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A Preliminary Study on the Cuttlefish Catches from the Wadge Bank Trawler Fishery

By

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Introduction

There are two kinds of Cephalopods which are economically important to the fishery in Sri Lanka. The one with the white cuttle bone is called the cuttlefish (S.Mapothu della), and the other without the bone but instead with a transparent internal structure is known as squid (S.della). In the past much interest was not shown in the fishery for Cephalopods. However, since 1973 this fishery has received much attention due to the greater demand abroad and profitability of exporting the commodity. In Sri Lanka there are no separate fishing gear used for Cephalopods, but they are taken along with variety of gear that is used to catch other fin fishes.

Cuttlefish contribute approximately 17% of the total production of Cephalopods in waters around Sri Lanka. In the Wadge Bank Trawler fishery the species *Sepia pharaonis* forms one of the economically important species, and is the dominant one and accounts for almost the entire catch of cuttlefish—in this fishery. This species is also one of the largest species of Cephalopods caught in our waters. The cuttlefish catch from the Wadge Bank Trawler fishery contribute to about 35% of the total production of the cuttlefish.

Although much work has been done on the evaluation of the Wadge Bank fishery data, no detailed study has been made in the past, on the analysis of cuttlefish catches. In this paper an attempt has been made to analyse this data in order to gather a preliminary knowledge of seasonal and annual variation in the availability, distribution by depth and catches in relation to the time of the day.

Material and Methods of Analysis

The catch data of the cuttlefish for the years 1970-1974 were obtained from the commercial catches of the trawlers operated by the Ceylon Fisheries Corporation. In this study the data sheets for the three stern trawlers namely 'Beruwela,' 'Myliddy' and 'Meegamuwa' were analysed separately for the years 1970-1972. They are 238–ton trawlers with engine output ranging from 420-460 hp. They have had an average of 12 trips a year and each trip lasted for about 12–14 days. These vessels were based at the Fishery Harbour at Mutwal (Colombo). Fishing was done for about 10-12 days in every operation leaving 2-3 days for the up and down trip from Colombo to Wadge Bank. Once they started trawling it goes on continuously throughout the day and night with a break at regular intervals for handling and shooting the trawl net. The average time of duration of haul is 2-4 hours. From the fishing data sheets obtained of the trawler operations, the following details were extracted for analysis.

(1) Time of shoot and hauling ;
(2) Duration of tow ;
(3) Trawling depth ;
(4) Total cuttlefish catch ;
(5) Fish catch variation.

The mantle length measurements of some cuttlefish samples were taken randomly from the trawler landings in order to study the mantle length distribution of this species.

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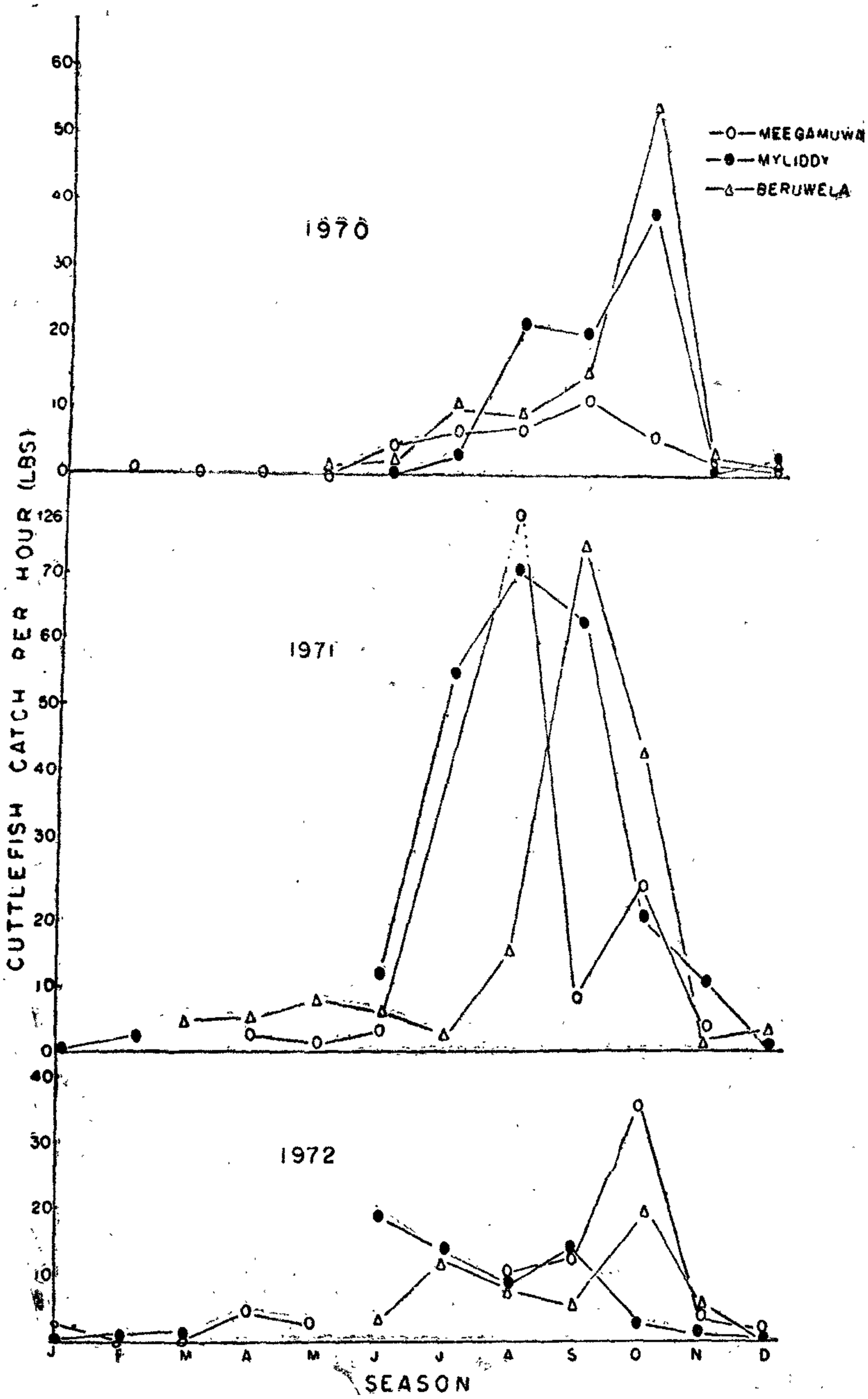

