Sorting.


Concentrations of Full Herring exploited by the Belgian Herring Trawlers in 1949.
A. Activity of the Herring Trawlers and Results recorded during the Fishery.
The first full-herring catches taken by the Belgian herring trawlers were landed on 13. July and the last on 5. December 1949. During July and August, the catches came exclusively from the Fladen Ground, whereas from September onwards, many trawlers already fished south of this area, viz., on the Turbot Bank, Old Devil Hole, and Gut. In October, this fishery extended to Brucey's Garden and the SW. area of the Dogger Bank. In November, the whole fishery moved suddenly to the extreme south of the North Sea, where it was localised between the "Ruytingen", the "Sandettié", and the Straits of Dover. There the fishery ended on 5. December.

The effectiveness of the trawler fleet is shown by Tables 1-4.


Biological Scale of the Full-Herring Concentrations exploited by the Belgian Herring Trawlers during the years 1946-1949.

Table 1. Number of the Belgian Herring Trawlers ( $\mathbf{t}$ ), and of their Voyages (v).

Classes of Vessels

(a) According to the fishing grounds

Fladen . . . . . - $\quad-\quad 2 \quad 2 \quad 7 \quad 36$ $\begin{array}{llllllllllll}\text { Centr. Area }{ }^{1} \text { ). } & - & - & - & - & 7 & 38 & 9 & 26 & 16 & 64 \\ \text { South. Area } & 6 & 8 & 2 & 2 & 4 & 7 & 1 & 1 & 13 & 18\end{array}$
(b) According to the monthly periods.

| July ......... | - | - | - | - | 7 | 9 | 6 | 8 | 13 | 17 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| August ...... | - | 2 | 2 | 7 | 19 | 13 | 27 | 22 | 48 |  |
| September ... | - | - | - | - | 7 | 20 | 13 | 28 | 20 | 48 |
| October ..... | - | - | - | 7 | 20 | 5 | 12 | 12 | 32 |  |
| November ... | 6 | 7 | 2 | 2 | 5 | 12 | 2 | 4 | 15 | 25 |
| December ... 1 | 1 | - | - | 1 | 1 | - | - | 2 | 2 |  |

${ }^{1}$ ) Central Area of the North Sea, chiefly "Old Devil Hole", "Turbot Bank", "Gut", "Brucey's Garden" and S.W. area of the Dogger Bank.

Table 2. Number of Sea-Days (S.D.) and of Effective Fishing Hours (F.H.).

Classes of Vessels
III IV V VI
S.D. F.H. S.D. F.H. S.D. F.H. S.D. F.H.
(a) According to the fishing grounds

| Fladen . .. | - | - | 29 | 300 | 391 | 3730 | 540 |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| 5337 |  |  |  |  |  |  |  |
| Centr. Area | - | - | - | - | 338 | 2620 | 251 |
| 2139 |  |  |  |  |  |  |  |
| South. Area 62 | 747 | 17 | 206 | 48 | 446 | 4 | 20 |

(b) According to the monthly periods

July ...... - - $\quad$ - $\quad$ - $1031143 \quad 73 \quad 554$
August.... - $\quad-\quad 29 \quad 300 \quad 195 \quad 1646 \quad 279 \quad 2676$
September . - - - $\quad 2031930299 \quad 3272$
October ... - - - - $\begin{array}{lllllll}166 & 1267 & 111 & 802\end{array}$
November . $60 \begin{array}{llllllll}737 & 17 & 206 & 105 & 780 & 33 & 192\end{array}$
December . 240 - 10 - $\quad 5 \quad 30$ -

Table 3. Number of H.P. developed ( $1000 \mathrm{H} . \mathrm{P}$.) and of Landings ( 1000 Kg .) (L.).

|  | III |  | IV |  | V |  | VI |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | H. P. | L. | H. P. | L. | H. P. | L. | H. P. | L. |
| Fladen | - | - | 90 | 41 | 1528 | 1626 | 3966 | 3687 |
| Centr. Area | - | - | - | - | 1068 | 1790 | 1525 | 1429 |
| Southern Area | 128 | 36 | 57 | 12 | 178 | 125 | 11 | 49 |
| July. | - | - | - | - | 472 | 308 | 389 | 358 |
| August | - | - | 90 | 41 | 674 | 951 | 1968 | 2101 |
| September | - | - | - | - | 786 | 1017 | 2507 | 1943 |
| October. | - | - | - | - | 519 | 984 | 531 | 619 |
| November | 126 | 36 | 57 | 12 | 312 | 277 | 107 | 143 |
| December | 2 | 0.3 | - | - | 12 | 4 | - | - |
| \%. | - | 0.4 | - | 0.6 | -- | 40.3 | - | 58.7 |

Table 4. Average Catch (1000 Kg.) per Voyage (C./V.), per Sea-Day (C./S.D.), and per Hour for $100 \mathrm{H} . \mathrm{P}$. developed (C/H).

