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Ödemåi, Kville sn, Bohuslän

Hällristning
Fiskare från
bronsåldern

Rock carving
Bronze age
fishermen



MEDDELANDE från
HAVSFISKELABORATORIET • LYSEKIL

nr
119

STUDIES ON THE NORWAY POUT (GADUS ESMARKII NILSSON)
PRELIMINARY RESULTS

BY
LENNART HANNERZ, 1961

May 1972

The following investigation has been presented by Dr. LENNART HANNERZ as paper No. 64 before the Gadoid Fish Committee of the International Council for the Exploration of the Sea at its meeting in Copenhagen in 1961.

May 1972

ARMIN LINDQUIST

STUDIES ON THE NORWAY POUT (GADUS ESMARKII NILSSON).
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The value of Gadus esmarkii as food for many economically important fish, including whiting, has been pointed out by many workers. With this in mind, an investigation of the distribution of Gadus esmarkii in the North Sea, the Skagerrak and the Kattegat was started in 1959 in connection with studies of whiting.

Comparative trawl hauls were made from the R/S "Skagerak" at a number of stations distributed over the three areas mentioned (cf. Fig. 1). A 70 foot trawl with a fine-mesh cod end (mesh width about 35 mm) was used, and the hauls usually were of one hour's duration; 4 - 6 hauls were made at each station. The mean catch of Gadus esmarkii per hour was then calculated.

The results of these calculations have been ^{plotted} graphically in Figs. 1 - 4. The catch per hour at the different stations has been illustrated by circles of varying sizes. Stations where the catch per hour was below 10, or where no Gadus esmarkii occurred in the catch have been indicated by a plus sign or a nought respectively.

As MASON (1960) already has shown, only few Gadus esmarkii are present at depths of less than 80 - 90 m in the North Sea (Fig. 1). Only single specimens have been found in the shallow parts of the south-eastern North Sea. During a Swedish cruise in September 1959 the greatest concentrations were found while trawling over depths of between ca. 80 and ca. 140 m in the north-western parts of the North Sea. Remarkably enough, only few specimens were found on that cruise at ca. 105 m near Bressay Shoal. Also at a station in the eastern North Sea (57° 32'N 5° 46'E) at a depth of 94 m the number of Gadus esmarkii was very small.

Several hauls were made in December of the same year in the Skagerrak and the Kattegat (Fig. 1). Considerable concentrations of Gadus esmarkii were found there, but in contrast to the North Sea, also at depths of less than 40 m.

The Kattegat and the Skagerrak were trawled again in February and March 1960. The catches were all smaller than in December. On this occasion, too, the greatest number of Gadus esmarkii caught in one hour's trawling was in the north-eastern parts of the Kattegat. Good catches were made even at a depth of only 30 m to the west of the Fladen Lightship (about 250 specimens per hour's trawling). The species was absent in the southern Kattegat at depths of 20 - 25 m on this occasion, as in December the previous year (Fig. 2).

Very great numbers of Gadus esmarkii were obtained in April - May 1960 at depths of 50 - 60 m in the north-eastern Kattegat (Fladen Lightship: average ca. 3950 specimens per hour's trawling), and at depths of 70 - 80 m

in the southern parts of the Skagerrak (N of Hirtshals: 3350 specimens per hour). Very small catches of the species were made at depths of 60 - 70 m at a station in eastern Skagerrak. At the same time only single specimens were caught at depths of 40 - 50 m in the south-eastern parts of the North Sea (Fig. 3).

The catches of Gadus esmarkii in the North Sea, the Skagerrak and the Kattegat during February and March 1961 were small (Fig. 4).

The material reported by MASON (op. cit.) contained no information on the occurrence of Gadus esmarkii in the Skagerrak and the Kattegat. The stock of Gadus esmarkii in these regions is large, however, and it was from there that NILSSON obtained the material for his description of the species. From what has already been said it is evident that the density of the stock is fully comparable with that found in suitable places in the North Sea. It becomes less dense in the shallow zones of the central and southern parts of the Kattegat, but the species still occurs in the southern Baltic.

There is a fundamental difference in the conditions of occurrence of Norway pout in the North Sea on the one hand and in the Skagerrak and the Kattegat on the other. The species is found only occasionally in the North Sea at depths below 80 - 90 m, while on the other hand large numbers are found in the Kattegat at depths below 40 m. This difference is illustrated in Fig. 3. Trawl hauls were made, as illustrated in the map, at about the same depth and the same time in the Skagerrak-Kattegat area and the south-eastern North Sea. In the former area the species was found in dense concentrations, in the latter only occasional specimens were found.

The difference may be due to temperature preferences. The bottom temperature was about 5.0° to 5.5°C at the Kattegat stations at the same time as it was 6.0° to 6.5°C at the North Sea stations. Another feasible explanation may be that some important competing species may be lacking at these depths in the Skagerrak-Kattegat zone, or that there are genetically distinct types of Gadus esmarkii with different demands on environment.