Fig. 1.—Seasonal variation in cuttlefish catch rates by different boats for the years 1970-1972.

Seasonal Variation

Catch data for the year 1970, 1971 and 1972 was studied in detail for the three boats ' Beruwala', 'Myliddy ' and ' Meegamuwa.' Catch per trawling hour was considered as the catch per unit of effort for each boat. The catch per unit effort for each boat for each year shows a well masked seasonal variation. Figure 1 shows that there is a peak season with a noticeable catch during the tail end of south-west monsoon, which is from July to October each year. The peak season for other fin fishes

was observed during the south-west monsoon. Thus the seasonal variation on the catch rate of cuttlefish appears to be independant of the variation shown by the catch rate for other fin fishes as seen in Figure 2. This increase in catch could be due to the aggregation of these cuttlefishes for spawning. Detail study on maturity and migration of this species is needed before making any conclusions.

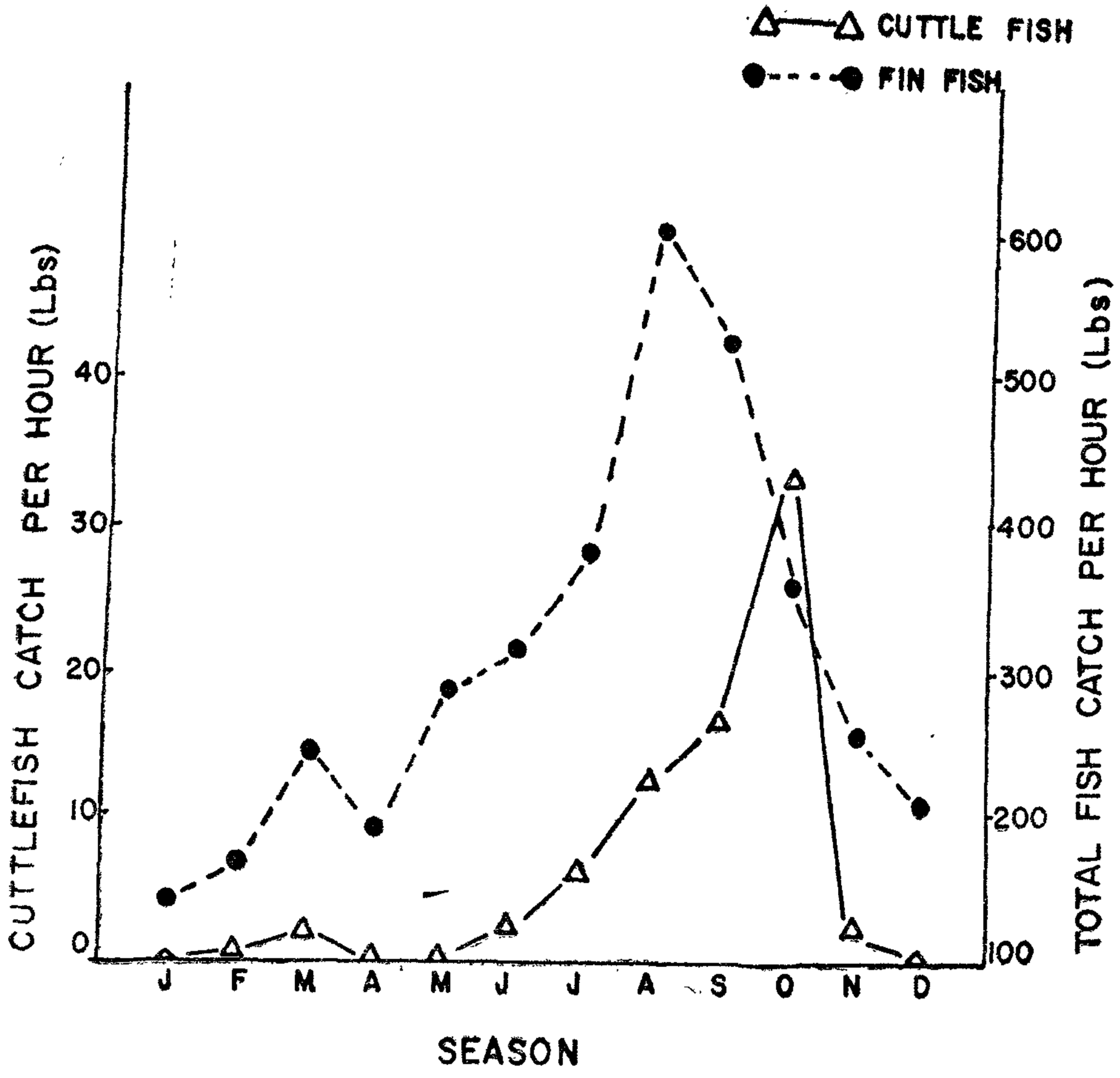

Fig. 2.—Comparison of the monthly variation of cuttlefish catch rates with that of other fin fishes.

Annual Variation

The total yearly catches of cuttlefish for these few years varied from 39,416 lbs. to 139,428 lbs. The total effort is more or less uniform throughout except for the year 1974 where it is very low. In spite of this the total catch of cuttlefish shows a well marked variation with a peak for the year 1971. Therefore it is clear that the cause of such a variation with a marked increase in catch in 1971 is not due to an increase in fishing effort. This change is also not related to the variation of the total fish catch during these few years. Total catch per unit of effort shows an increase in 1972 and again in 1974 (Figure 3). However, the catch frequency graphs for the year 1970-1974 (Figure 4) shows that there is no marked difference in catch rate. In all these years the maximum frequency was observed for the catch rate of 20-40 pounds per hour. It is also observed that the peak catch in 1971 is attributed to the higher catch rates as seen in Figure 4. Since the available data are very little, it is

difficult to determine what caused such a variation in catch. However, it will be interesting to study any such change in the total cuttlefish catches for the few years following, in order to make a clear picture of such variation.

