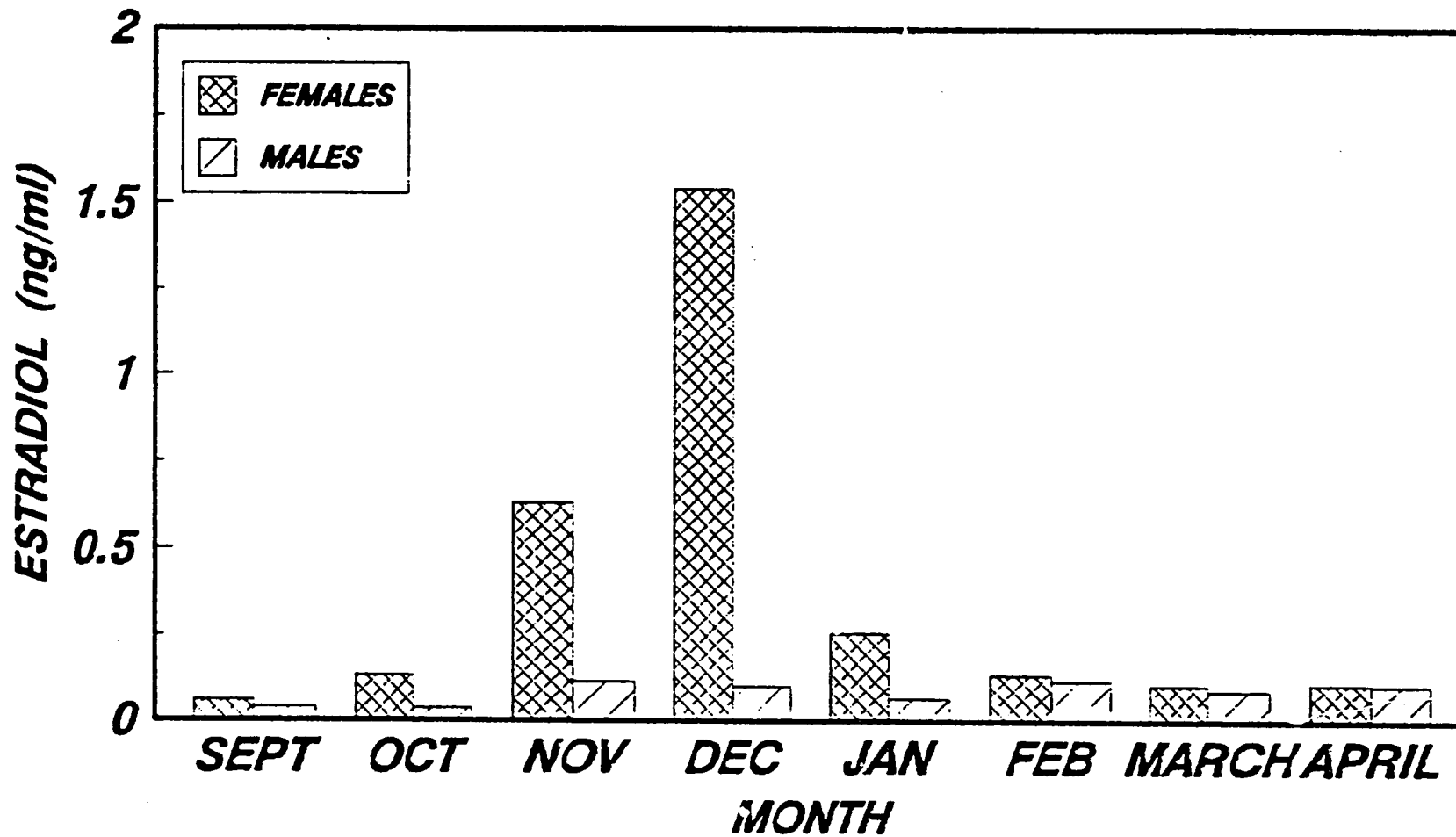
PLASMA ESTRADIOL LEVELS AND OOCYTE DIAMETERS

in Mullet (*Mugil cephalus*)

