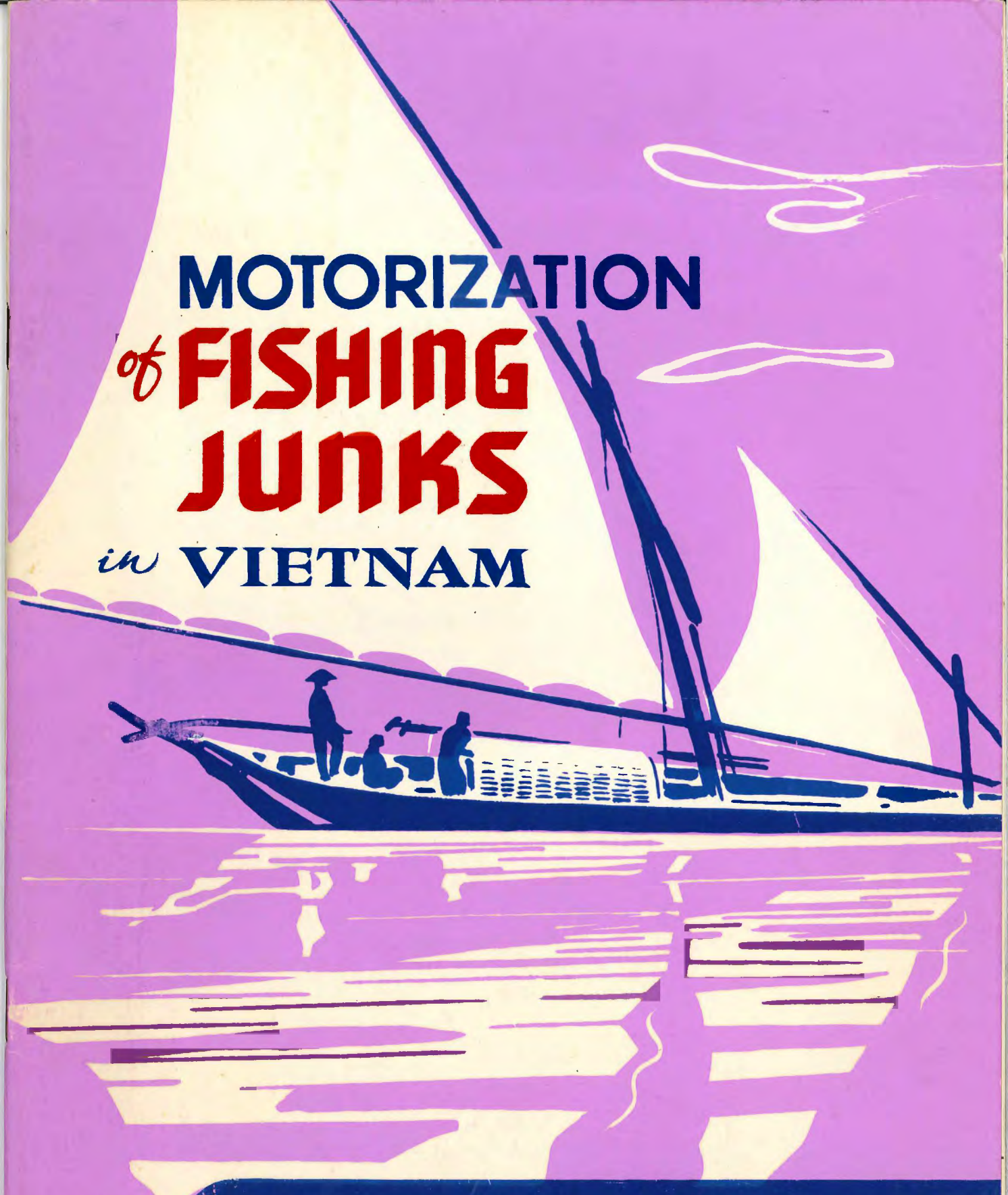
MOTORIZATION of FISHING JUNKS in VIETNAM



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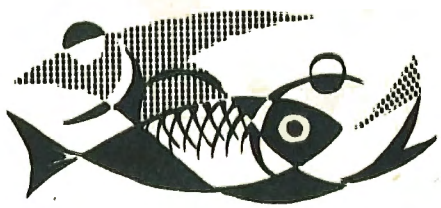

DIVISION OF AGRICULTURE
United States Operations Mission
to Viet-Nam
Saigon, Viet-Nam

THE MOTORIZATION of VIETNAMESE FISHING JUNKS

The basic work covered by this report is a portion of the cooperative technical and financial assistance program of agricultural improvement and development jointly supported by the International Cooperation Administration of the Government of the United States and Agricultural Agencies of the Republic of Viet-Nam

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Fisheries Advisor

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ACKNOWLEDGEMENTS

Special thanks are given to Mr. W.H. Fippin, Chief, and to Mr. L. W. Jordan, Deputy Chief of the USOM Division of Agriculture and Natural Resources, for their support and encouragement in the undertaking of the project for motorizing the "basket-bottomed" fishing boats of Vietnam ; and to Mr. C.E. Thomas and Mr. George McDonald of Program Support for their assistance in preparing this brief review of that project.

The line drawings used in plates I and 2 are from "Voiliers D'Indochine" by J.B. Pietri.

A Vietnamese Master Fisherman wearing palm leaf rain-coat

"So goes the Podrone
So goes the Fleet."

DEDICATION

With great admiration and respect, this small volume is dedicated to the brave and industrious fishermen of Vietnam who, for uncounted generations, have plied these temperamental tropic waters in their fragile "basket" boats, bringing food from the sea to their protein hungry countrymen in return for a most meager living. The work herein described was undertaken in the hope that their labors might be more amply rewarded. May the holds of their "basket" craft be richly ladened.

INTRODUCTION

There are approximately 35,000 fishing junks of the "bamboo bottom" type being used in the coastal waters of Vietnam today. Their annual catch, which now exceeds 165,000 tons, represents only a fraction of the country's salt water fishing potential.

Heretofore, dependent upon the whim of the winds, or upon their oars, for motive power, the fishermen of Vietnam have been obliged to invest large portions of their time and effort simply in getting their craft to and from the fishing grounds. An even more grievous handicap has been the consequent limitation of their fishing range causing near shore grounds to be grossly overworked and leaving wholly unexploited the larger, richer shoals that lay tantilizingly out of reach.

But today, with junk motorization the Vietnamese fishermen no longer need be tethered to shore by the calculated range of his luck and the endurance of his oarhands. The oarsmen in turn may now be freed for more rewarding work.

There is small wonder that the hard pressed fishermen have responded so enthusiastically to the introduction of a simple, practical method for installing motors in their "bamboo-bottomed" junks. This small innovation is revolutionizing the country's fishing industry. With American Aid help, boats are being motorized in steadily increasing numbers, at the present rate of about 1,000 per year. Those so equipped are bringing to market three times more fish than they did with no motors, which means an appreciable increase in standard of living for the fisherman's family, better diets and more income for the nation. A new era of prosperity has come to the coastal villages of Vietnam.