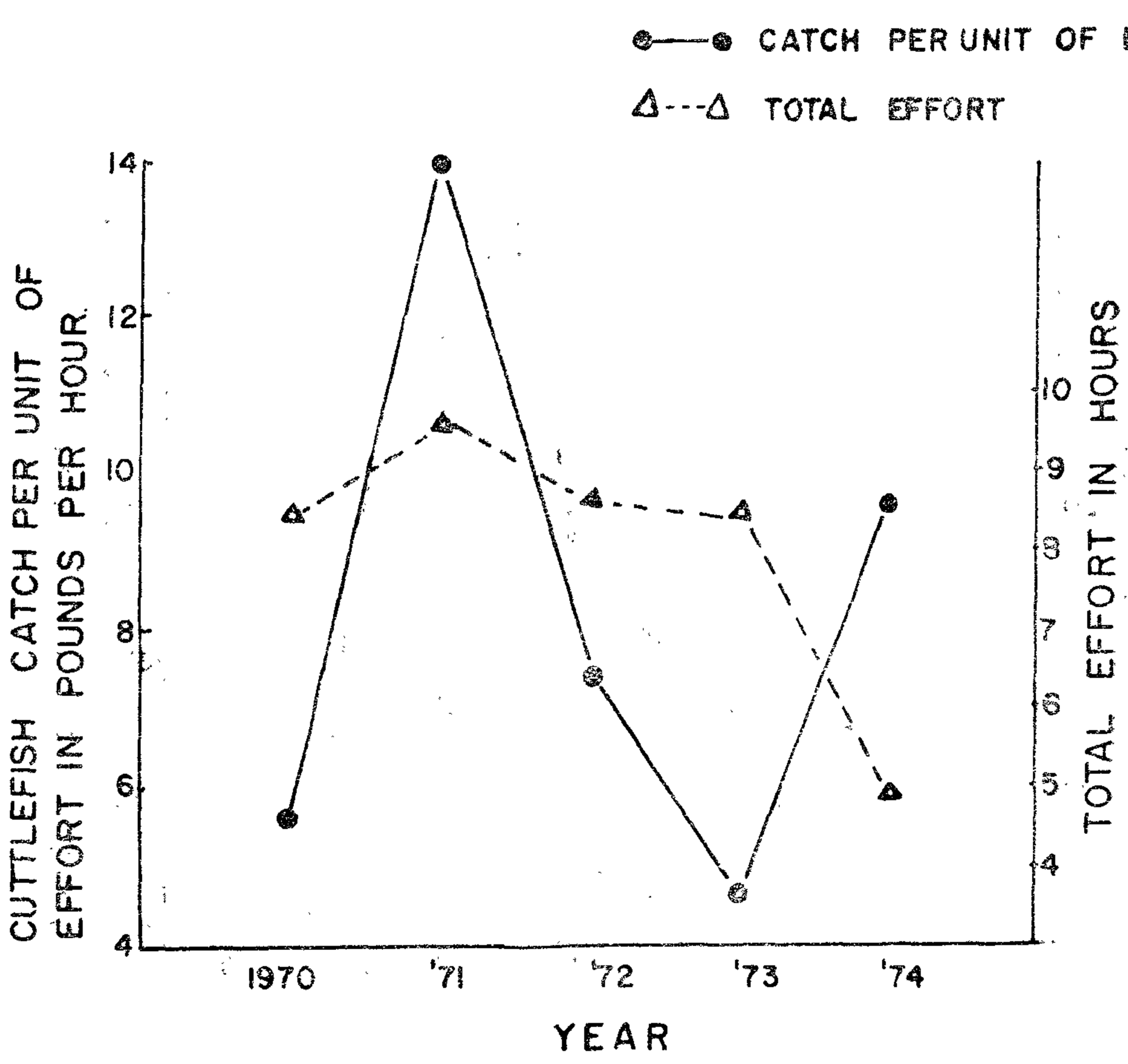

Fig. 3.—Annual variation of cuttlefish catch per unit of effort for the years 1971-1974.

Catches in Relation to Time of the Day

Analysis of catch per unit of effort for different times of the day show that there is a general tendency for catch to be heavier during the day time than at night. In this analysis the time of the day was taken from the average of the time of shooting and time of hauling. Figure 5 shows that more catch was observed between 6 hrs. and 18 hrs. of the day. It is also observed that during this period the catch rate was greater than 50 lbs. per hour. However, for this analysis only the catch data during the peak season, i.e. from July to October in each year was taken into consideration. This is because in other months of the year insufficient data are available for such a study.