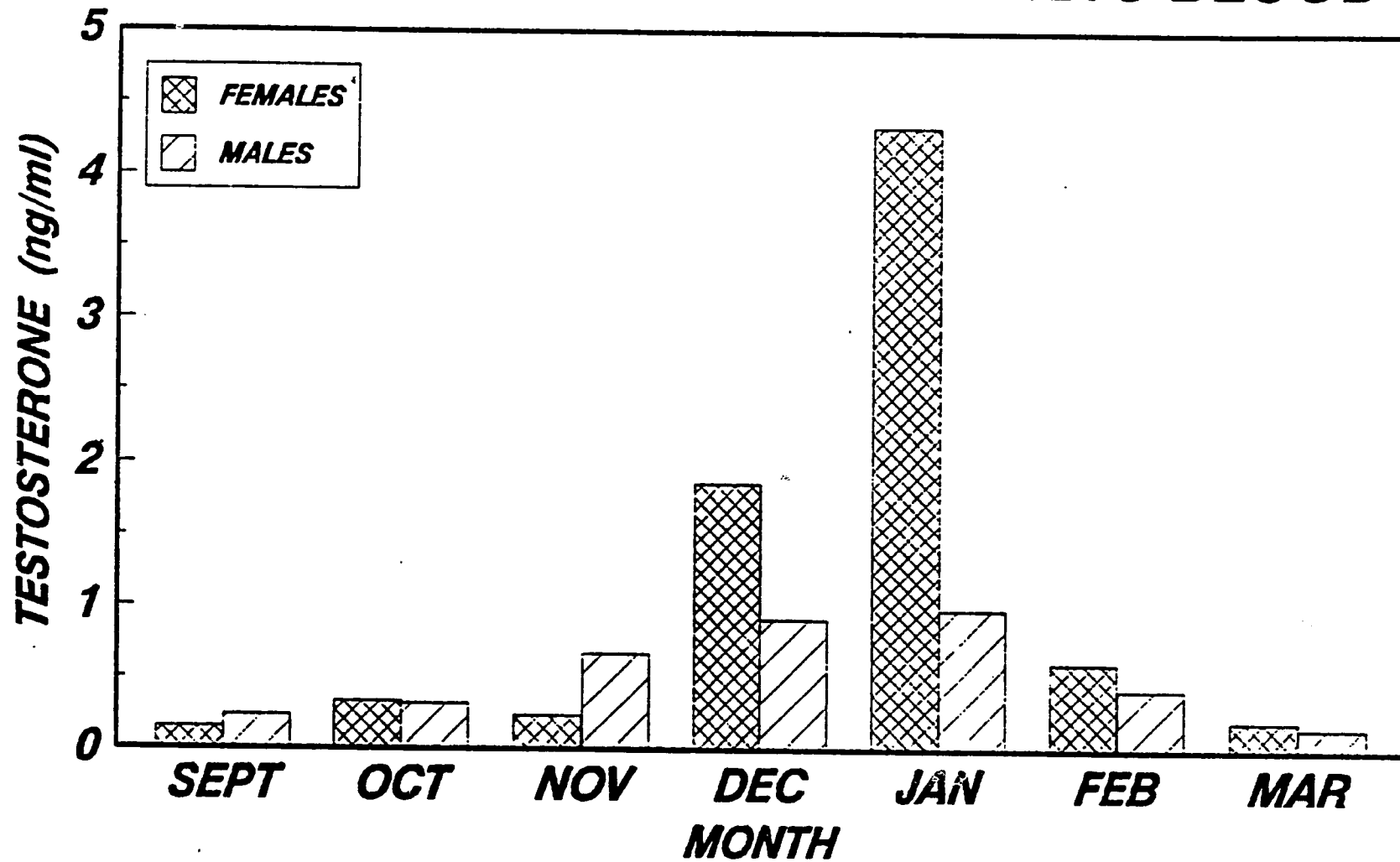


ESTRADIOL LEVELS IN MULLET'S BLOOD

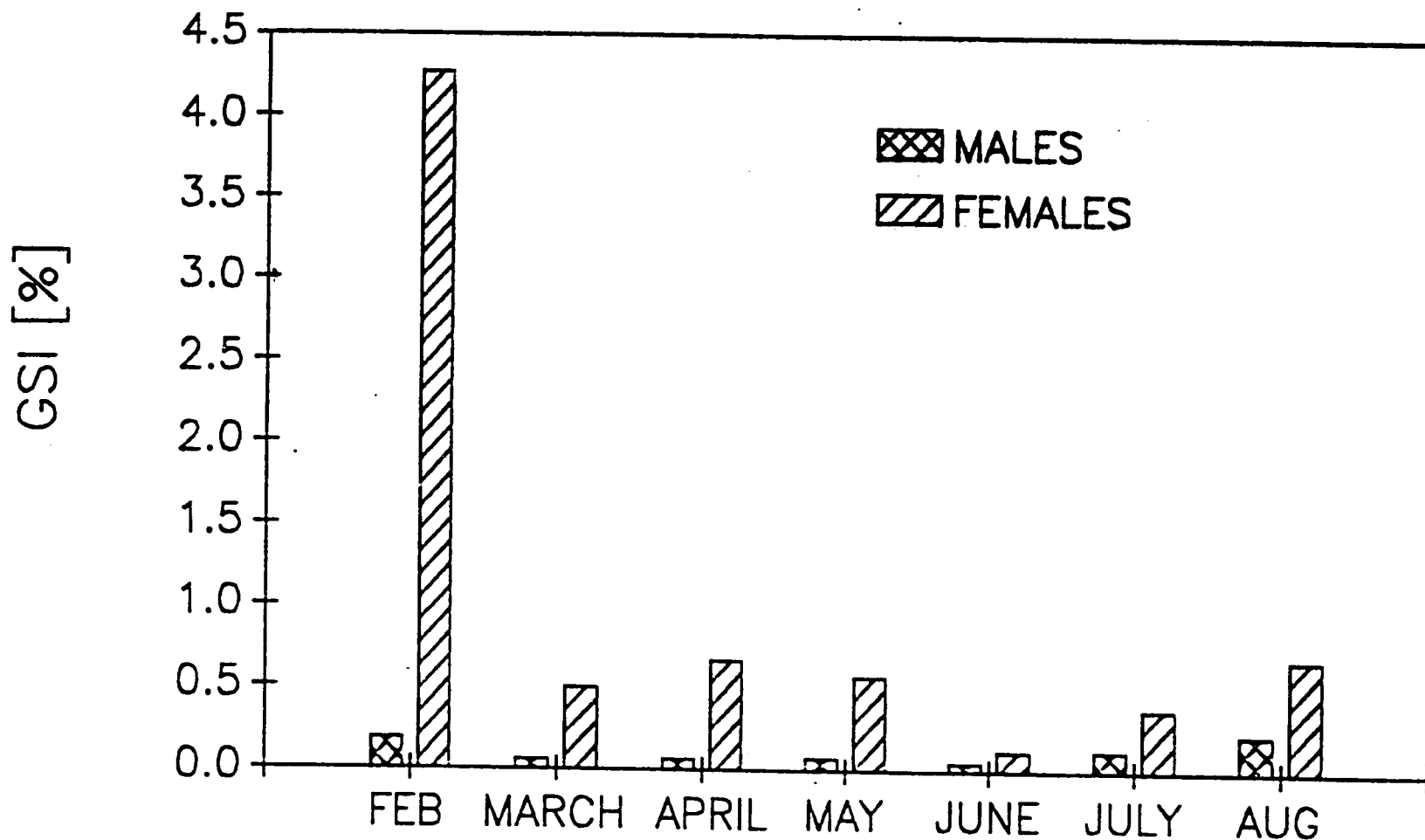
1989-1990



TESTOSTERONE LEVELS IN MULLET'S BLOOD



GONADAL SOMATIC INDEX OF MULLET FROM DAG SHAN 1990



maturation, and spawning. They started with 70 fish; unfortunately, this is far too few to conduct a program owing to inability to obtain sufficient amounts of necessary chemicals. They have to examine many parts of the fish, especially the hormones, with particular reference to gonadotropine, which is the functional group influencing reproduction.

Dr. Gordin discussed the previous sea bream work as a model for the current project. It is necessary for experimentation to begin with a five gram pituitary gland protein. Thus, it is necessary to slaughter 3,500 fish! They could develop the fry specifically for this purpose, but that process would be entirely too slow. Accordingly, they had arranged to buy the fish. Unfortunately, just as they had completed these purchase arrangements, a streptococcus infection occurred which made the purchase very risky for the purpose, and they decided not to proceed that way.

Last spring, however, the laboratory did buy a large amount of mullet weighing 0.5 kilos per individual. The hormonal pathways are illustrated in their report and described in various studies. In the sea bream they need to measure GCH, but cannot do this yet with mullet. Accordingly they try an indirect bioassay, which must be accomplished in the right season when the pituitary is loaded with gonadotropine. The question is, is this substance stable? If so, why can they not obtain huge amounts from the fish factory? In fact, this is their major source.

Gordin showed a gonadal somatic index of mullets by months, demonstrating that their big peak is in February. He also showed a graph of the bio

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assay of the mullet's GCH. While the peak occurs in Israel in February, it takes place in Egypt in June and July. They had graphed estradiol levels in mullets' blood in 1989 and 1990. This peaks in December. They then tabulated the spawning induced in mullets in January 1990.

Dr. Gordin then stated that out of 3,785,000 larvae spawned, the number that finally survived in the grow-out stage, through the period when the eggs were floating, survival in the hatcheries, and survival in the nursery, numbered no more than 500! In other words, 1 out of 7,570 larvae survived into the growout stage. On the other hand, questioning revealed that the Israelis are achieving 80% survival in their sea bream experiments.