THE FISHING JUNKS OF VIETNAM

When considering the variety of fishing craft used throughout the world, one notes literally thousands of types that differ radically in design, length, draft, beam and the manner of construction. To those uninitiated in the ways of the sea, it might appear that such a variety of craft represents the capriciousness of the fishermen and their desire to have something different. This is far from fact. A careful investigation of each type of fishing vessel will reveal that it has been developed to meet specific local conditions such as seasonal winds, type of wave to be encountered, sudden violent squalls, maybe ice, extreme tides, high surf conditions, availability of building materials and many other factors.

The unique "basket-bottomed" fishing junk of Vietnam is an example of resourceful adaptation. Nowhere else in the world is this singular type of craft constructed. Used principally in the coastal areas of Central and South Vietnam, it has a history of development that dates back over many hundreds of years. The warm tropical waters of the South China Sea, are abundant with teredo wood worms, small bivalves, mollusk and other marine life which attacks the untreated wooden bottoms of boats in a most vicious manner. Also, there are few deep water harbors along the coast of Vietnam. This necessitates beach landing through surf to unload fish catches, or the use of open roadsteads for anchorage. For these reasons, the bamboo bottomed boat has evolved, and this craft, well suited to the area, is predominant in Vietnamese waters.

Long before the invention of preservative marine paints, the Vietnamese fisherman was plagued with the necessity of frequently renewing the bottom of his boat because of the destruction caused by teredos and other harmful marine life. His problem was to find a material that would resist the attack of the "worms". Good "Sao" wood was available for general hull construction, but it was the bottom of his boat that was causing trouble. Eventually he found that bamboo, strong, pliable, tough and light, when treated with a resin binder, best resisted the "bite" of the teredo.

CONSTRUCTION

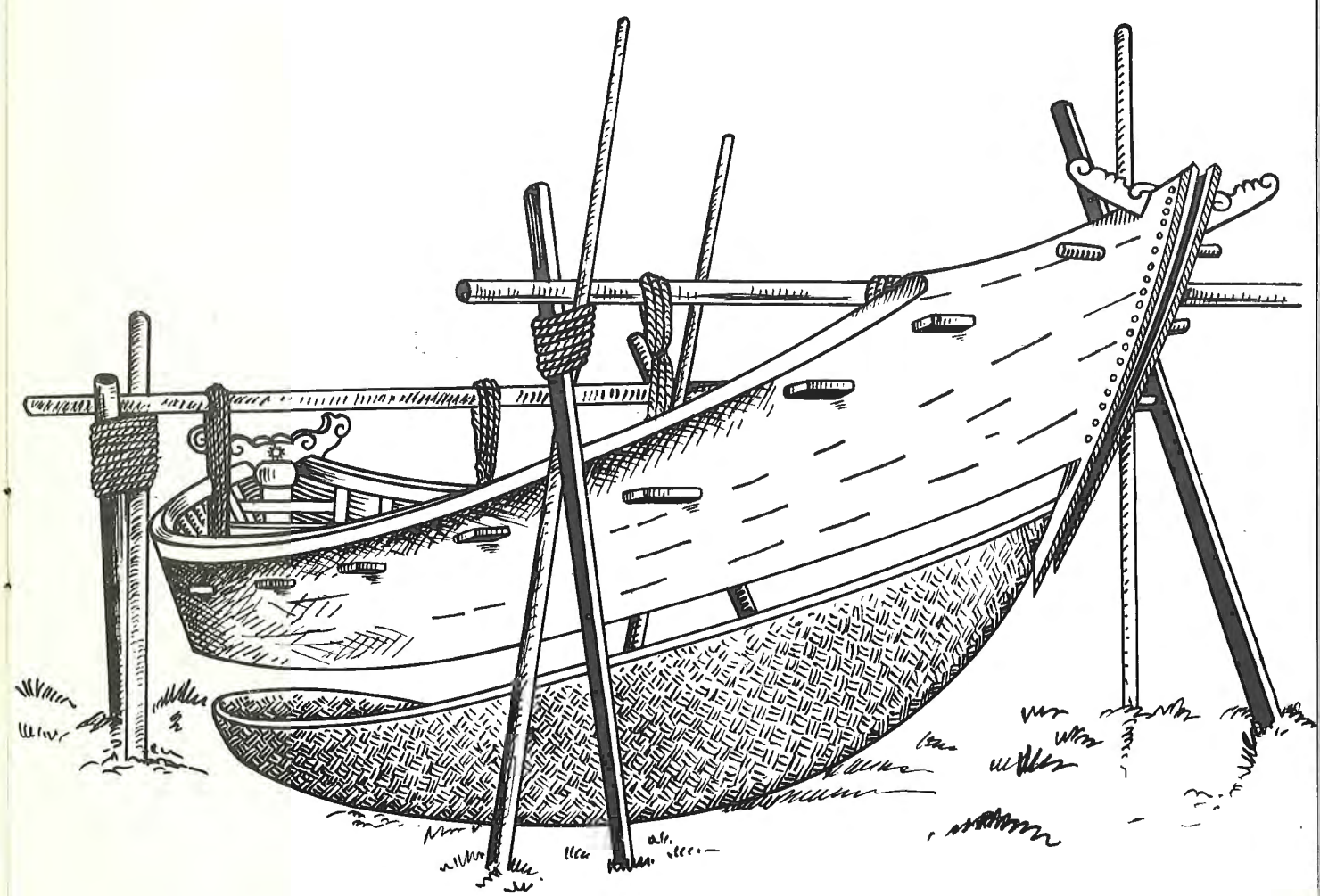
Thus developed a boat ingeniously composed of two parts, the lower part made from long strips of bamboo woven into a vast, watertight basket. The upper part, a bottomless wooden hull, is fitted onto the basket, thereby comprising one of the most curious methods of boat construction in the world (Plate 1). The method used in attaching the hull to the watertight, bamboo basket employs a longitudinal gusset at the chine (Plates 2 and 3). Removable, false deck planking is fitted within the wooden hull over the floor timbers for working "deck" space. Only the fish catch is carried in the bamboo "basket" bottom which is held in shape by long, flexible, bamboo bilge stringers.

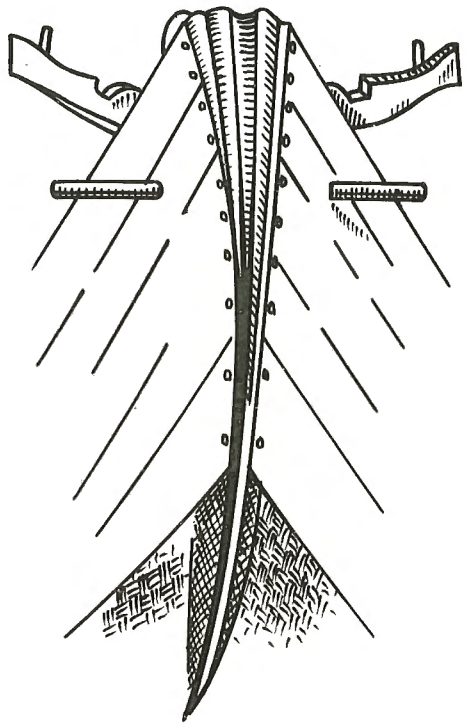
Choice lengths of giant bamboo are highly prized for junk construction. Poles sometimes as long as 50 ft. or more are brought from remote inland jungle sources and seasoned with great care.