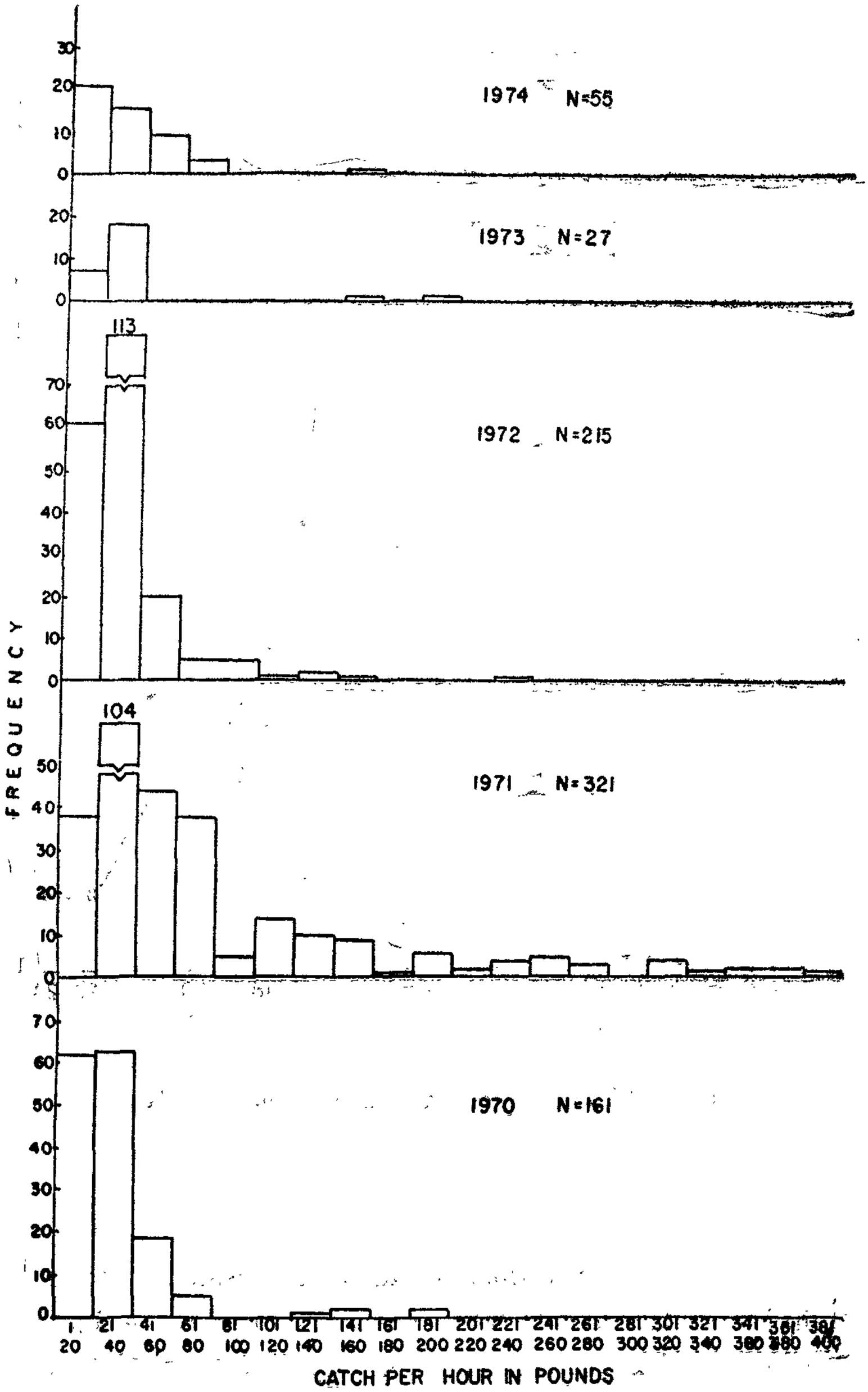

Fig. 4.—Catch frequency graphs for the years 1970-1974.

Since there is little knowledge about the fishery biology of this species of cuttlefish, it is very difficult to predict the cause