The great differences in the frequency of individuals in the last mentioned area in February-March and April-May 1960 suggests that a concentration of the species in these regions occurs during late spring. It has not been established whether this concentration is connected with spawning, but this seems probable.

MASON (op. cit.) considers that "probably little effective spawning" takes place in the North Sea south of 59°N. The North Sea stock mostly spawns in areas to the North of Scotland, near the Orkneys and Shetlands. Spawning seems to take place there in January, February and March, during which time the species is rare in other parts of the North Sea. This is also confirmed by my own observations (Fig. 4). The stock in the Irish Sea is recruited similarly from spawning grounds to the south-west of Scotland and the north of Ireland.

The distribution maps (Figs. 1 - 3) show that there is no considerable migration of the stock in the Skagerrak-Kattegat area to the North Sea during the winter and spring. Instead there is a concentration of Gadus esmarkii in the relatively shallow zones in the SE Skagerrak and the northern Kattegat during late spring. Thus it seems very probable that this stock is maintained by spawning within the regions mentioned.

Since there is a possibility of genetical difference between a North Sea stock and a Skagerrak-Kattegat stock, an investigation of the racial characteristics of the Norway pout has been commenced.

The following morpho-metrical characters have been studied:

- (1) Orbital diameter/opercular head length
- (2) Opercular head length/total length
- (3) Pre-anal distance/total length
- (4) Pre-anterior dorsal distance/total length
- (5) Pre-pectoral distance/total length
- (6) Pectoral fin length/total length

The following meristic characteristics have also been studied:

- (1) Vertebral count (VS)
- (2) Number of medial gill rakers (for methods see HANNERZ 1960).

Sex and stage of maturity have been determined, and calculations of age made with the help of the otoliths.

A sample was taken at the Fladen Ground on 14 February 1961 and one at "Leran" on 7 March 1961 (Fig. 5). Both samples were frozen on board and studied on shore in the laboratory. The results of the analyses have been plotted graphically in Figs. 6 - 8.

Fig. 6 shows that most of the fishes in both samples belong to age group I (i.e. they were about one year old when caught). No fewer than 94% of the fishes in the "Leran" sample belonged to this age group. Only one three-year-old fish was present in this sample. Of the Fladen Ground sample 26% were fishes older than one year. Three-year-olds were very rare in this sample, too.

The average length of the fish in age groups I and II has been compared in Fig. 7. It will be seen from the figure that it is almost identical in both stocks.

The majority of the one-year-olds in the sample from "Leran", taken on 7 March, were in maturity stage III (ca. 50%), while the two-year-olds varied between stages III and VI. In the sample taken at the Fladen Ground on 14 February, most of the one-year-olds were in stages I and II, and the two-year-olds were in stages IV and V.

The analysis of the morpho-metrical characters did not reveal any demonstrable differences.

On the other hand it has been possible to demonstrate the presence of such differences in the meristic characters studied (Fig. 5). The mean number of vertebrae in the sample from the Fladen Ground was 53.00, and in the "Leran" sample 53.30. Statistical testing showed that this difference was due, with a very high degree of probability ($p < 0.01^{**}$), to other causes than chance. The averages for medial gill rakers (gill rakers II) were 19.73 in the Fladen Ground sample and 19.48 in the "Leran" sample. This difference was very probably due to other causes than chance ($p < 0.2$).

Thus it seems that Norway pout in the Skagerrak and the Kattegat differ from those of the North Sea as regards occurrence (depths at which they are found), choice of spawning ground and meristic characters. These differences may possibly be genetically conditioned.