Fishing craft of varying designs ranging from 2 to 14 tons gross are constructed in this manner. These boats are excellent for sailing. To keep them from making excessive leeway, a large adjustable bow sheer rudder and an oversized stern rudder are used (Plates 4-5).

This craft is landed on the beaches through rough surf, or passed over treacherous sand bars to gain entrance into small river mouths or lagoons where rigid, all-wooden hulls would become dangerously embedded in the sand upon contact (Plate 6). However, when this unique craft is grounded, the flexible bottom absorbs the shock. By a lateral deformation, the bottom widens out like a soft rubber ball as the hull settles down. The boat then frees itself on the next wave.

PLATE 1





The immersed basket bottom, due to its low cost and simple construction, can be replaced frequently, while the wooden upper hull, permanently secure from all but cursory contact with the water, lasts indefinitely.

The coastal areas of Central and South Vietnam are frequented by the Northeast and Southeast Trade Winds which provide the motive power for sailing junks. The seasonal period for each wind is about six months. Thus, the east and west coasts of Vietnam are alternately either lee or weather shores according to the direction of the winds. Like all winds, the trade winds of the Orient are not constant but vary from dead calm to gale force. During some periods of the year they diminish in force when least expected, leaving the fisherman far offshore unable to return to dispose of his catch which consequently must be jettisoned as his craft has no way to carry ice in the hold.

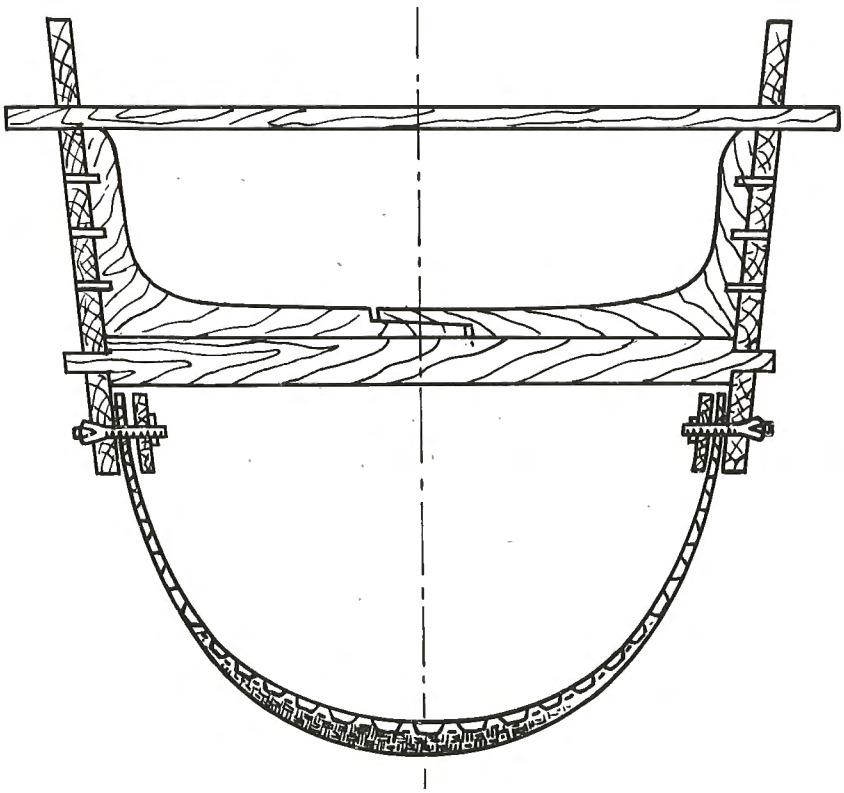


PLATE 2

GOING TO SEA IN A BASKET

I do not subscribe to the statement often heard, that Vietnamese fishermen are afraid to go very far to sea in search of catches or to explore new fishing grounds among known offshore shoals. My own opinion in this matter is much to the contrary. Personally, I believe that Vietnamese fishermen are very courageous sailors, I congratulate them on being sensible enough to go no farther offshore than they can safely go without some assurance of returning to port with their catches (Plates 7-8). This is especially evident when it is recalled that, aside from oars, the wind is the only source of motive power, a factor which subjects the fishermen to the "not-to-tender" mercies and vagaries of the seasonal monsoons and trade winds. To more fully exploit their fishery resources, their paramount need has been for a motive power reliable in either fair or foul weather.

PROBLEMS OF MOTORIZATION

The unusual construction of the Vietnamese "basket bottomed" fishing craft, without keel, ribs, stern post, dead wood or horn timber, has presented a most difficult problem of motorization. Such a craft does not lend itself to the conventional methods of motor installation. Consequently, a new and radically different method had to be devised. Because of the modest price the fisherman receives for his catch, it was most imperative that any solution to the motorization problem be inexpensive, entailing only small capital investment and operational costs.

With the encouragement of Mr. William H. Fippin, Chief, Division of Agriculture and Natural Resources, and Mr. Levi W. Jordan, Deputy Chief, the challenging task of Vietnamese junk motorization was undertaken in the fall of 1957. Inquiry to several marine motor manufactures' representatives, asking whether their firms had experience with similar installation problems, produced only negative responses.

HOW THE PROBLEM WAS SOLVED

Several methods of motorization were explored, the ultimate solution came with the development and adaptation of the [redacted] "Pro-Pet" assembly.

Its basic principle of propulsion employs a vertical retractable propeller and drive shaft similar to an outboard motor or "Harbor Master" (Plate 10). The first engine used was a 2 1/2 H.P. horizontal stroke, all purpose, farm machinery diesel engine which transmitted power to the propeller assembly by means of a V-Belt (Plate 11). To absorb engine vibration which could be injurious to the bamboo bottom, the engine bed was suspended from the gunwales of the craft and the engine mounted on four automobile clutch springs.

Thus, by the cooperative efforts of the GVN Fisheries Directorate, The Japanese Diesel Engine Specialist of U.S. Consultants Inc., [redacted], and USOM, a method was developed whereby this unusual fishing craft could be successfully motorized. The first public demonstration test run was made in the waters adjacent to Cap St. Jacques on Jan. 10, 1959 (Plate 12).

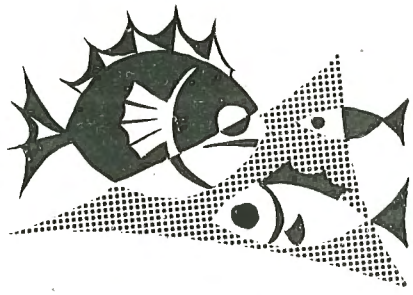
Important features of this installation are its low cost and its multiple uses. Sizes of engines now available range from 2.5 to 8 H.P. A number of improvements have been made to the original propeller assembly. The length of shaft from power pully to propeller has been increased. A gear box now provides positions of forward, neutral and reverse. The engine and propulsion assembly can be transferred to another craft in less than one hour when preparation has been made for motorization. Or the farm engine may be carried up to the fishing village by four men, to be used for any number of power purposes such as pumping water, polishing rice, running a fiber decorticator, etc.