of such a variation. It may be that these fish remains in the sea bottom during the day time and become active feeders at night.

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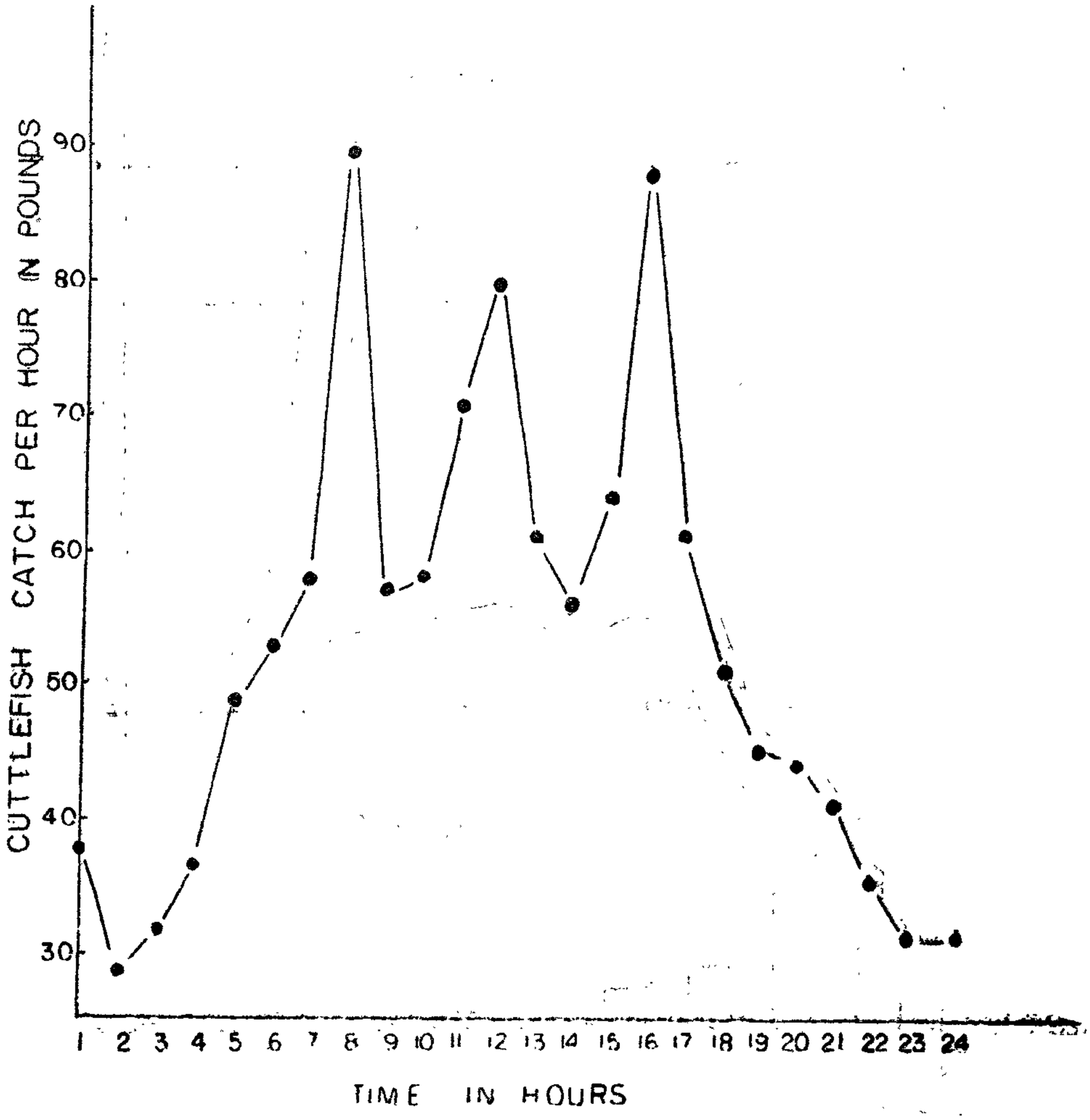