Dr. Magda Zaki then discussed her progress. She is dealing with two important species of mullet, *mugil cephalus* and *mugil capito*. Her group is studying all of the characteristics of the eggs as an important indicator of breeding success. She outlined six steps, including the immature to the mature spawning and described measurements at different months of the year.

The gonads appear to be at their largest size in November, decreasing in January to a size of 20 centimeters in the male and 25 centimeters in the female, i.e. in the natural state. Those collected from the fish farm measured 13 centimeters and 17 centimeters respectively. Her tables of monthly distribution of maturity stages are attached herewith as Appendix D to this report.

Dr. Zaki then described the monthly variations in the sizes of the

organisms taken from Lake Edku, graphing particularly the diameter of the eggs, which appear to be bimodal. She also graphed fecundity, i.e. the numbers of eggs laid and dropped during the year. Apparently, the largest spawning period occurs from October through February, and these statistics are also described in the Appendix.

Dr. Zaki's group is also studying the histology characteristics of the fishes' gonads. Half of the egg is yolk and the other half is cytoplasm. Her next experiments will measure the relative factors in egg characteristics with respect to e.g. temperature, salinity, etc.

Mugil cephalus spawns during the period June through August. She has published five papers so far, and she distributed them to the participants at the meeting.

Dr. Eisawy summarized the discussion by describing measurements at three collecting ponds at Alexandria, Lake Burullus, and Damietta. He described some rather surprising statistics in that the fry maximize first in Alexandria, fifteen days later at Burullus and then fifteen days later at Damietta showing an apparently statistical significance in correlation with longitude. The intensive questioning which followed revealed little understanding of why this should be taking place in that fashion. The Shore Process project engineers, however, offered the possibility that one of the factors, if not the principal factor, would relate to the major water movement itself which follows approximately the same periodicity.

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Dr. Ahmed Hamza, who followed Dr. Zaki, apologized that the results of the work he is doing would not naturally be available for several weeks following this meeting owing to the nature of the respective spawning seasons. He is working on food and feeding of marine fishes. He offered several comments concerning the importance of feed in a typical fish farm, noting that mullet thrive on a wide variety of food.