The primary objective in developing this type of motorization was to enable the net fishermen with their larger craft to reach new fishing areas of considerable distance from home port. (Plate 13 shows the becalmed fishing fleet of Qui-Nhon, less than five miles from port, obviously over-fishing the local area.)

Expanding the fishing range of the fleet through motorization has lowered the fishing intensity on near shore and local fishing grounds. With less density of fishing gear in a given area, both surface net fishermen and bottom trawlers have experienced an increase in catch per unit of

man effort. Another interesting aspect of motorization has been the return of older men to the fishing fleet. A husky oarsman to help row the craft back to port when there is a lack of wind is no longer a prime requisite in crew recruitment.

It is almost axiomatic that when a breakthrough has been made in solving a difficult mechanical problem, many variations in applying the basic principle develop. As an example, Plate 14 shows two small, long line, matted bottom fishing craft motorized with a [redacted] 2 H.P. all-purpose "pot-cooled", horizontal stroke, farm diesel engine mounted on a suspended engine bed. In this type of motorization the engine flywheel hub is attached to an oversized universal joint to which, in turn, is attached the propeller shaft (Plate 15). The shaft then runs through a long pipe, or stern tube, the inboard end of which is above the water line, negating the need of a packing gland. A piece of heavy-duty inner tube is then fitted snugly around the protruding stern tube and secured in a watertight manner to the hull. The heavy tire inner tube centers the stern tube and propeller shaft through a hole in the hull and absorbs vibration. The thrust from the propeller is carried by the propeller shaft directly against the universal joint and engine.