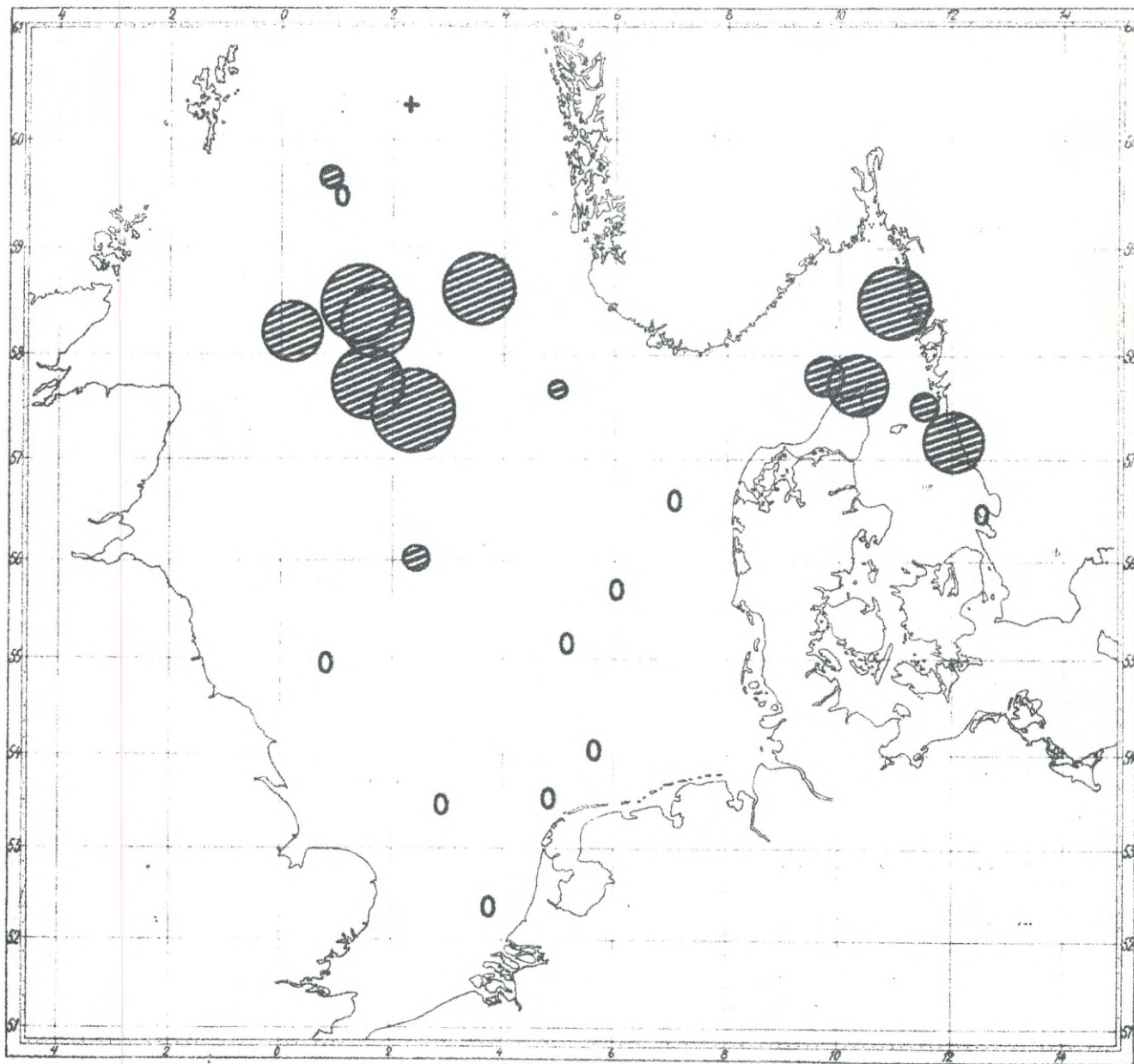
References:

- HANNERZ, L., 1960: Studies of two Meristic "Racial" Characters of Whiting.- ICES:CM 1960, No. 206.
- MASON, J., 1960: A Report on the Distribution of Gadus esmarkii NILSSON in the North Sea and Adjacent Waters.- ICES:CM 1960, No. 41.
- RAITT, D.F.S., 1960: Preliminary Studies on the Age and Growth of Gadus esmarkii (NILSSON).- ICES:CM 1960, No. 40.

Gadus esmarkii

Fig. 1.