Dr. Hamza's work generally concerns the progression of fish fry (.5 grams at 2 centimeters) through the fingerling stage (3 grams at 7 centimeters) to the adult stage. He determines food preferences by starving the fish and then: first applying natural foods obtained through plankton nets and other similar means; feeding egg yolks; and then yeast. He then upgrades the raw materials using, for instance, egg yolk/starch combinations and egg yolk/mill flour combinations. In response to Abel's question, he stated that the feeds being developed from chicken feathers and tomato waste five years ago had been discontinued as ineffective.

Apparently, the best results are obtained from combinations of the egg yolk and rice bran indicating that protein/starch combinations are more effective than protein products themselves. Dr. Hamza indicated that he was obtaining growth rates of approximately 1/10th of a gram per fish per day for the first month for the capito species. He is now experimenting with dried blood and slaughterhouse waste as possible feeds for the mullet. At this point in time, however, the Egyptians have not optimized a fingerling stage feed. However, as expressed previously, the starch/protein mix does appear to be heading in the right direction.

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Another line of research refers to the particle size of the feeds. Apparently there is a significant difference in the ability of the respective species of mullet to ingest foods according to the size of the feed particles. In the case of capito, it is quite necessary to recognize a serious restriction in the size of the feed particle. Accordingly, rice bran appears to be satisfactory for the process from fingerling to adult stages. While the capito can absorb relatively large particle sizes for feed, there is a definite anatomical limit to the particle size which can be utilized by the cephalus. Accordingly, it is one of the objective of the Egyptians' project to determine an optimum mix of the starches and proteins in terms of nutrition and utilization and then to reduce the cost by adjusting its composition.

Dr. Hamza was followed by Ms. Ingrid Lopatch of the Elat Laboratory. She is concerned with nutrition and in particular of the sea bass and gilthead sea bream (*spaurus auratus*). While her work is described in detail in Appendix E to this report, it can be summarized as follows: she is trying to determine the degree to which fish can synthesize the various fatty acids. Accordingly, she feeds the fish these fatty acids which have been dosed with radioactive carbon (i.e. C14). C-14 is introduced into the fish as pellets, injected through capillaries directly into the fishes' stomachs. The quantitative rate at which the food composition of these pellets is utilized is measured by the carbon dioxide output of the fish through respiration. This, in turn, is accomplished by absorbing the expired carbon dioxide on various CO₂ absorbants. The organic chemistry of the process is determined by analyzing the relative amounts of the unsaturated

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fatty acids in the bodies of the fish before and after the experiment.

Dr. Eisawy again summarized the discussions by relating his recent comparisons of fish culture projects in Israel and Egypt. Until his arrival as coordinator for Egypt, fish culture in Egypt was relatively disorganized. It was taking place in the northern lakes only and had not considered the additional-food-factor. Therefore, he has tried several directions.

First, he has overseen the development of hatcheries adjunct to natural resources. The initial experiment was on carp where fry were placed in enclosures to maximize production. As a concomitant measure, he stopped farmers from taking the fry for any other uses. Then fertilizer food was added to these enclosures. The problem was how to raise the production of the enclosures. His initial efforts resulted in increasing production from 200 to 500 fish per fedan. They are now able to produce 1,950 kilograms per fedan (approximately one acre) under optimal circumstances. In actuality, however, production of 1,000 kilograms per fedan is more likely.

Dr. Eisawy stated that the problem now is to turn the enclosure into a managed farm and he cited Tilapia, Mugil Capito and Carp. In the process, he was able to increase the Capito by 250% in the growth progression, but lost 50% of the Tilapia in the process. It appears that the cost to Egypt would be approximately 1,000 EL per pond. The enclosures, on the other hand, cost from 3,000 to 6,000 Egyptian pounds (EL) per pond. Intensive production costs approximately 1,000,000 EL per fedan yielding 70 to 120 tons per fedan. The fedans obtain 200 tons per 1,000 fedans; therefore, they work better than intensive fish farming.

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A controlled enclosure yields one ton of fish per fedan. At 300 fish per fedan, one obtains 300 tons which is better than intensive farming, cooperating in the initial estimate. Therefore, it is better to aim for horizontal rather than vertical development.

Dr. Eisawy continued, citing the scarcity of fresh water; accordingly, the Egyptians are progressing from fresh water aquaculture to brackish water aquaculture, and ultimately they will extend the process to mariculture (i.e. pure sea water). The obstacle, however, relates to the lack of feed, particularly in competition with chickens which represent the highest ratio of growth weight per feed input at the present time. Thus, they must seek other food such as algae, and this needs further research. Dr. Eisawy expressed his hope that fish farms represent the technology of the future.

Dr. Lopatch, in separate conversation, described standard paths of development of the various fatty acids which are measured by chromatography in determining the relative amounts of these acids before and after the experiment, using C 14 tracers:

This ended the meetings including the steering committee meetings and workshops. In concluding, Dr. Cohen described his satisfaction that the discussions had progressed from monologues to dialogues in which the participants in each of the projects have demonstrated their ability to work with each other regardless of country affiliation.

In concluding the ceremonies, Dr. Abel echoed Dr. Cohen's remarks. He

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stressed that while he had been able to follow the workshop on geology, he had to admit that biologists have a language all their own, and he hoped, therefore, that they would treat his draft with kindness and care, responding in such a way as to make the report meaningful.

On Thursday, August 30, the group met with Dr. Yuval Ne'eman, Minister of Energy and Infrastructure, Science and Technology. Dr. Ne'eman has replaced Moshe Schachal as the minister overseeing the IOLR.

