

ANNUAL MEETING - JUNE 1965The size and sexual maturity of herring  
(Clupea herengus L.) on the fishing  
grounds of Nova Scotia and Georges Bank, in July, 1964by Jan Netzel, Eugeniusz Stanek  
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During the research cruise in June and July, 1964, to the fishing grounds of the northwestern part of the Atlantic Ocean - from Hamilton Inlet Bank to Georges Bank - 5,412 herring were measured and biological characteristic of 366 were investigated. The materials were collected mainly in the region of Georges Bank. On other fishing grounds, except the southern slopes of Emerald Bank, herring appeared in very small quantities. Total length of fish was measured and the stage of gonad maturity determined according to Maier's scale.

Fish for the investigations were captured with two types of bottom trawl. On the western part of the Great Newfoundland Bank (Green Bank) and on the fishing grounds of Nova Scotia (Sable Island Bank, Middle Ground, Emerald Bank, Sambro Bank) herring were captured with the cod trawl with 100 mm mesh in the codend, whereas, on Browns Bank and Georges Bank the fishing was performed with a herring trawl of 70 mm mesh in the codend. On Georges Bank, herring were captured at 50 - 100 m; on other fishing grounds, the fishing was generally carried out below 100 m. The regions investigated on the Nova Scotia and Georges Banks are shown on Fig. 1.

The results of investigationsFish length

The length of the fish and the mesh size of the trawls are given in Table 1. Results show that at the same mesh size the fish are of different length. For instance, on Green Bank and on the southern slopes of Emerald Bank, where the mesh size of the trawls used was 100 mm, the average length of herring was 37.6 cm and 33.2 cm. Considerable difference in herring lengths was found also in the region of Georges Bank. The largest fish were captured on the slopes of this Bank (31.0 cm), while the smallest individuals appeared on the northern slopes (25.7 cm.) On the northern slopes of Georges Bank, there appeared relatively more small fish of length 18-23 cm. Length frequencies of herring taken from the different fishing grounds are shown in Fig. 2

Table 1. Length of herring in the catches

Fishing ground	Range of length (cm)	Mean length (cm)	Mesh size of trawl codend (mm)
The Great Newfoundland Bank			
- Green Bank	31-42	37.6	100
Southern slopes of Emerald Bank	27-39	33.2	100
Northern slopes of Georges Bank	17-34	25.7	70
Western slopes of Georges Bank	25-35	31.0	70
Southern slopes of Georges Bank	23-34	27.2	70
Southeastern slopes of Georges Bank	23-33	29.0	70
Georges Bank - Corsair Canyon	18-39	28.6	70

Sexual maturity

On the western and southern slopes of Georges Bank considerably fewer males were taken. The ratio of males to females was 1:3.5. On the other fishing grounds, the sex ratio remained approximately 1:1.

The state of sexual maturity of herring on particular fishing grounds is given in Fig. 3. On the southern slopes of Emerald Bank, most of the fish were in maturity stage IV. Here, also fish in stages III and V were found. On the northern slopes of Georges Bank, the state of the gonads did not show any definite tendencies. Most of the males were in stages IV and V, whereas the females were less mature, most of them being in the stage III. On the western slopes of Georges Bank, the majority of females were in stage IV. The males were in a more advanced stage, though only about 15% of them were in stage V. The less mature, stage III fish, made rather an admixture here. In the catches on the southern slopes of Georges Bank, the herring were all in stage IV, but there were twice as many females as males. The fish of other stages of maturity (II, III, V) occupied only 10% of the catches. The southwestern slopes of Georges Bank were characterized by the fish of the most advanced maturity and almost all the individuals were in stages IV and V. The number of females was slightly larger, and the males in stage V occupied a little more than 20% of the catches. On Corsair Canyon, the fish were mostly in stage IV and the two sexes occupied over 77% of the catches. There were few males in stage V (about 9%) and a slight mixture of the fish in stages III and II.

In general, a decided majority of herring in all the catches from all investigated fishing grounds were in stage IV, with females having a distinct numerical majority. Only males were found to be in stage V, suggesting their earlier maturation.

Occurrence in the catches

During the research cruise, from Labrador southward catches were examined and the species composition recorded. Data on the occurrence of herring on particular fishing grounds is included in Table 2.

Table 2. The occurrence of herring in the catches from the northwestern part of the Atlantic Ocean in summer, 1964.  
(x - single individuals, xx - in small quantities, xxx - in larger quantities, xxxx - in large quantities, xxxxx - in very large quantities).