the North Sea, Sept. 1959 - the Kattegat and the Skagerrak, Dec. 1959



1000/hour of trawling



< 10/hour of trawling

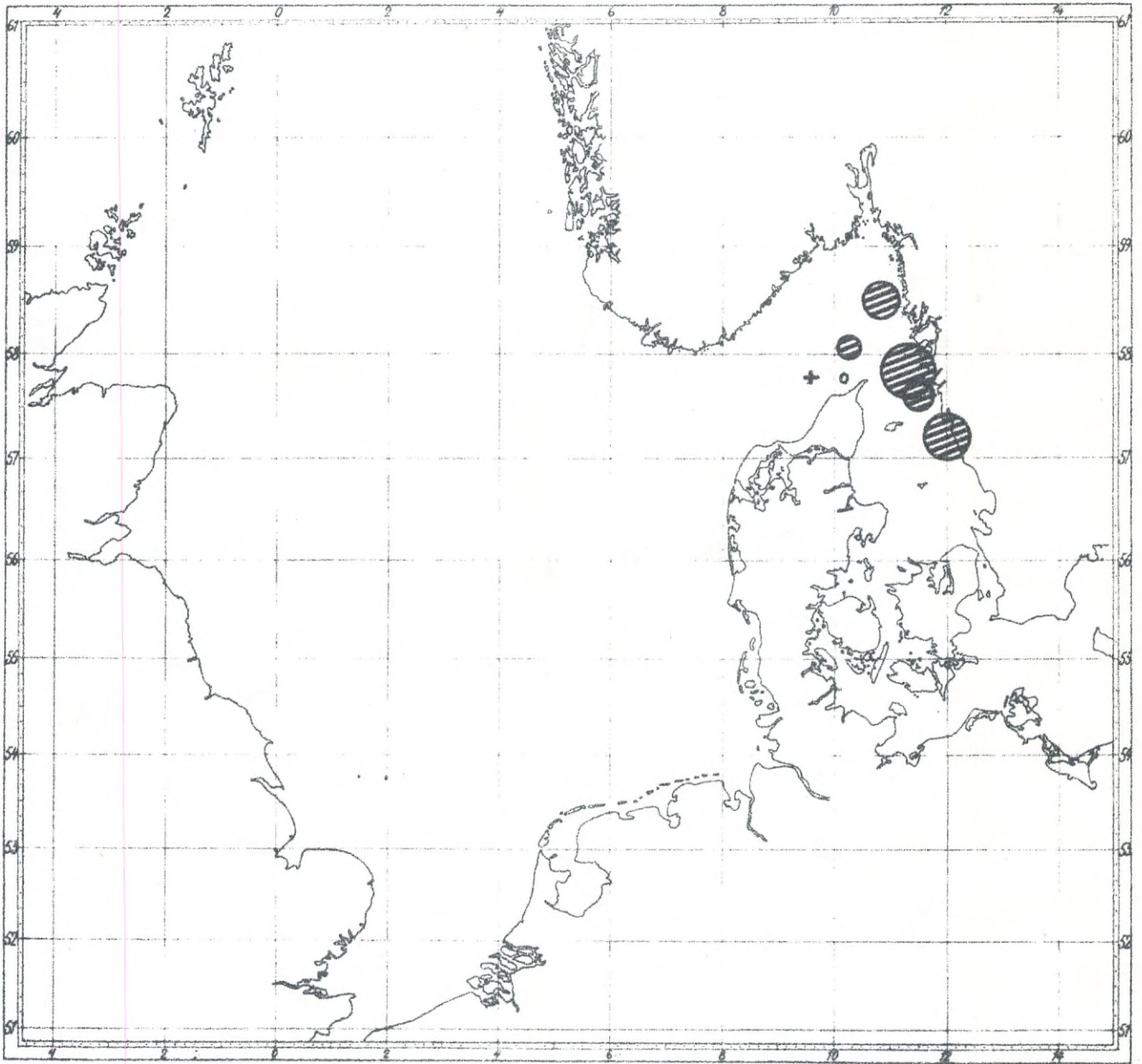


no catch

Gadus esmarkii

Fig. 2.

Febr.-March 1960



1000/hour of trawling

+

< 10/hour of trawling

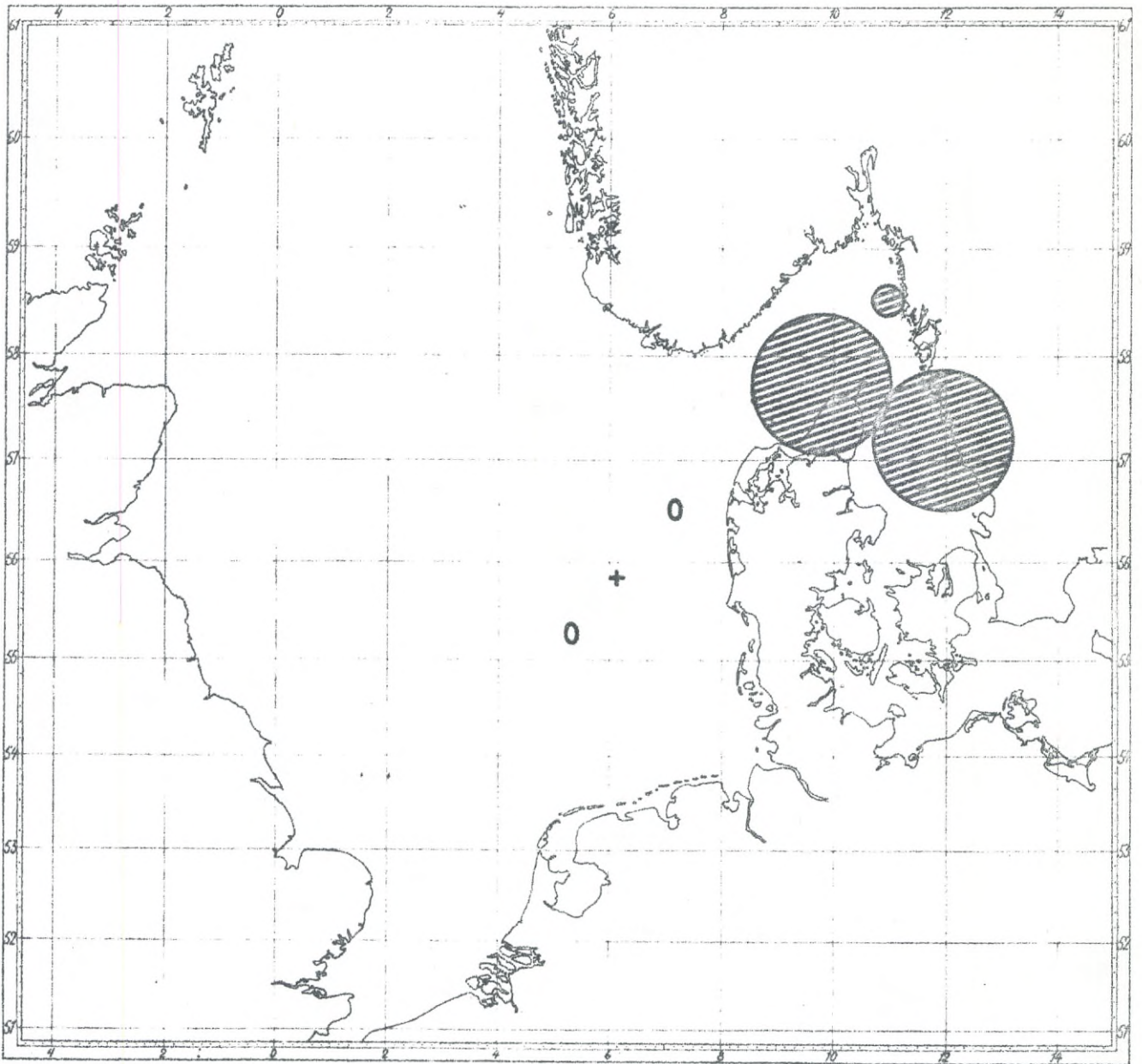
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no catch