Dr. Cohen opened the meeting by explaining the group's presence in Israel. Abel followed, cataloging the technological components of the Program and what has been accomplished therein to date. Dr. Eisawy then conveyed his sense of the Program's goals, values, and future. The Program appears to have the minister's full support.

From there we visited the Weizmann Institute as the guests of its Vice President, Dr. Mordhay Avron. Dr. Avron offered us a guided tour of the Institute, followed by a lecture -- actually a preview of the beta-carotene project proposed as part of Phase IV.

This project holds enormous promise. It is based on the unusual properties of an unusual organism called *dunaliella* which exists naturally at extremely high salinities. In fact it is the only living resident of the (thus mis-named) Dead Sea. *Dunaliella* is composed largely of glycerin, which property had originally led to speculation upon its possible culture as a source of useful organics.

Its most valuable property, however, is its ability to produce beta-carotene in significant quantities.

Beta-carotene is an essential ingredient in a large number of health foods, and is legitimately credited with a wide variety of medicinal properties. It is, for instance, the primary active agent which makes Vitamin A beneficial to eyesight. It is evident that this will be an excellent project, in all three 'countries' interests.

The meeting with Dr. Avron was the final item on the agenda, as the meeting planned with Ambassador Brown was not compatible with the plane schedules.

The next -- and last -- stop, was the airport. Aloha.

9/24/90

jwb

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P A C K A G E

I Overall Plan

II History of Development

III Tasks for Egyptian Delegation

IV ~~Enclosures~~ "Agaba Agreement" of 5/14/89

V "Program Instructions" of 4/6/90

VI Enclosures: Proposals or outlines

A. Oceanography

B. Environmental Monitoring

C. Mariculture

D. Socio Economic Aspects of Tourism/Recreation

E. Coral Reef Development

VII Management Plan

VIII Bar Chart Time Table

DEVELOPMENT OF GULF OF AQABA IN THE DECADE OF THE NINETIES

- Development of The Master Plan, including a general, but clear statement of The Overall Goal (Completed)
- Use of The May 14, 1989 "Agaba Agreement" as The substantive Document (Completed)
 - a. Statement of Goal
 - b. Statement/listing of Objectives Toward That Goal
 - c. Statement of Priorities and suggested actions
 - d. Listing of suggested research Topics (presently includes inter disciplinary environmental studies; mariculture; Coastal Resources and management)
 - e. Identifies The overall Steering (Coordinating) Committee
 - f. Suggests The appropriate Subcommittees, i.e. Teams
 - g. Sets forth Timetables for accomplishment
 - h. offers a flow chart
- 3. Adoption of Research Areas
 - a. Environmental Protection
 - b. Resources Development
 - c. Coastal Management and Development
- Division of Master Plan into Three 3-year phases:
 - a. 1991-1994 : Phase I
 - 1/3 Environmental Protection
 - a. Physical Oceanography
 - b. chemical Oceanography
 - c. Biological Oceanography

2 Coral Reef Dynamics Impact of Human Activities

- 2/ Mariculture - Preliminary Approaches
 - a. Selection of one or Two species
 - b. Engineering aspects - initial approach

3/ Tourism and Aquatic Recreation Introductory Aspects of Socioeconomics

b. Phase II 1994-1997

- 1/ Continuation of mariculture
advanced aspects of development
marketing
selection of additional species

2/ Further development of Socio Economic and political aspects of Tourism and Aquatic Recreation

3/ Pollution: assessment of impacts on marine resources and the environment

c. Phase III, 1997-2000

1/ Completion of mariculture, including all species amenable to the Technology

2/ Coastal Management, Geology

a/ Erosion

b/ Sedimentation

c/ Tectonic

3/ Impact of Harbor construction and/or Modification
on Marine Environment ^{and industrial development.}

4/ Maritime Traffic Research

Brief History of its development

May 14, 1989: Preparation and Signing of
The "AQABA ENVIRONMENTAL PROGRAM"

1. Statement of Overall Goals
2. Listing of objectives
3. Suggested Priorities
4. Recommended Actions
5. Established a Coordinating Committee
6. Established Committees and designated participants for each project
7. Set forth Timetable for accomplishment
8. Set up an elementary flow chart

April 6, 1990: Sub Committee of Steering Committee met in
College Station Texas: Mancy, El Sayed, Abel

"Development and Implementation of The "AQABA PLAN"

1. Constructed Proposal outlines
2. Offered instructions for completion of proposals
 - a. Hazard Monitoring
 - b. Mariculture
 - c. Oceanography of The Gulf
 - d. Socio-economic and political aspects
3. Drafted and circulated The Management Plan for The Program
4. Set up a detailed work flow chart with individual responsibilities outlined

- 5. Set forth agenda for Steering Committee scheduled for May 23, in Washington
 - a. Agreement on the projects
 - b. Assignment of responsibilities for each project, by country
- 6. Renewed its Time Table
 - a. Submit final copies of proposals to steering Committee by June 30, 1990
 - b. Steering Committee submit complete proposal to USAID by August 31, 1990

May 23, 1990 Full Steering Committee met in Washington: Eisaawy, El Ibiary, Cohen, Mancy, El Sayed, Abel (Jordanian Representative had to cancel)

- 1. Reaffirmed objectives
- 2. Promised to complete proposals by August
- 3. Scheduled Full steering Committee meeting for Cairo, Summer of 1990

Recreation Objectives For The Egyptian Contribution

1)

2

ture

iew Jordanian Proposal

2e and

plete Egyptian Proposal in parallel

can be

• Agree on The Species ?