Fishing ground	Frequency
Southern part of the central area of the Great Newfoundland Bank	x
The Great Newfoundland Bank - Green Bank	xxx
Sable Island Bank	x
Middle Ground	x
Southern slopes of Emerald Bank	xxxx
Southwestern slopes of Emerald Bank	x
Sambro Bank	x
Browns Bank	xxxxx
Northern slopes of Georges Bank	xxxxx
Western slopes of Georges Bank	xxxxx
Southern slopes of Georges Bank	xxxxx
Southeastern slopes of Georges Bank	xxxxx
Georges Bank - Corsair Canyon	xxxxx

Herring were first encountered in the southern part of the central area of the Great Newfoundland Bank. Single individuals were also noted on the Sable Island Bank, Middle Ground, southwestern slopes of Emerald Bank and Sambro Bank. Greater numbers of herring were found on the southern slopes of Emerald Bank, on Browns Bank and in all the investigated regions of Georges Bank. Echo recording indicated that the herring, at

this time, did not gather into dense bottom shoals, but were in the upper water layers.

#### Conclusions

The occurrence of herring increased and at the same time the length of this species slightly decreased in the catches on the fishing grounds from Labrador southwest to Georges Bank. The maturity stage of the gonads showed that these fish belonged to the population from the early autumn spawning.