Fig. 3.

Gadus esmarkii

April-May 1960



1000/hour of trawling



< 10/hour of trawling

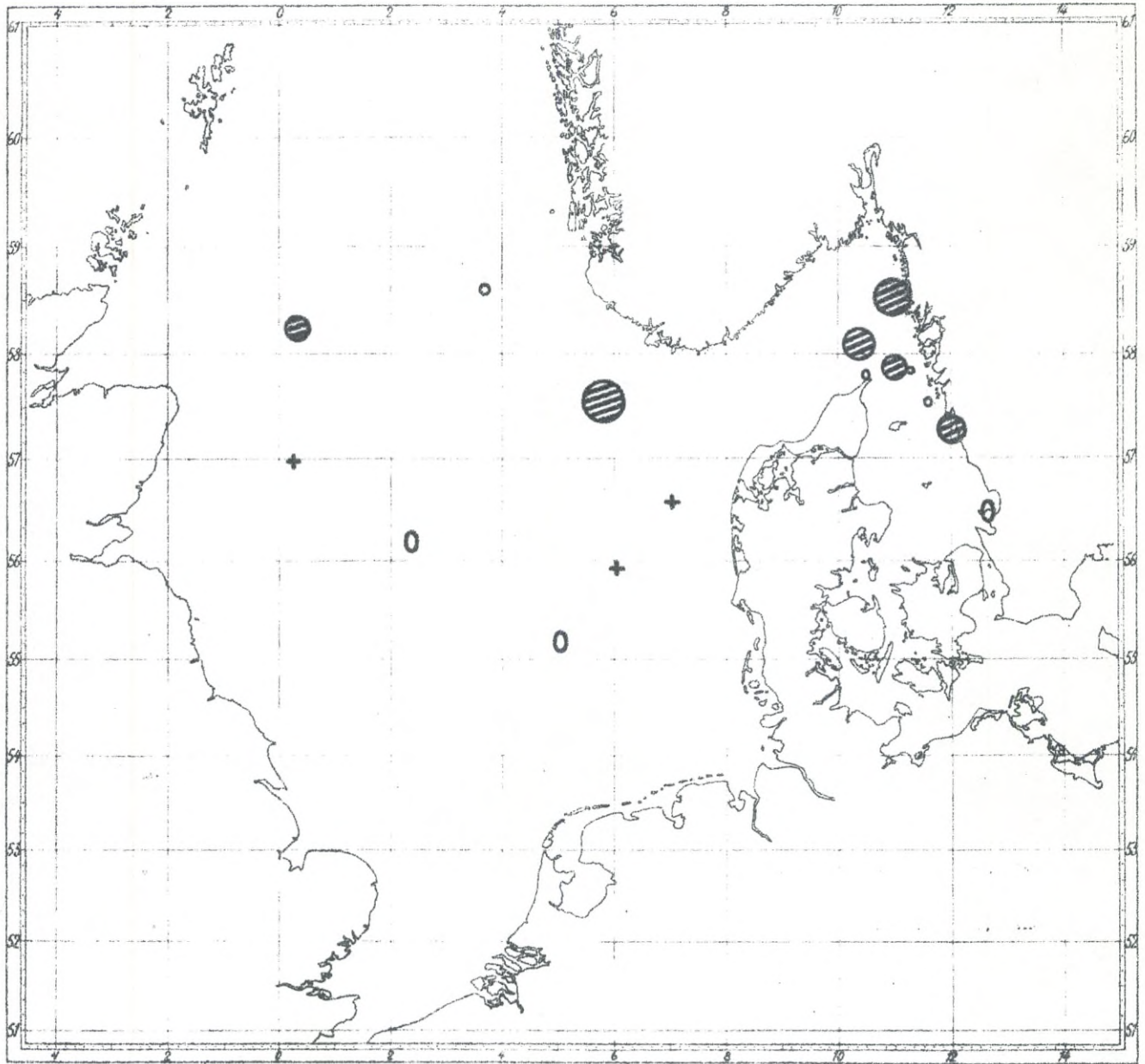


no catch

Fig. 4.