Fig. 5.—Cuttlefish catches in relation to the time of the day.

Distribution by Depth

There is no evidence of the influence of depth of water on the distribution of cuttlefish. However the catch data of the Wadge Bank Trawler fishery reveals that they are found in depths of 18 fm to 38 fm with a maximum catch between 22-30 fm. Since there is a marked variation in the catch in different times of the day, only the time interval of maximum catch was taken into consideration. Thus in this analysis only the catch data from 7.00 hrs. to 18.00 hrs. was used. Figure 6 shows a scattered drawing of the cuttlefish catches in relation to the depth of water.

Mantle Length Distribution

The length frequency distribution of the cuttlefish *Sepia pharaonis* is shown in Figure 7. It shows a unimodal distribution with the mode at 19-30 cm. group.

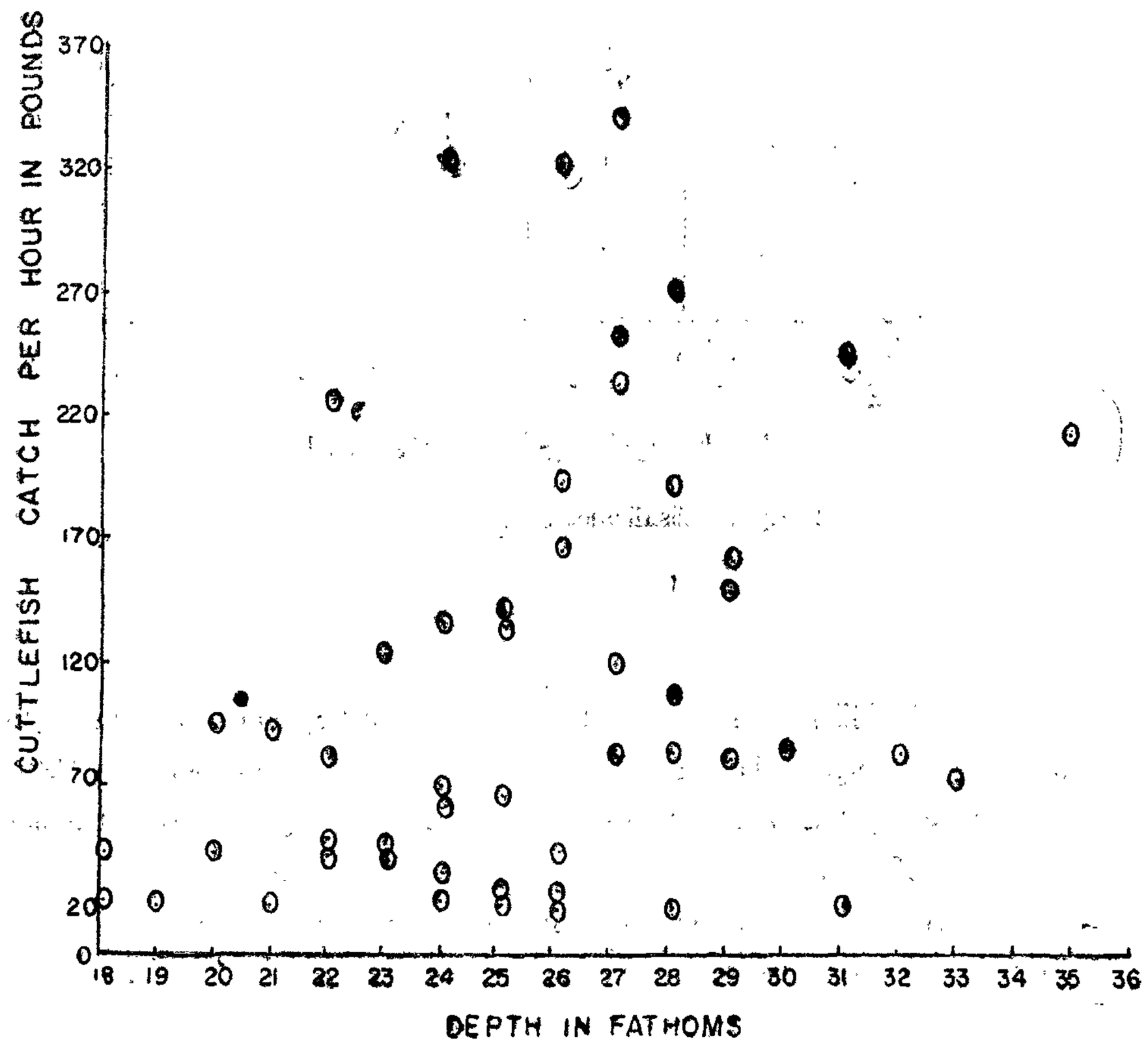

Fig. 6.—Scattered drawing of the cuttlefish catches in relation to the depth of water.

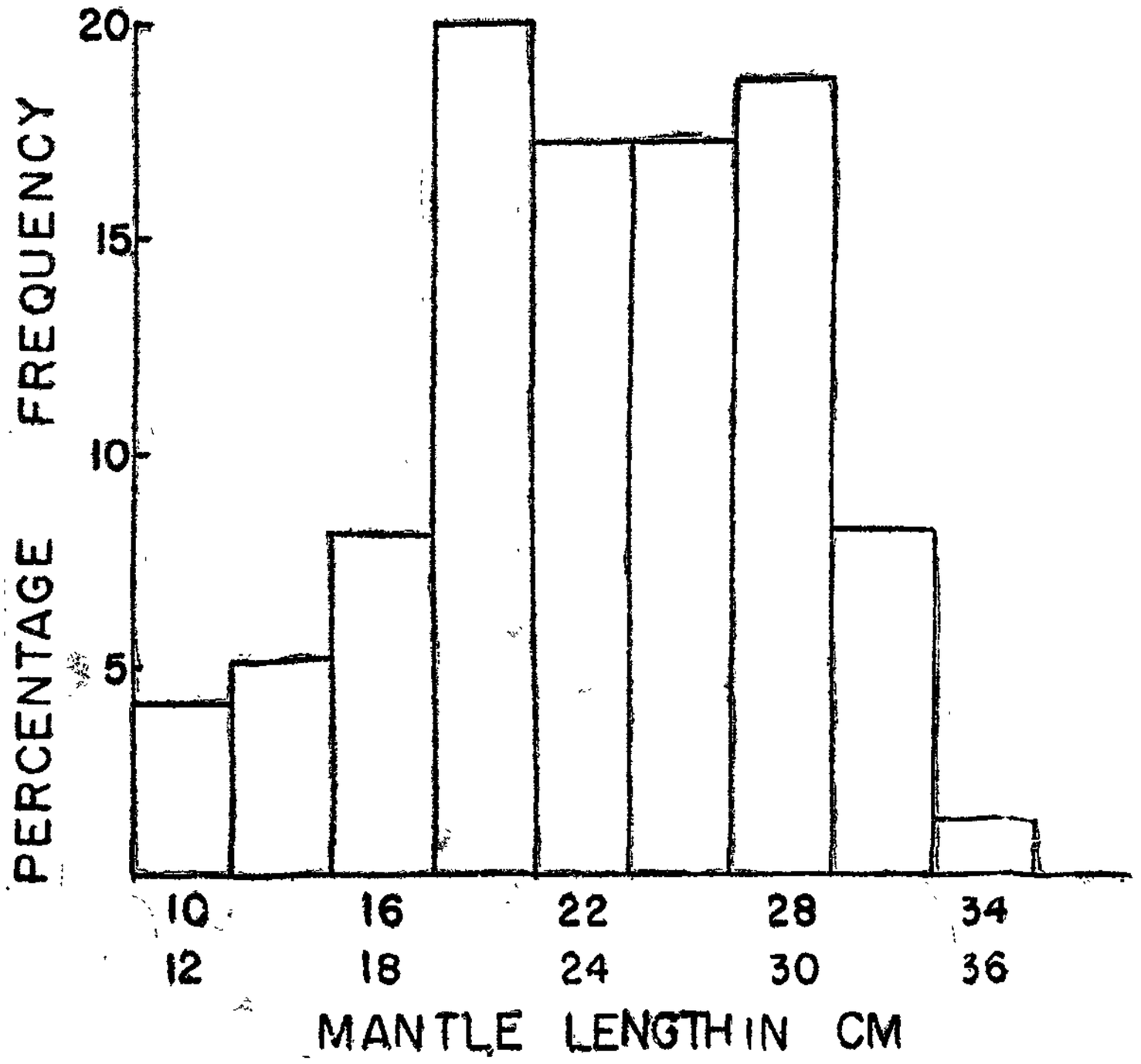

Fig. 7.—Length frequency distribution of the cuttlefish *Sepia pharaonis*.