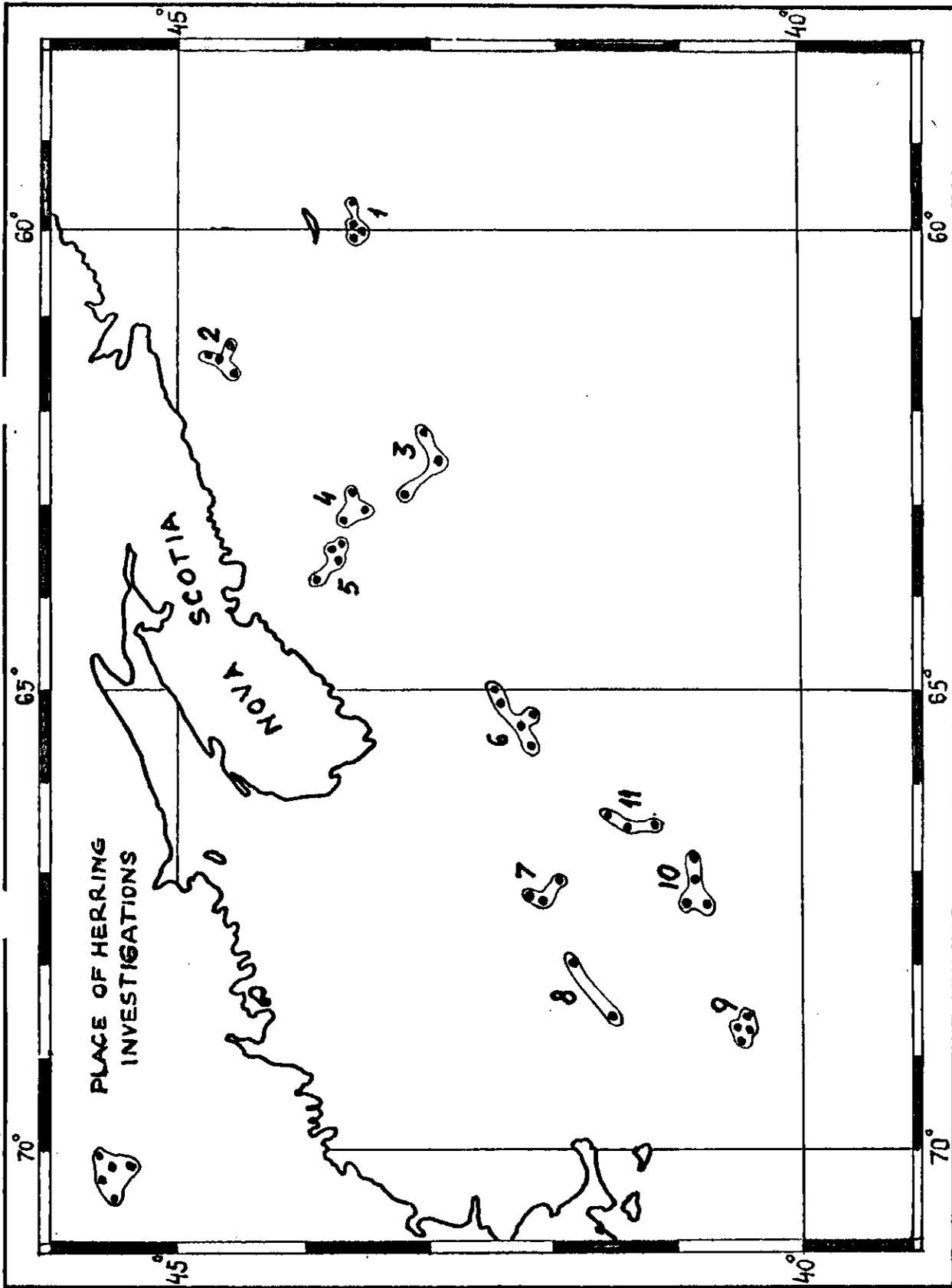


Fig. 1. Areas of herring investigations during July, 1964. Demarcation of the regions of investigations: 1 - Sable Island Bank; 2 - Middle Ground; 3 - Western slopes of Emerald Bank; 4 - Northwestern slopes of Emerald Bank; 5 - Sambro Bank; 6 - Browns Bank; 7 - Northern slopes of Georges Bank; 8 - Western slopes of Georges Bank; 9 - Southern slopes of Georges Bank; 10 - Southeastern slopes of Georges Bank; 11 - Georges Bank -