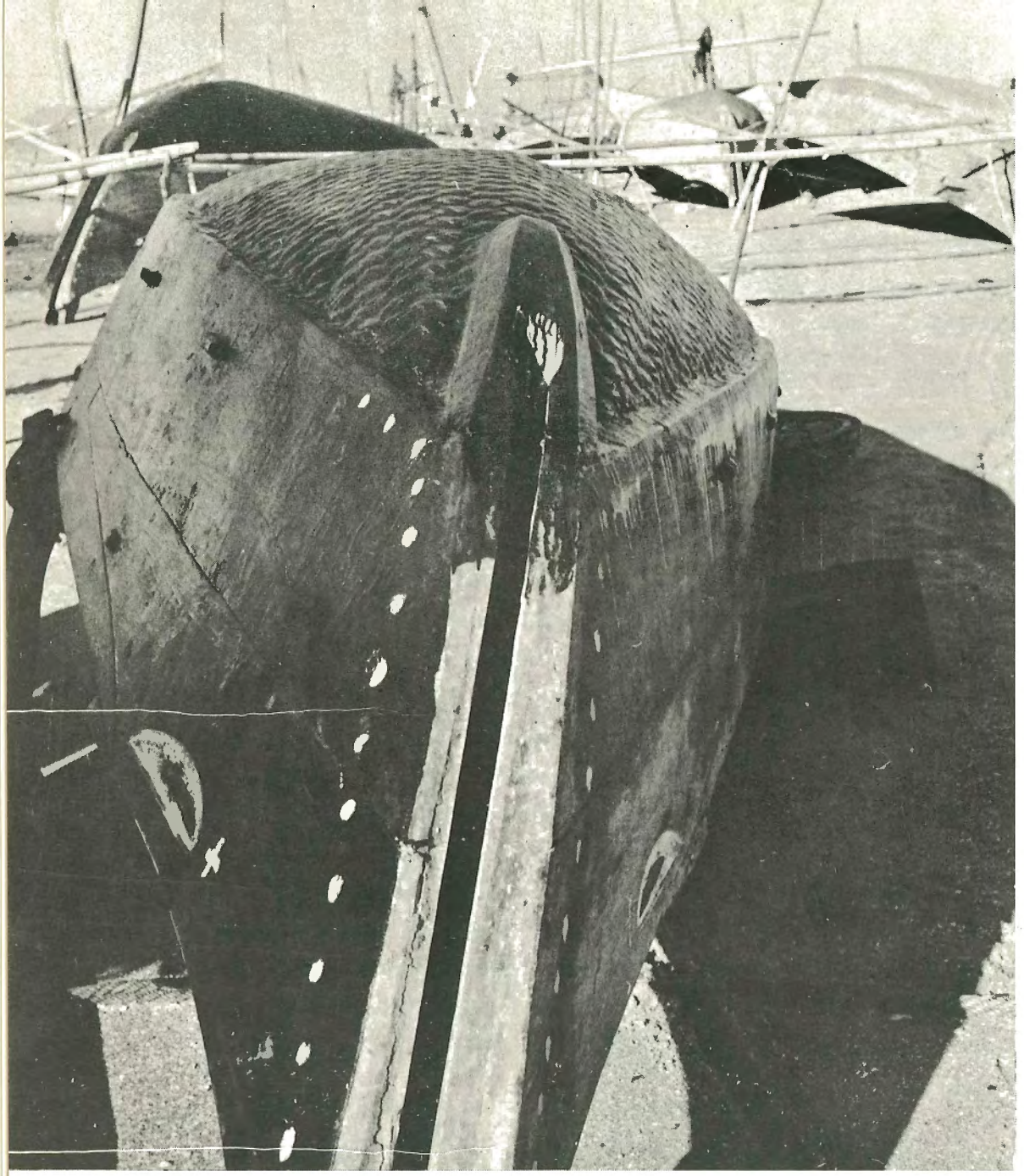


FISH CATCHES HAVE TRIPLED

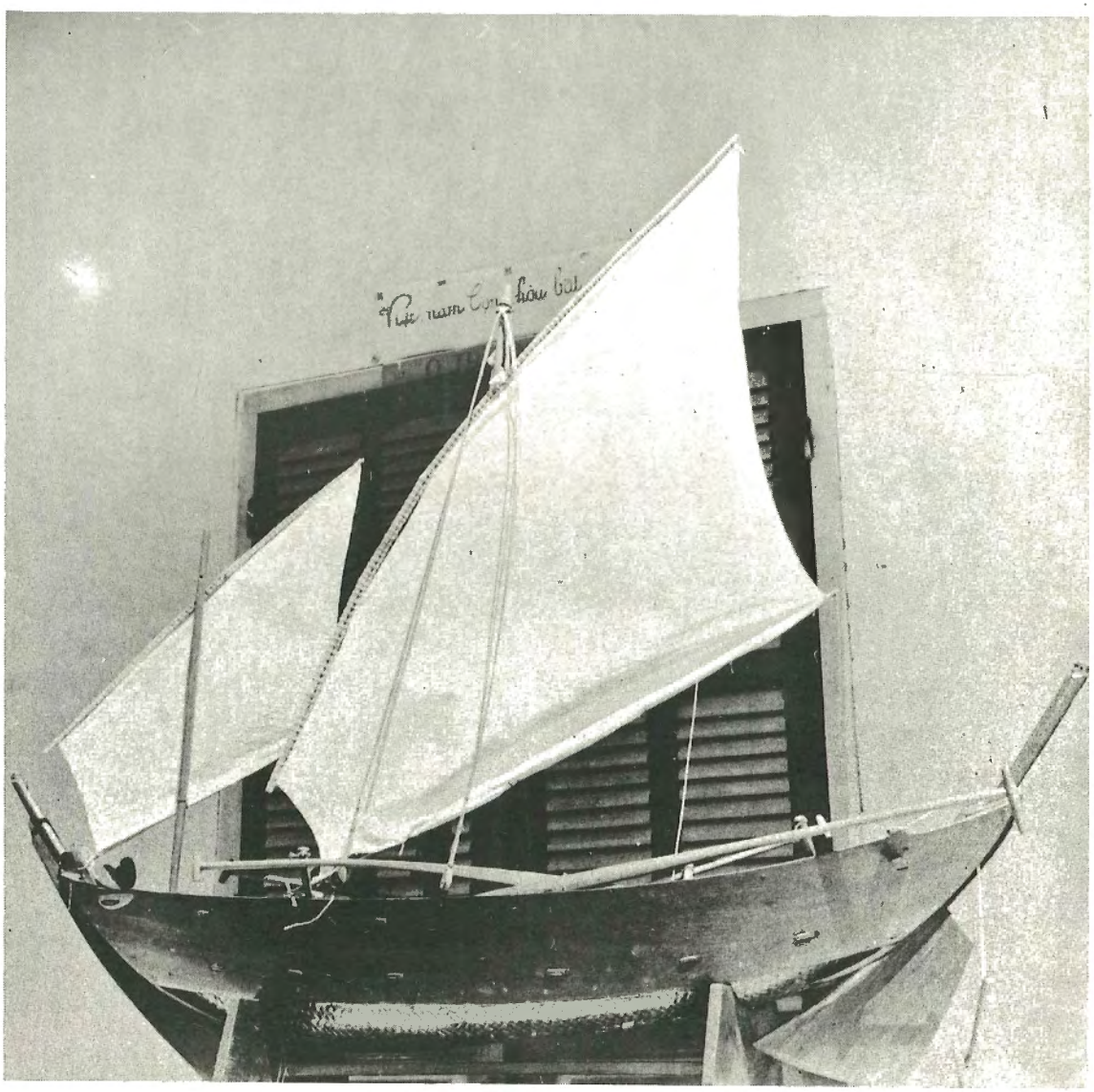
It is surprising how successful this peculiar type of motorization has been with small bamboo bottomed fishing craft used for long line fishing. Over 150 craft were so motorized in the first quarter of 1960. Fishermen equipped with the motorized craft, free from having to depend on the wind for motive power, may now leave or return to port at will. With motorization, new fishing grounds are being explored that were never before within the reach of these boats. Fish catches have tripled per man unit of effort.

The beach of a Vietnamese fishing village in the evening, when fishermen are busily preparing their engines and gear for the morning departure, now has all the exciting atmosphere one experiences in a boom town. To a fishery long stagnant something new has been added that is stimulating and profitable.

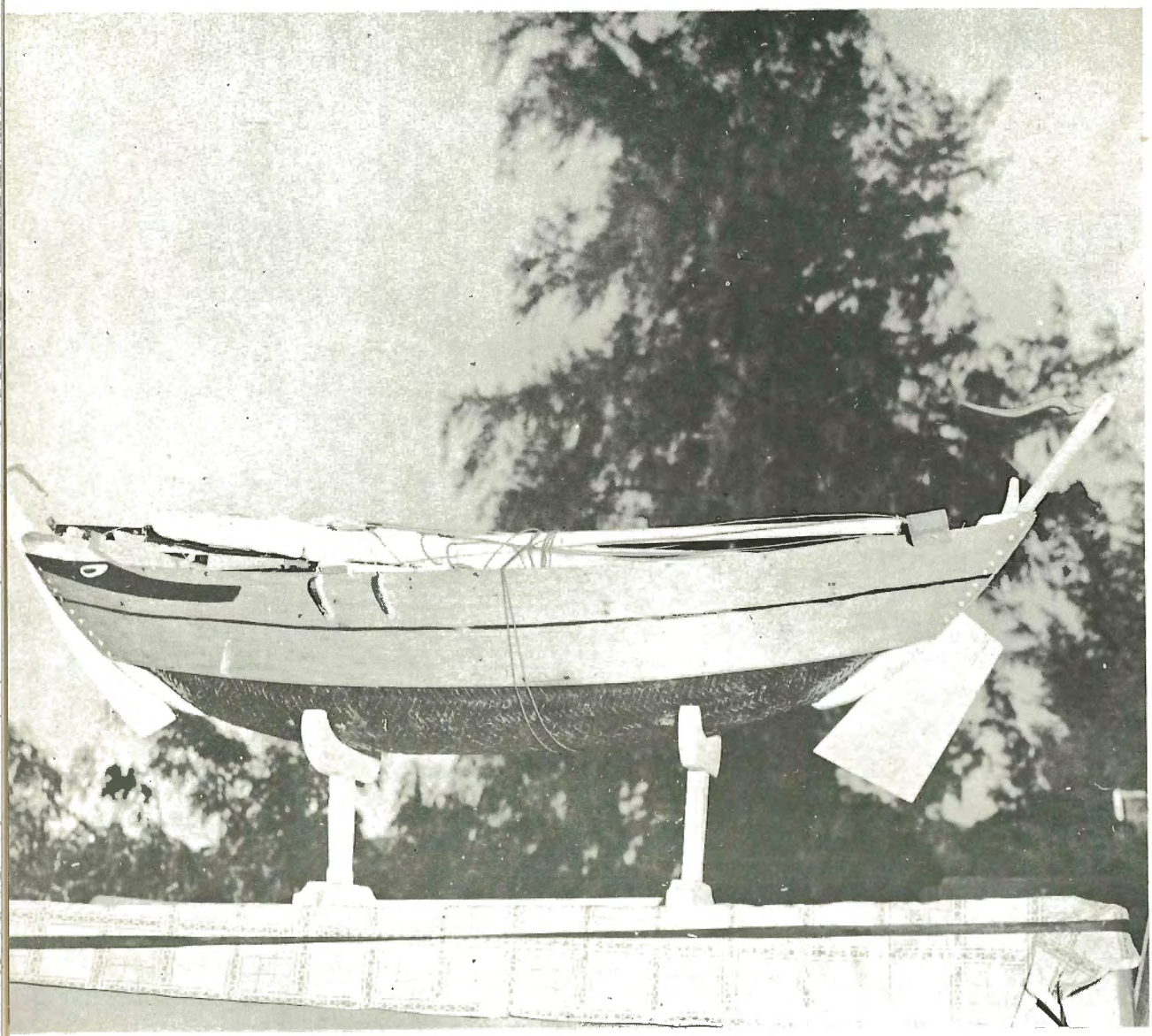
New horizons of production and a higher standard of living are now foreseeable to everyone.