Gadus esmarkii

Febr.-March 1961



1000/hour of trawling



< 10/hour of trawling



no catch

Gadus esmarkii

Fig. 5.

Sampling stations

Febr.-March 1961

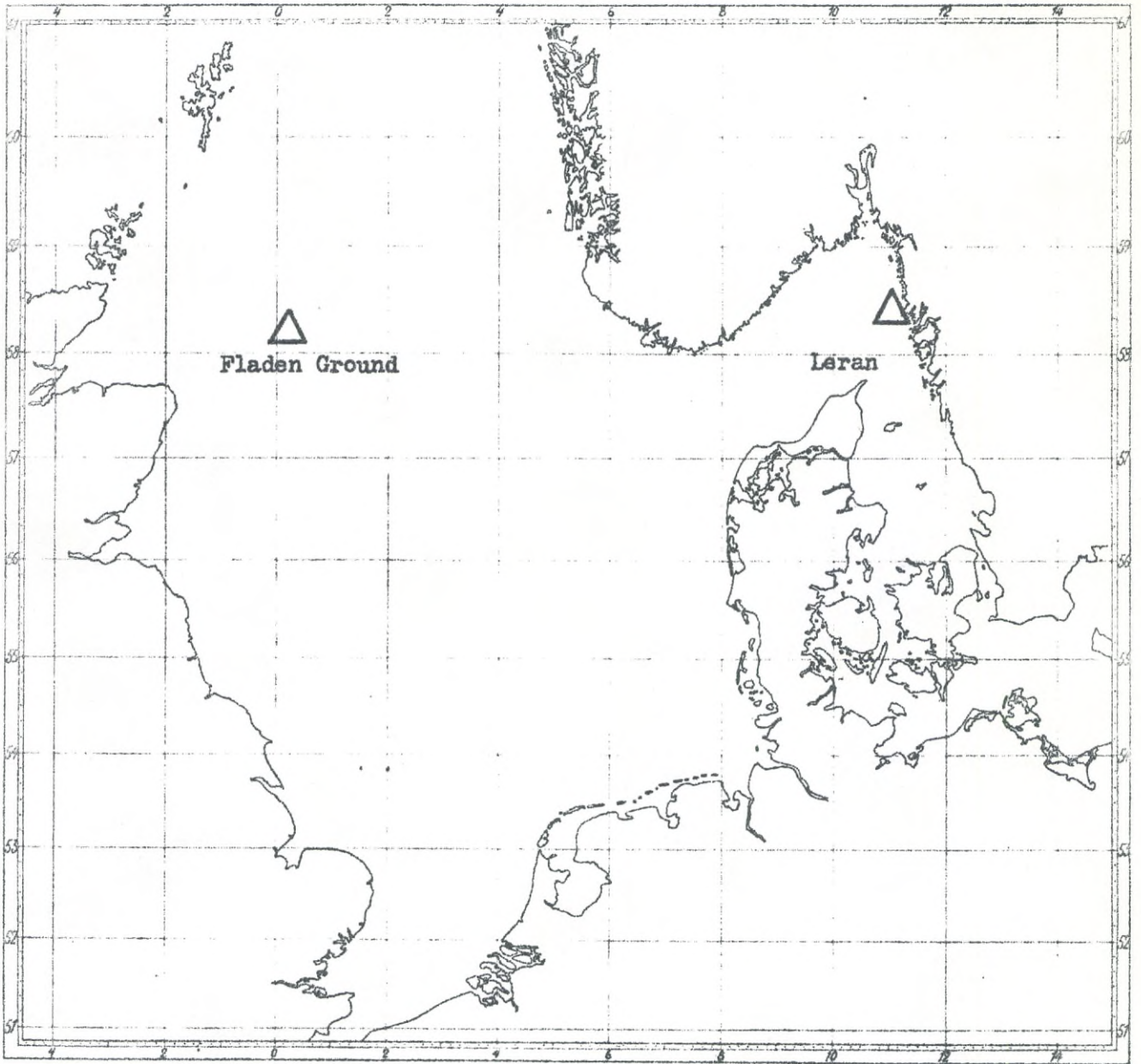


Fig. 6.