Discussion

Recently in many countries, the importance of bottom trawling for Cephalopods, including cuttlefish squid and octopus is increasing. It has also been found that different from many fish, Cephalopods are not effectively guided by lines and netting of trawl gear. The length of bridle has hardly any influence on the catching efficiency and the mesh size in the front part of the gear must be small enough to prevent excessive escape (FAO Fishing report No. 170). Thus specific technological problems regarding inter-relation between gear size, mesh size and towing speed has to be studied for increase catching efficiency.

Although there is no separate fishery for Cephalopods in Sri Lanka, the catch data of the Wadge Bank trawler fishery reveals that there is a remakable quantity of the cuttlefish *Sepia pharaonis* in this fishing ground. Cutt lefish catch comprises about 4-5% of the total fish catch by these trawlers. This species of cuttlefish is also found incidentally among the other fin fishes. This is observed almost along the entire coast of the Island. There may be additional fishing grounds in the waters around the Island and alternative fishing methods could be developed to further increase the catch.

Although many questions regarding the life history, population, migration and exploitable potential are unanswered a detail study of this fishery together with the efficient fishing techniques would lead to the substantial increase in the catch.

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MENDIS, A. S. (1968) Stern trawling on the Wadge Bank with 235 tons trawlers. **Proc.** Indo-Pacific Fish. Coun. 13 (iii) 468-500.

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Symposium on the Development of Off-Shore and Deep-Sea Fishing

The symposium was held on the 29th and 30th of November, 1977, at the Agrarian Research and Training Institute Auditorium, Colombo. It was declared open by the Hon. Minister of Fisheries Mr. Festus Perera. Gist of the Hon. Minister's address is on page 38.

The symposium was divided into 3 Sessions as indicated below :

There was discussion at the end of each presentation. These discussions as recorded by the rapporteurs are given at the end of each paper.

Recommendations of the Symposium are given on page 129.

Gist of the Inaugural Address by the Hon. Minister of Fisheries, Mr. Festus Perera

The Minister indicated that use had not been made of fish resources in the past in spite of the fact that we had an unlimited expanse of sea around us. The fishing industry should have played an important role in the economy of this country. The new government has taken this into consideration and formulated new policies which would form the foundation for the expansion and development of the fishing industry in the future. One of the major policy decisions taken was that government institutions will not be involved in active fishing operations. Government expects the private sector to venture into the fishing industry in a big way especially in the off-shore and deep-sea range. However the Minister pledged protection to the thousands of small scale fishermen who form the backbone of the fishing industry in this country. The Minister referred to the fact that Sri Lanka has a coast line of over 1,000 miles and that her geographical position gave advantages over a wide sector of the Indian Ocean which has an area of some 20 million sq. miles. He said that the stage was now set for our transition from almost solely exploiting the coastal fishery sector to also exploiting the off-shore and deep-sea waters.

Explaining further, the potentialities for the development of off-shore and deep-sea fishing, the Minister said that the coastal fishery engages 58,000 active fishermen currently landing about 120,000 tons. Even this has been made possible by the gradual transition from the traditional to mechanized fishing. There are now about 7,500 mechanized boats plying in our waters. Surveys have shown the existence of fish resources not far from the coast which could be used by larger vessles, and improved techniques. The necessary infrastructure like fishing harbours for deep-sea vessels, cold storage, frozen ice plants, repair workshops, etc., are also available. He was certain that the increased fish supplies required could be provided by the expansion of our fishery to the off-shore and deep-sea regions. Such expansion will go a long way in meeting the fish requirements of our people which should be the cheapest source of protein for our people.

The Minister explained that this government has given more concessions to the fishermen than any other government in the past. The budget of the new government has given special preferences to the fishing industry. Because of the need to go in for larger boats, the government has obtained the assistance of the Asian Development Bank to initially obtain 30 vessles of the 38-ft. class. Some of these boats are already being operated by entrepreneurs successfully. The goverment has decided to grant an enhanced subsidy to those who buy these vessels and also to grant a 5-year tax holiday to those who operate them. The Minister said that the government hopes that these measures would act as a catalyst in the development of the fishing industry in this country.

In declaring open the symposium the Minister wished it all success. He requested everybody present to participate fully in the discussion and put forward their views in regard to the development of the industry. He said he would not enforce any ideas on fishermen but wanted them to express their ideas and to co-operate with the government in expanding the fishing industry. He further pointed out that proper management was necessary for developing the fishing industry and that everyone concerned must know what is happening around them. He also emphasised the need for having deadlines and targets and all programmes aimed at the development of the fishing industry.