3 - Close-up of a bamboo matted bottom fishing junk under repair at Phan-Thiet.

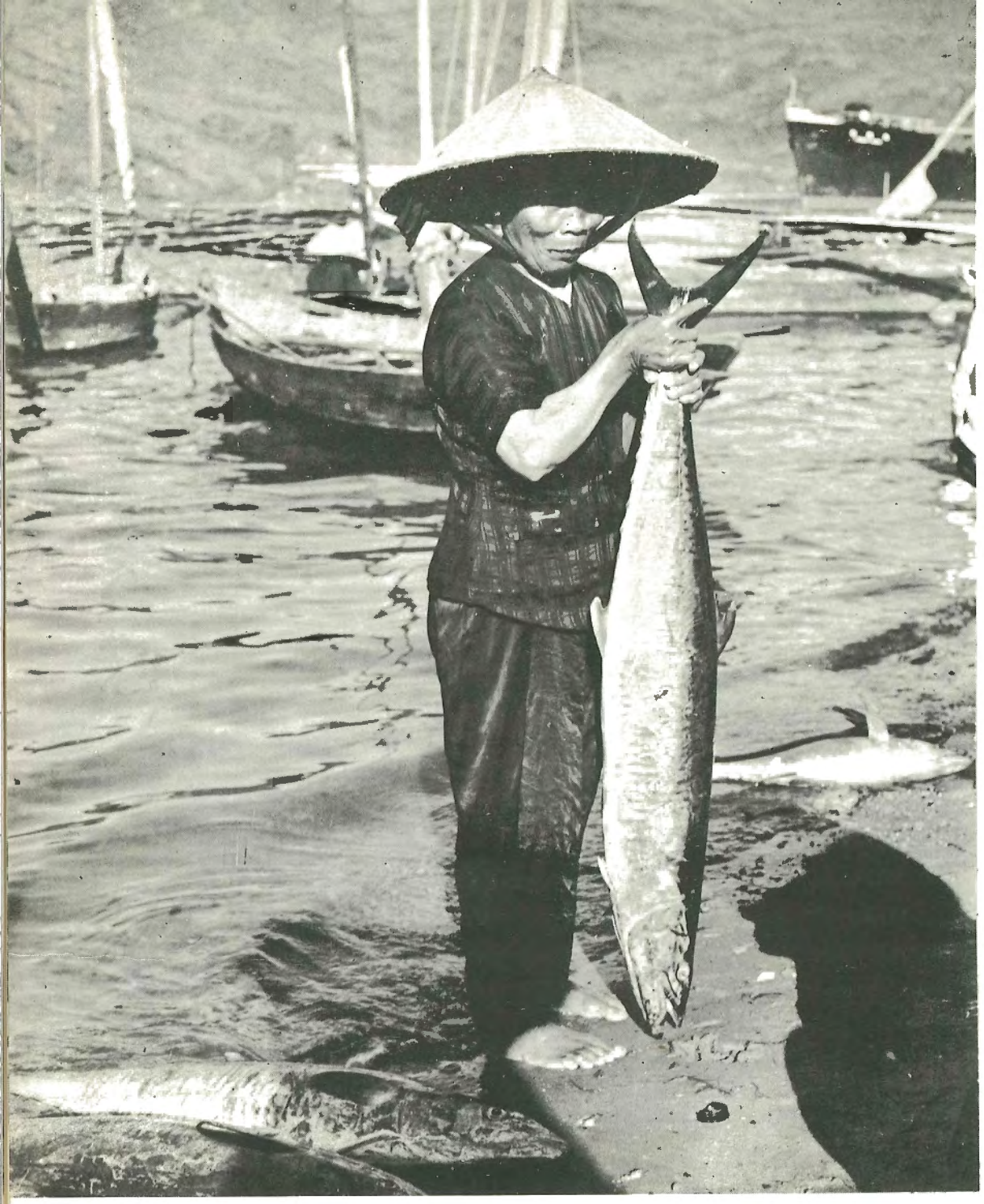


4 - Model of bamboo matted bottom type fish junk used in the Da-Nang (Tourane) fishing area.



5 - Model of bamboo matted bottom type fishing junk used in the Phu-Hoi fishing area. Masts and sails have been lowered for shipping

6 - Bamboo matted bottom fishing junk on beach at Cua-Viet (Quang-Tri Province) being readied for launching through surf to join other craft in offshore fishing. Note the large trawl net ready for casting. Subsequently, all craft will return to the beach to unload their catch.



7 - A Vietnamese Fisherman displaying a part of his catch on the beach at Qui-Nhon. Bamboo matted bottom fishing junks in background.

8 - *Small sampans unloading fish catch from bamboo matted bottom fishing junks at Phan-Thiet.*

(Note the decorative eyes painted on bows, a vestige of ancient animistic beliefs found also in Polynesian and North Pacific cultures.)