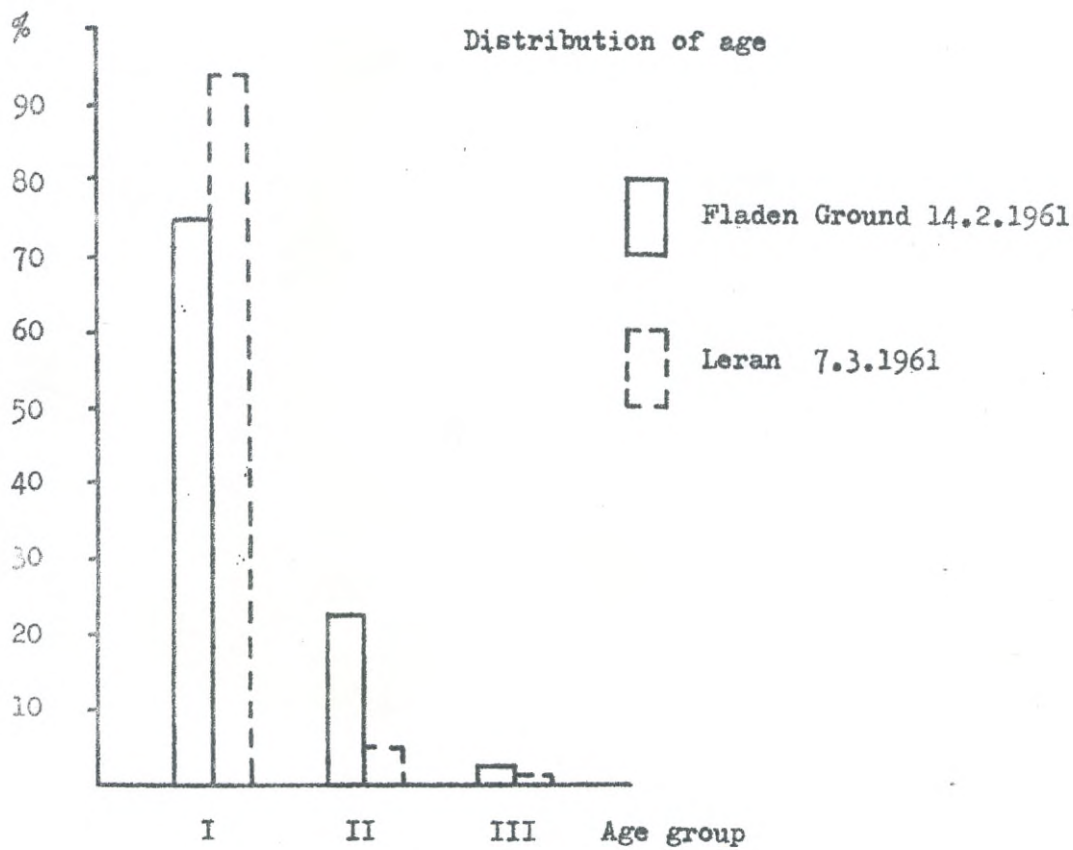
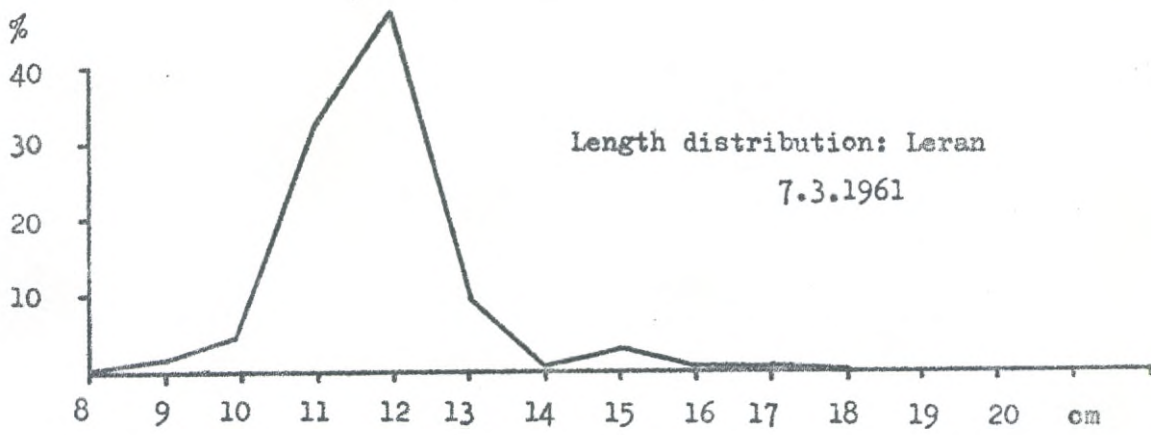
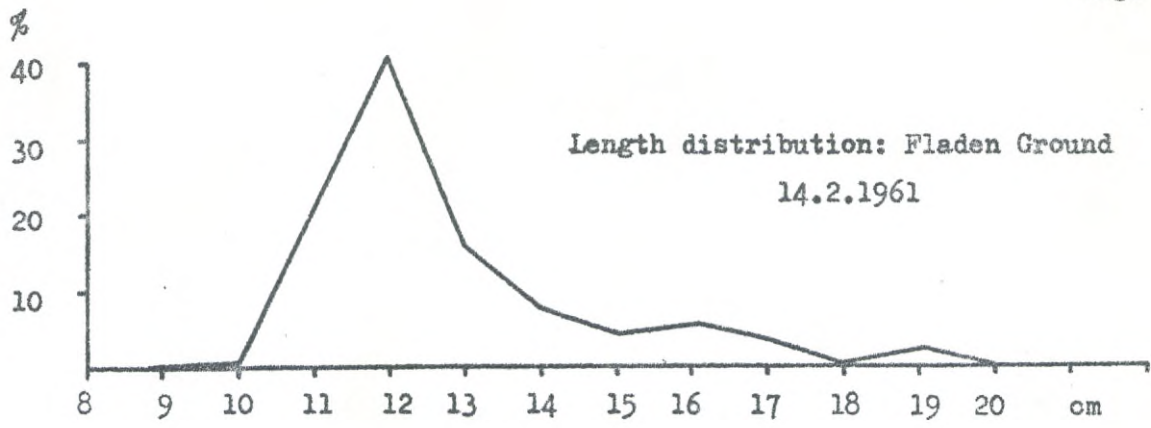