• Agree on Time Table ?

• Agree on Technologies ?

gets

• Agree on Budget ?

gets

• Identify The Principal Investigator

gets

• Identify The scientists for each sub-project

at Egypt

• site a process for each subsection.

rael

• a may agree or disagree with each sub-section

ie)

a- If agree - simply fulfill your sections in

ation

parallel with The Jordanian proposal

b. If disagree, propose alternatives; send

to Dr Wahbeh to reconcile

plete The process by end of October

must obtain The same material as The

n Hillel Gordin

is not necessary for The Egypt-Israel

to be identical to The Egypt-Jordan proposal,

y should be sufficiently similar to each other

ofy USAID

sure That needed equipment is clearly specified

a. justified in each case

b. include approximate cost

Same with Travel

Natural Resources

B. Coral Reefs

1. Review proposals
 - a. Bright - USA
 - b. Rinkevich - Israel
 - c. Wahbeh - Jordan

These are mainly ecological studies of existing coral reef.

2. Each of these suggests subtopics for research.
3. The Bright proposal, especially, suggests several approaches for the Egyptians - consider each one for
 - a) participation, or
 - b) rejection

If rejection - exclude from proposal.

If participation - amplify what further activities you wish to engage in:

4. Match the above to the Jordanian outline
5. Identify principal investigator for the project
6. Identify investigators for each topic/sub project
7. We will obtain similar documents from Jordan to match.

8. When you are finished, match with the Rinkevich proposal

- a. Determine which processes are identical
- b. In cases of dissimilarities, return to

Israel for reconciliation with Rinkevich proposal

9. Identify all needed equipment
 - a. Justify purchase
 - b. Estimate costs

10. Do same for travel

11. Calculate Total Budget

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C. Socio-Economic Aspects of Tourism and Aquatic Recreation


1. Review preliminary outline (IT is non-professional)
2. Review data on the subject compiled and furnished by the Jordanians
3. Determine what similar data are available and compile same
4. Obtain a professional assessment of what can be done in this area and the suggested approach
 - a) send copies to Jordan - include budgets
 - b) send copies to Israel - include budgets
 - c) send copies to U.S.A. - include budgets
5. The Coordinating Committee will ensure that Egypt receives equivalent documents from Jordan and Israel (USA participation would be remote and expensive)
6. Accept leadership responsibility for coordination of the final documents
7. Attempt to follow a Time Table:
 - a. # 3 October 1990
 - b. # 4 End of October 1990
 - c. # 6 December, 1990


AQABA PLAN: (TENTATIVE) TIMETABLE


(8)


1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000


Phase I: ^{Preparatory} Complete Proposal 

Phase I: Activity (Implementation) 

Phase II: Complete Proposal (Preparatory) 

Phase II: Activity (Implementation) 

Phase III: Complete Proposal (Preparatory) 

Phase III: Activity (Implementation) 

COOPERATIVE MARINE TECHNOLOGY PROGRAM FOR THE MIDDLE EAST

Steering Committee Meeting - August 27, 1990
Institute of Oceanographic & Limnological Research, Haifa, Israel

AGENDA

1. Israeli Remote Operating Vehicle (ROV) Cruise Schedule for Oct.
2. Wrap-up on Phase IV
3. Aqaba Plan
 - a. Updating on recent events
 - b. Current status of planning
 - c. Rearrangement of proposal sequence
 - d. Project coordination
 - e. Assignments and deadlines
4. Logistics
5. Finances
6. Other Country Participation
7. A Tenth Anniversary Book
8. Next Meeting

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REVISED AQABA PLAN
Decade of the Nineties

Phase I: 1991-1994: Ecosystems of the Gulf of Aqaba

1. Environmental Protection and Monitoring
 - a. Physical, Chemical, & Biological Oceanography
Egypt - Hussein Badawi
Israel - Steve Brenner
USA - Sayed El Sayed*
 - b. Coral Reef Dynamics and Impact of Human Activities
Egypt - Hussein Badawi
Israel - Reinkevich
USA - Tom Bright*
2. Mariculture - Preliminary Approaches
Egypt - Dr. El Gaman
Israel - Hillel Gordin*
3. Socioeconomic aspects of Tourism and Aquatic Recreation
Egypt - Ahmed Barrania*
Israel - Yuval Cohen (!)
USA - (Theodoro Panayoutou?)

Phase II - 1994-1997: Human Activities

1. Pollution and Human Activities
 - a. Assessment of Pollution Impacts on Living Marine Resources and the Marine Environment
 - b. Development of a framework concerning collaboration for Preventative and Abstement Measures
2. Continuation of Mariculture
 - a. Advanced Aspects of Development
 - b. Marketing
 - c. Selection of Additional Species
3. Further Development of Socio Economic and Political Aspects of Tourism and Aquatic Recreation

Phase III - Continuation of Human Activities

1. Impacts of Shoreline Activities/Coastal Management
 - a. Natural Causes
 - 1/ Erosion
 - 2/ Sedimentation
 - b. Human Causes
 - 1/ Harbor Construction/Modification
 - 2/ Maritime Traffic
 - 3/ Industrial Development
2. Completion of Mariculture, including all species amenable to the Technology