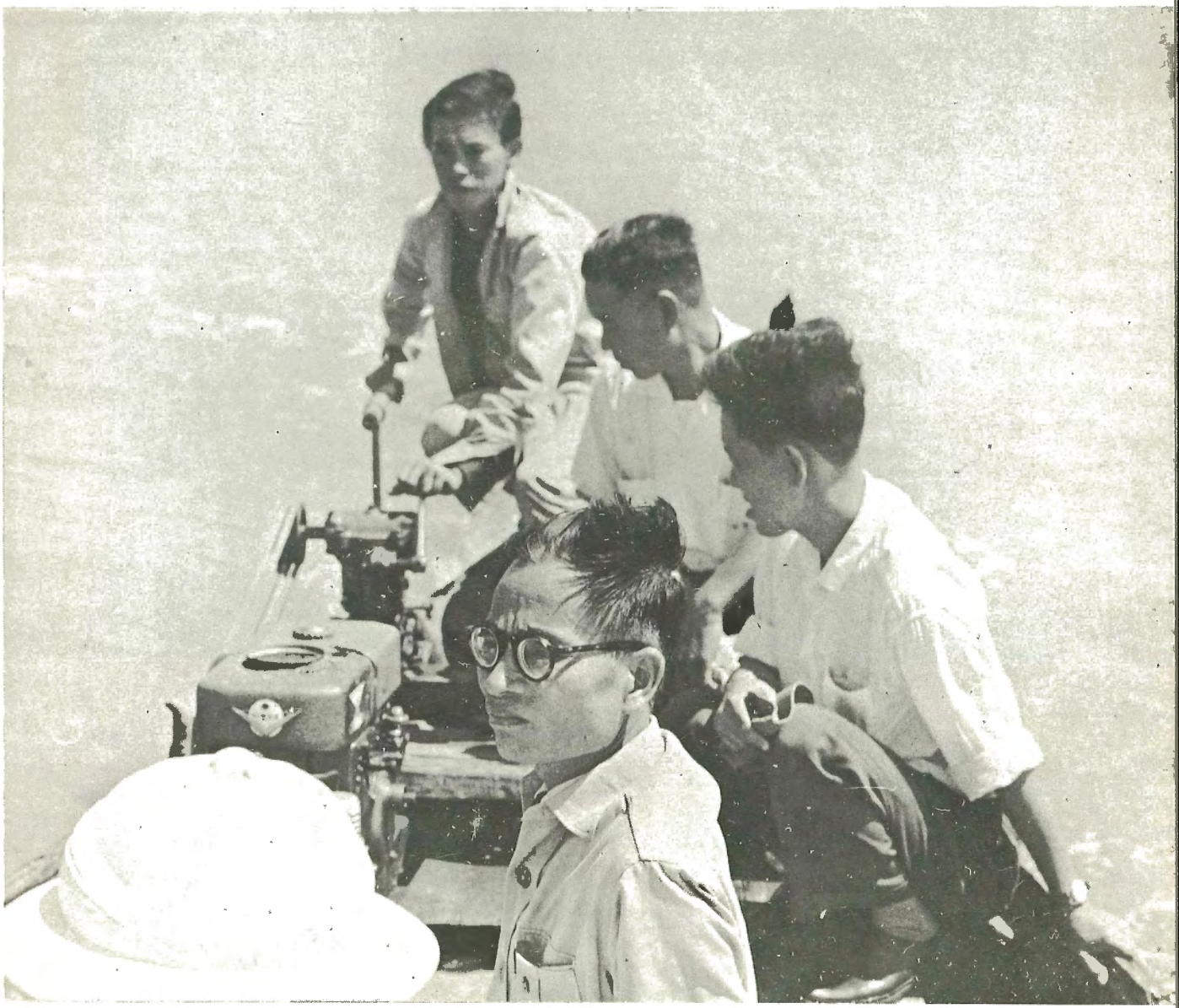
9 - *Bamboo matted bottom fishing junks of the Phan-Thiet fleet moored in the Muong Man River for observance of "TET" (Lunar New Year). It is estimated that there are over 35,000 fishing junks of approximately this size operating in the offshore waters of Central and South Vietnam.*

10 - Propeller assembly and 2½ H.P. horizontal stroke all purpose farm diesel engine installed in 2½-ton bamboo matted bottom fishing junk. Craft is being readied for first public demonstration, Jan 10, 1959.

11 - A 2½-ton bamboo matted bottom fishing junk motorized with 2½ H.P. horizontal stroke "pot-cooled", for all purpose, farm diesel engine. Note V-belt transmission of power to propeller assembly.

In the background is a 14-ton bamboo matted bottom fishing junk returning to port at Ben-Da. Craft of this size will be motorized with 8 and 10 H.P. engines and stronger propulsion assemblies now being developed.

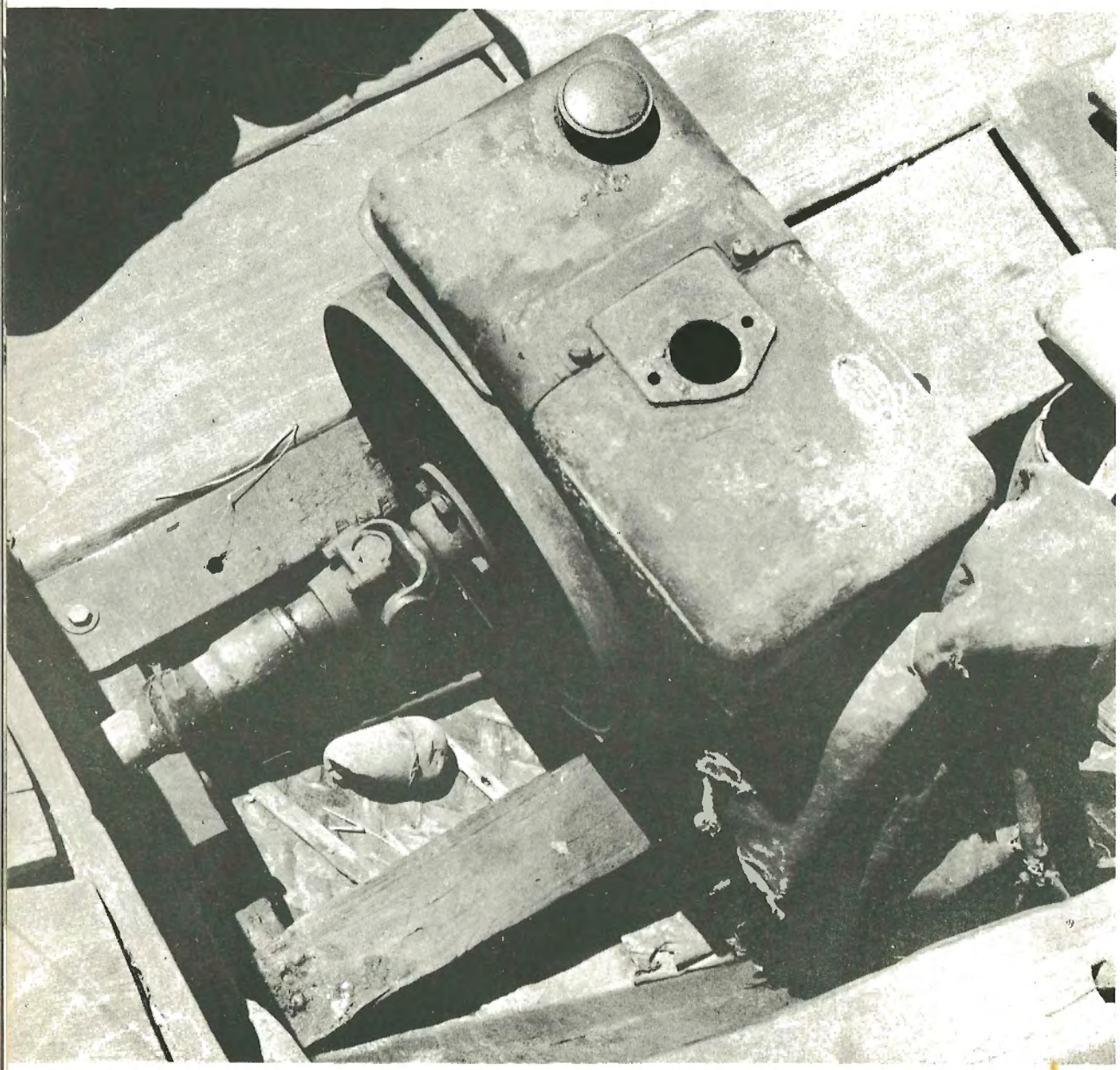
12 - *First public demonstration of motorized 2½-ton bamboo matted bottom fishing junk at Cap St. Jacques on Jan 10, 1959.*



13 - Approximately 375 bamboo matted bottom fishing junks of the Qui-Nhon fleet becalmed in dense concentration on local fishing ground less than five miles from home port.

Motorization of the fleet eliminates scenes like this.