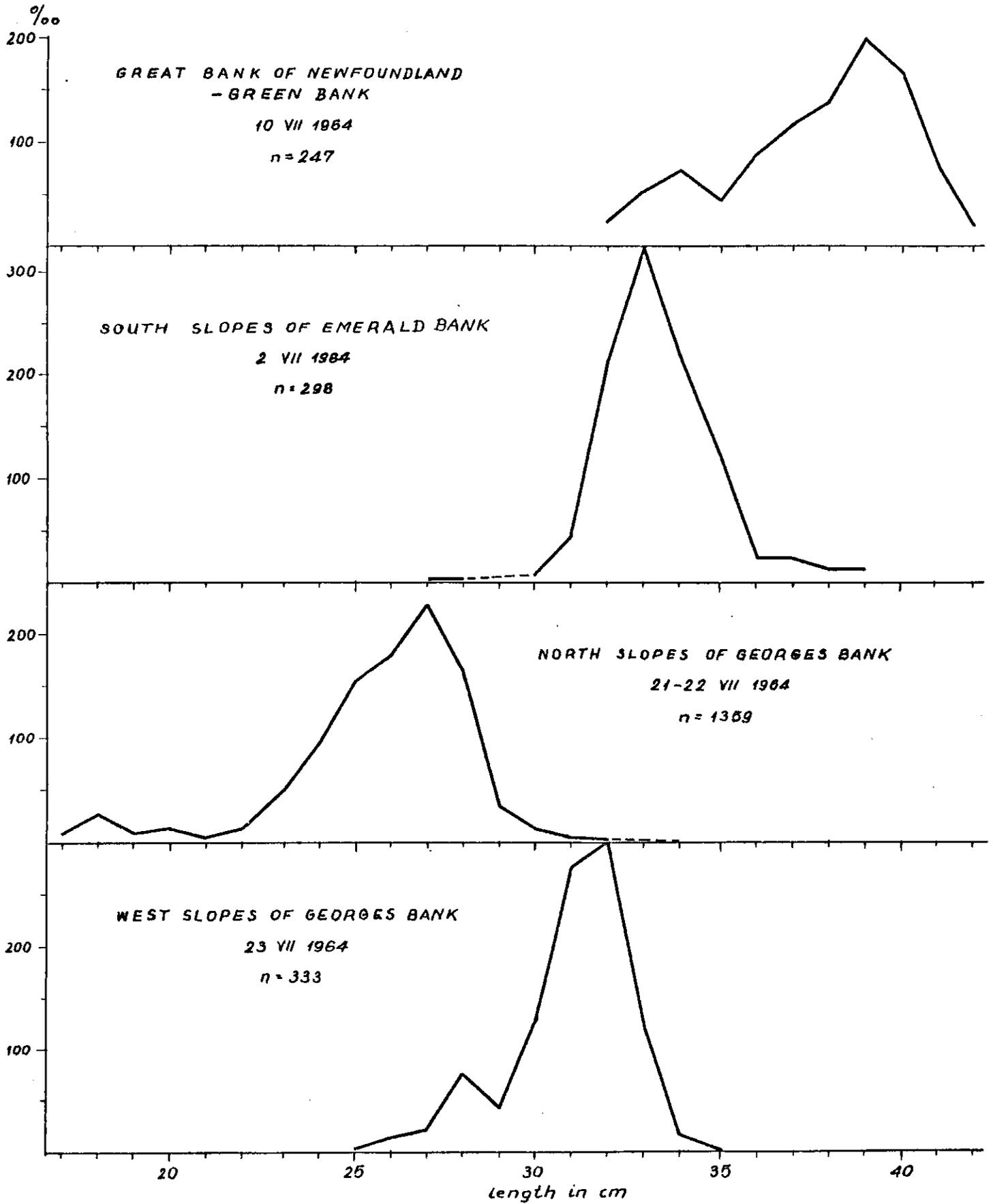


Fig. 2. Length composition of herring

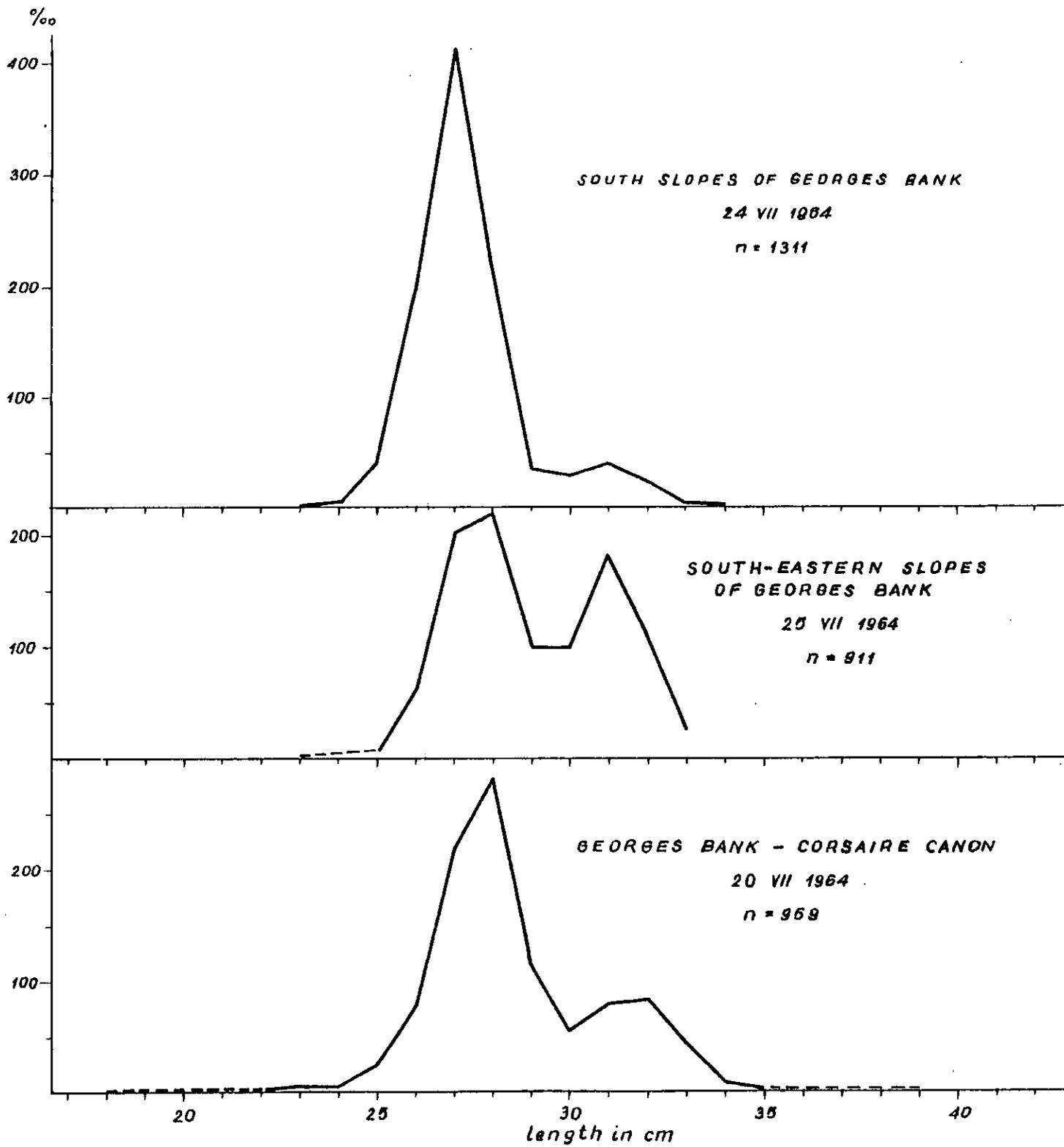