EGYPTIAN PROCUREMENTS

<u>DATE ORDERED</u>	<u>ITEM</u>	<u>SOURCE</u>	<u>COST</u>	<u>Requestor</u>
21-90	Assorted Computer Items	Sun Microsystems, Inc.	34,213.00	Maiyza
21-90	Vehicle Parts	Middletown Auto Parts	\$2,168.70	Eisawy
27-89	Framework 3 Lanpak	P.C. Connection	\$659.00	Beltagy/Zaki
24-89	Chevy Celebrity Spare Parts	Middletown Auto Parts	\$4,575.20	Khafagy
24-89	Velocity Joint	Middletown Auto Parts	\$934.10	Khafagy
6-89	CTD Profiler	Sea-Bird Electronics	\$11,735.00	Eisawy
6-89	Portable Induction Salinometer	Beckman Industrial Corp	\$8,041.00	Eisawy
6-89	2RCM4S, 1 Conductivity Cell 3 Vinyl Floats Sets, 2-WLR-7Water Level Recorder 2 Moring Fram, 2 Vinyl Float	Aanderaa Instruments	\$33,152.00	Eisawy
15-89	Historange Microtome Main Unit	Cambridge Instruments	\$18,316.00	Zaki
8-89	Assorted	Pharmacia LKB	\$16,853.00	Zaki
9-89	STD Meth Exam Wtr/Waste	Fisher Scientific	\$84.41	Awad
20-89	Palmer Counting Cell	Wildco-Wildlife Supply	\$303.40	Awad
20-89	Book Limnology -Wetzel	W.B. Saunders Co.	\$71.51	Awad
20-89	Chlorophy II A from Anacystis	Sigma Chemical Co.	\$34.90	Awad
			<u>\$131,141.22</u>	

ISRAELI PROCUREMENTS

89	AT computer		4,400.00	Aharon Zvi
89	Boat		8,100.00	Aharon Zvi
89	Others		10,600.00	Aharon Zvi
			<u>23,100.00</u>	

December 1990

Papers/Reports published**resulting from****Cooperative Marine Technology Program for the Middle East
(Phase III and Phase III-amended)****I. Shoreline Change Along the Nile Littoral Cell**

Inman, D.L. 1984. The Nile littoral cell and man's impact on the coastal zone of the southeastern Mediterranean. p. 352-353 In: 19th Int'l. Conf. Coastal Engin., Abstracts, Amer. Soc. Civil Engin., 544 pp.

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- Boyd, W.A. and R.L. Lowe 1985. A high density cassette data acquisition system: operation and applications. IEEE Ocean Engineering Society. Conference Record, November 12-14, 1985, v. 1, p. 606-609.
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- Inman, D.L., S.A. Jenkins and M.H.S. Elwany (in preparation). A continuity model for sediment budgets and shoreline changes.
- Inman, D.L., M.H.S. Elwany and S.A. Jenkins (in preparation) Bar-Berm and shorerise profiles.

Elwany, H. and Y. Iosilevskii 1990. Wave spectral analysis programs for a CAS unit.

Elwany, H. nad Y. Iosilevskii. 1990. Wave spectral analysis programs for a CAS unit. A joint report, CCS and SIO, 4 pp. APP. A-H.

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PROBLEMS and CORRECTIVE ACTIONS

All the readers of this report will by now be extremely weary of seeing the identical problem top-listed on all the reports: Underfunding. An innovative expression of this problem was sought for the longest time -- unsuccessfully.

In the case of the Marine Program, however, lack of funds is not really a problem, per se, because once a fixed amount has been assigned to a Program, the Principal Investigator who cannot adjust the tempo of his program to the funding has no business as Principle Investigator. This is true of the Marine Program: The Steering Committee members are satisfied with the total award figure. This Program's problems are caused by process rather than product.

- a. Auditing. Expression of this problem is frustrating because the cause of the travail (A-110, A-133) is well understood. The imposition of draconian reporting requirements stems from misuse of AID funds in the past, and the U.S. Government is probably taking the right steps to confront this to a large highly automated organization, these reports present little problem; to a small organization. In this regard, the Consortium (i.e. R.B. Abel) made two errors. He failed to forecast the advent of A-110 (this hardly a disgrace, since no one else predicted it either) and acting in the

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spirit of the Program, he gave up 40% of his deserved indirect costs. USAID has apparently made the decision to allow the errors to cancel out by encouraging the Consortium to submit a supplemental request for the remaining overhead, simply to cover the additional accounting costs. The request was submitted in June, 1989; it will apparently not be processed until Spring 1991. This causes the Consortium to operate with borrowed funds (@ prime + 1 1/2%) during the interim.

- b. The Phase III - Amended fiscal cycle has been shifted from September to March as a matter of administrative convenience. Although the reason for this is entirely valid, other agencies accompany such actions by awarding bridge funds to accomplish the transition AID has chosen not to do this.

Actions being taken at the Consortium to address the above two problems including:

- 1 All of Dr. Abel's domestic time is being contributed;
- 2 He has released part of his clerical support force and now issues all except very official correspondence in longhand.

- c. Severe limitations on operating funds in the field nearly caused cessation of operations in Egypt. The problem was solved when the AID Contracts supervisor allowed a waiver from 30 to 90 days. Mr. Bert Porter of AID was the principal protagonist in behalf of the Program.