14 - Propeller assembly of motorized small long line bamboo matted bottom fishing junk. (See plate 15 for engine installation.)



15 - Small long line bamboo matted bottom fishing junk motorized with [redacted] 2 H.P. horizontal stroke all purpose farm diesel engine. Note large universal joint from propeller shaft attached to hub of flywheel.

LONGITUDINAL SECTION

METHOD USED TO MOTORIZE VIETNAMESE BAMBOO MATTED BOTTOM FISHING JUNK

Figure 1

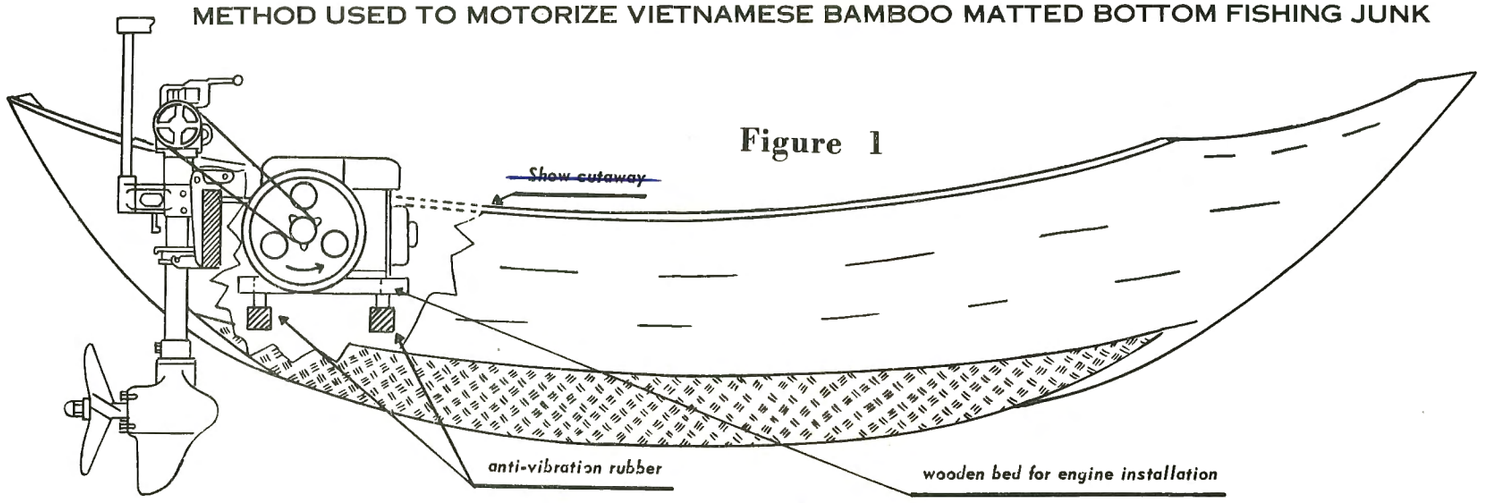
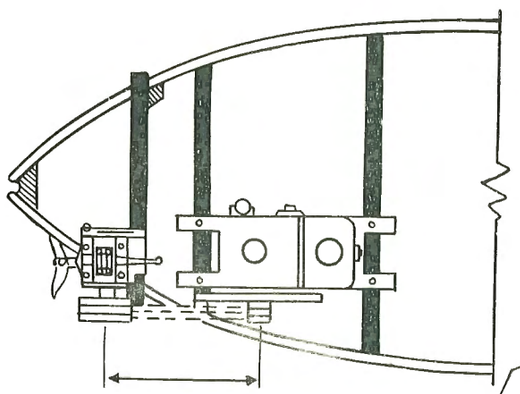
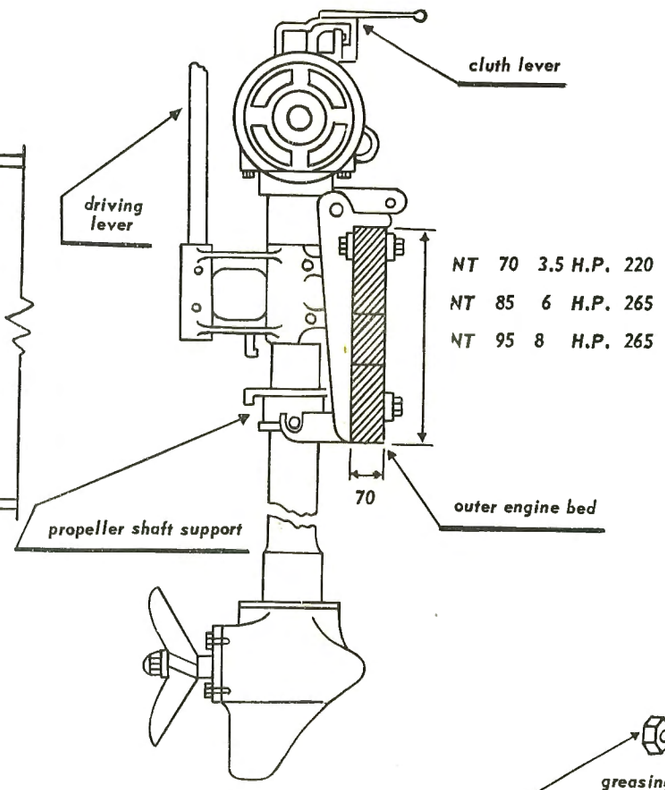


Figure 2



NT 70 3.5 H.P. 1200 M/M
NT 85 5 H.P. 1300 "
NT 95 8 H.P. 1500 "

Figure 3



NT 70 3.5 H.P. 220
NT 85 6 H.P. 265
NT 95 8 H.P. 265

Figure 4

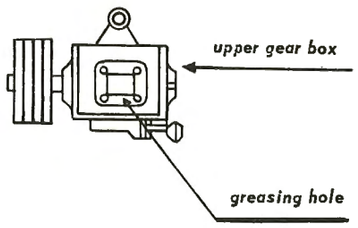
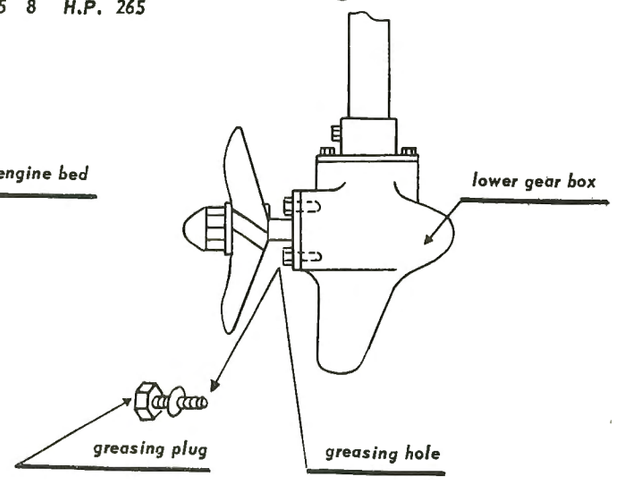


Figure 5



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