Fig. 2 (cont'd). Length composition of herring

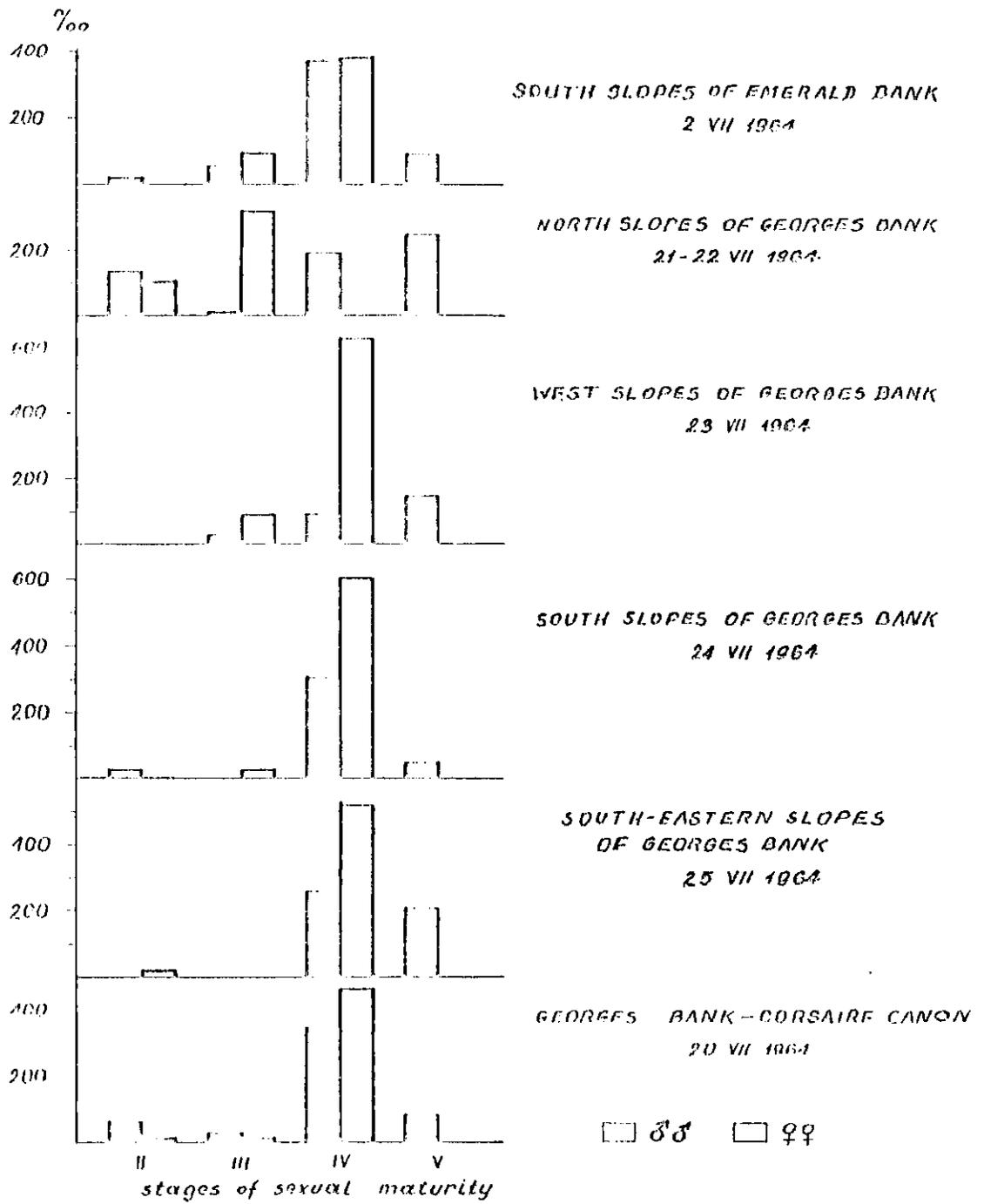


Fig. 3. Sexual maturity of herring according to Maier's scale