Fig. 7.

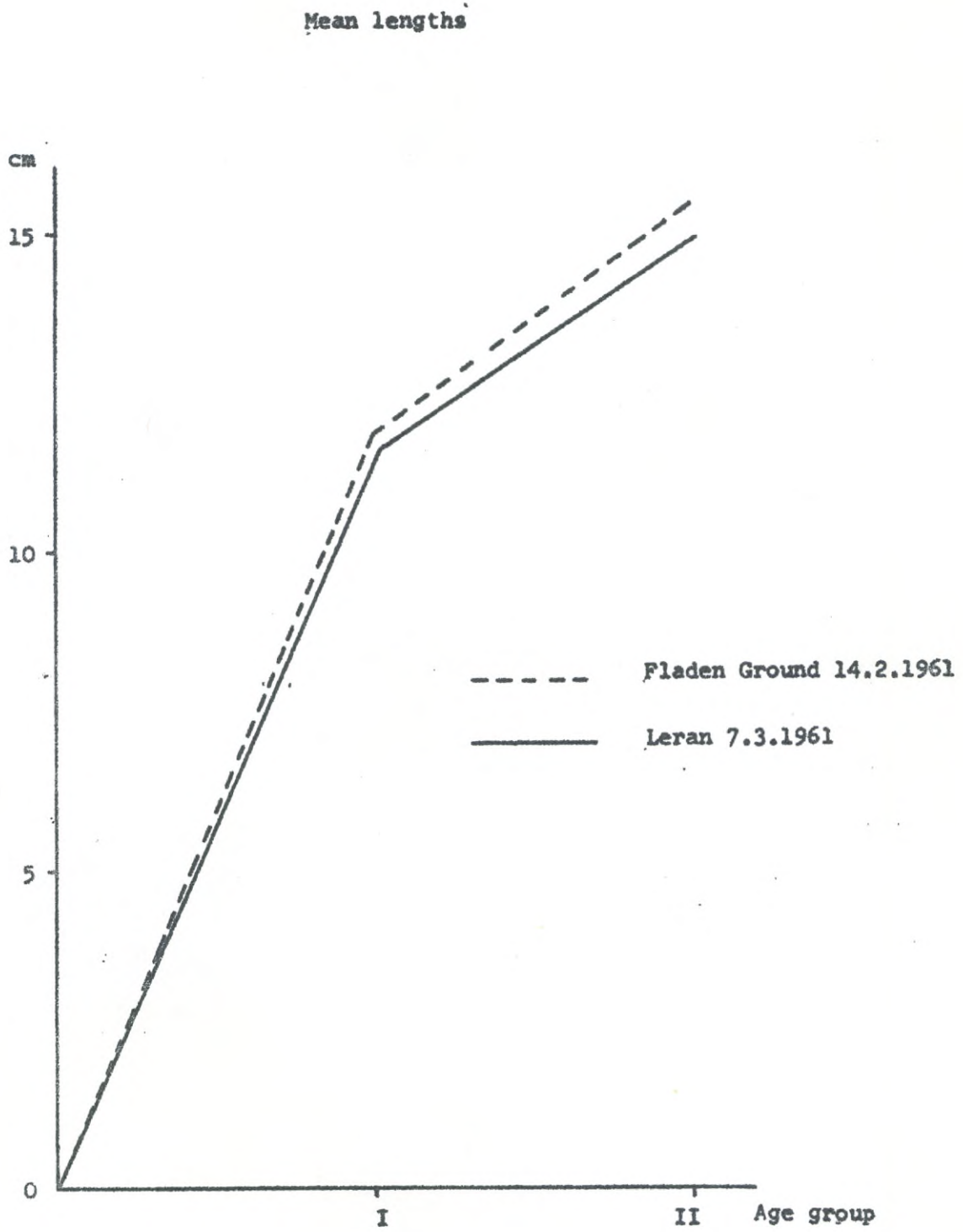


Fig. 8.