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- d. When Drs. Mellor (Princeton), Brenner (Haifa), and Maiyza (Egypt), met to standardize their observations and analysis, they settled on equipment already on board: In Israel and the United States, but not in Egypt. AID's requirement for the Consortium to prepare specifications and go through the bidding process caused a ten month delay in Egypt's sector of the project and set the project back dramatically. The equipment has now been procured, but at severe cost to the Program, particularly in its cooperative aspects.

- e. By far the worst potential set-back to the Program almost occurred when the funds provisionally allocated to it in 1987 were re-deployed to the Albert Einstein Foundation owing to unusual "earmarking" by the Congress. Through Congressman James Scheuer's initiative the Congress made the funds available from another source. The event occasioned a two year processing time for the Phase III - Amended contract.

- f. An early problem relating to Egyptians antipathy to traveling in Israel was overcome almost single handedly by the Eisawy - El Ibiary team. Travel to the workshops is now limited only by available funds.

- g. Interfacing between the Marine and other Regional Cooperation Programs is lacking in the United States. To the knowledge of the author, the only action being taken to address this problem is his own griping. This will be covered in more detail in the next section.

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n. The nature of this Program, with particular reference to its science, its geography, and politics, makes continuity very difficult. For instance it's impossible to stop fish from growing while they await the start of the next phase, nor can the scientists themselves, interacting in the Middle East, simply stop living. Understandably, however, USAID must take considerable time to process proposals in a proper and deliberate manner. Accordingly, overlap of six to twelve months ought to be striven for between phases, and this should be included in USAID's next budget request.

i. Congress is greatly interested in Regional Cooperation. So are our Middle East Ambassadors and officials of many Washington agencies at the policy level. This is not so at AID. I commonly discuss the Program with the Administrator of NOAA, Assistant Director of the National Science Foundation, and President of the National Academy of Engineering, but I've not penetrated to even the third level of AID in three years.

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INTERFACING POSSIBILITIES AND AN ASSESSMENT
OF TRUE COLLABORATION

The possibilities for interfacing with the AID bilateral Program in Egypt have been explored, and there is interaction between the Academy and the Agriculture which is apparently the recipient of considerable USAID.

Interaction with the other Regional Cooperation projects occurs to some extent in the field, but lamentably, not in the United States where it would be most useful. In 1984, at Abel's instigation, the AID Regional Cooperation Program Manager, Richard Burns, convened an informal workshop. Abel, at least, found it interesting, productive, and generally rewarding.

A lavish three-day summary session was convened in the House of Representatives in 1985. Through no fault of USAID, it failed to live up to expectations, at least, in this perspective. The presentations were formal and structured; interaction was minimal; the arrangement for the Congressional Hearing was farcical; and the report was too little and too late, i.e. it lacked substance and emerged two years after the meeting, too late to have any effect on the program.

This author, on his own initiative has prepared and submitted a report to AID enumerating the observations of a long time participant in constructive perspective. These twenty observations include many of the issues covered in this report plus many others. Highlighted, however, was the matter of

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interfacing among the Regional Cooperation principal investigators.

To estimate true cooperation is not easy, nor have indices of measurement been provided by the contracting agency. Accordingly, these will be offered de novo:

1. Sharing of data - To the writer's best knowledge, no data obtained by either country has been withheld by the other. Rather, there appears to be a friendly competition to produce and deliver the most and best information.
2. Co-publication - This has been slow to start but is now proceeding satisfactorily. A half dozen publications have been co-authored.
3. Travel - Where formerly, all travel had to be performed by the Israelis, the story is now quite the opposite. The Egyptian teams now number up to a dozen participants. In Cairo and Alexandria, the private homes are commonly open to the Israelis. The only apparent limit is funding, now.
4. Personal Interaction - This is the hardest to quantify and the easiest to observe and report. If mutual friendship, esteem and admiration were the criteria for success of this type of Program, it would be the world's greatest. In particular the personal bonds between the leaders continues to transcend politics and is largely responsible for the pending recruitment of other Arab nations.

Work Plans

Both the Egyptian and Israeli laboratories are revising their work plans; consequently it is proposed to submit these as addenda, to avoid further delay. At this time, however, the following actions can be projected:

1. Shoreline Processes Project:

- a. The scientists will continue to develop the computer program to improve alignment between Israeli and Egyptian CASS (mainly wave) records.
- b. A meeting among all participants, originally scheduled for Scripps Institution of Oceanography (La Jolla, CA) will be moved, probably to Cairo, to reduce travel costs. The meeting was originally scheduled for California, where the equipment is being further developed.

2. Eastern Mediterranean Circulation Project:

The Israelis and Egyptians will continue to refine temperature profile data from all previous cruises in the Eastern Mediterranean. Egyptian participation has been set back one year while their equipment was being ordered. The equipment was shipped in December 1990 and is expected to arrive and achieve operation by February, 1991.

3. Grey Mullet Culture:

The Egyptians will continue to develop correlations between egg size and quality, and various experimental feeds.

The Israelis will continue to track hormones through the fish's digestion processes. They will meet to compare data during the winter.

4. Studies of Brackish Water Fishes:

Both the Israelis and Egyptians continue to be concerned over experimental feeds. They will continue their efforts to maximize growth factors and to reduce costs. The Egyptians will continue to work on egg yolk/starch/bran/milk flour combinations, and the Israelis on fatty acid synthesis. They expect to meet in February/March to compare results and discuss further planning.

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