|  | III |  |  | IV |  |  | V |  |  | VI |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | C./v. | C./S.D | C./H. | C./V. |  | C./H. | C./V. | C./S.D | C. $/ \mathrm{H}$. | C./V. | C./S.D. | C./H. |
| Fladen |  |  |  | 20 | 1.4 | 45 | 45 | 4.2 | 106 | 71 | 6.8 | 93 |
| Centr. Area | - | - | - | - |  | - | 47 | 5.3 | 167 | 55 | 5.7 | 94 |
| Southern Area | 4 | 0.6 | 28 | 6 | 0.7 | 22 | 18 | 2.6 | 70 | 49 | 12.2 | 427 |
| July. | - | - | - | - | - | - | 34 | 3.0 | 65 | 45 | 4.9 | 92 |
| August. | - | - | - | 20 | 1.4 | 45 | 50 | 4.9 | 141 | 78 | 7.5 | 107 |
| September | - | - | - | - | - | - | 51 | 5.0 | 129 | 69 | 6.5 | 77 |
| October. | - | - | - | - | - | - | 49 | 5.9 | 189 | 52 | 5.6 | 117 |
| November | 5.1 | 0.6 | 28 | 6 | 0.7 | 22 | 23 | 2.6 | 89 | 36 | 4.3 | 134 |
| December. | 0.3 | 0.1 | 14 | - | - | - | 4 | 0.7 | 30 | - | - | - |
| Total. | 4.5 | 0.6 | 28 | 13 | 1.2 | 36 | 44 | 4.6 | 128 | 65 | 6.5 | 94 |

Table 5. Recapitulation of the Activity of the Herring Trawlers during the Full-Herring Campaigns 1946 to 1949.

| Details | $\begin{gathered} \text { Classes } \\ \text { of } \\ \text { Vessels } \end{gathered}$ | Campaigns |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 1947 |  | 1948 |  | 1949 |  |
|  |  | ! | v | t | v | t | v | $t$ | v |
| Number of Herring Trawlers in Activity ( t ), and Number of Voyages (v) | III | 8 | 12 | 4 | 5 | 16 | 33 | 6 | 8 |
|  | IV..... | 26 | 156 | 37 | 169 | 42 | 161 | 4 | 4 |
|  | VI. | 12 | 89 | 19 | 141 | 22 | 138 | 13 | 79 |
|  | Total... | 46 | 257 | 60 | 315 | 80 | 332 | 30 | 172 |
| Number of effective fishing Hours | III | 793 | - | 312 | - | 1,183 | - | 747 | 一 |
|  | IV...... | 1,102 | - | 18,655 | - | 16,640 | - | 506 6 | - |
|  | VI......... | 6,812 | - | 14,339 | - | 12,376 | - | 7,496 | - |
|  | Total | 18,707 | - | 33,306 | - | 30,199 | - | 15,545 | - |
| Number of 1000 H.P. developed | III | 155 | - | 56 | - | 199 | - | 128 | - |
|  | IV. | 2,958 | - | 5,485 | - | 5,315 | - | 147 | - |
|  | VI. |  |  |  |  |  |  | 2,774 | - |
|  | Total | 7,414 | - | 14,667 | - | 13,594 | - | 8,502 | - |

Table 6. Weight of Full-Herring landed during the Years 1946-1949.


Table 7. Seasonal Values recorded for the Years 1946 to 1949 (1000 Frs.).


Table 8. Percentage Distribution of each Centimetre Class, Mean Length (cm ), Average Weight, and Percentage of Males.

| cm . | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | Mean | Aver. weight | \% males |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| N. Area. | - | 0.2 | 1.0 | 1.7 | 5.9 | 15.5 | 30.2 | 34.2 | 10.0 | 1.3 | 27.6 | 165 gr . | 55.5 |
| C. Area. | 1.1 | 3.2 | 8.9 | 10.5 | 11.7 | 14.6 | 28.9 | 17.1 | 3.8 | 0.2 | 26.4 | 142 " | 52.0 |
| August | - | - | - | 0.7 | 9.0 | 18.6 | 30.2 | 31.2 | 8.6 | 1.7 | 27.5 | 165 | 57.6 |
| September | 0.7 | 0.4 | 3.6 | 4.2 | 3.3 | 12.0 | 31.3 | 33.1 | 10.7 | 0.7 | 27.5 | 160 | 47.3 |
| October. | 0.9 | 4.2 | 10.4 | 12.5 | 13.8 | 14.9 | 27.1 | 14.2 | 2.0 | - | 26.2 | 136 | 56.7 |
| Total. | 0.5 | 1.6 | 4.8 | 5.9 | 8.7 | 15.1 | 29.5 | 26.1 | 7.0 | 0.8 | 27.0 | 154 | 53.8 |

Table 9. Percentage Distribution of each Stage of Maturity, and of Quantity of Mesenteric Fat.

| Stage of Maturity | I | II | III | IV | V | VI | VII | VIII-II | Fat 0 | 1 | + | M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Northern Area.. | 0.1 | 1.2 | 6.1 | 16.4 | 54.4 | 20.3 | 0.7 | 0.9 | 24 | 50 | 10 | 16 |
| Central Area | 0.2 | 1.1 | 1.3 | 3.7 | 16.2 | 67.6 | 4.1 | 5.9 | 46 | 46 | 4 | ธ |
| August | 0.2 | 1.7 | 7.4 | 22.6 | 62.4 | 5.0 | 0.7 | - | 14 | 49 | 14 | 22 |
| September | 0.4 | 1.3 | 4.2 | 9.1 | 38.0 | $\underline{2.0}$ | 1.3 | 3.6 | 36 | 46 | 7 | 10 |
| October. |  | 0.4 |  | - | 9.8 | 78.9 | 4.9 | 6.0 | 52 | 47 | 0.4 | 0.4 |
| Total \% | 0.2 | 1.1 | 3.8 | 10.3 | 36.1 | 42.8 | 2.4 | 3.3 | 34 | 48 | 7 | 11 |
| Percentage distribution of mesenteric fat in $\left\{\begin{array}{l}\text { 1st group, maturities I-III. . } \\ \text { 2nd group, maturities IV-VIII (II) } \ldots \ldots \\ \text { 2 }\end{array}\right.$ |  |  |  |  |  |  |  |  |  |  |  |  |

Table 10. Percentage Distribution of each Year-Class observed and Number (No.) of readable Scales, and Age-Groups of total catch compared for 1946 - 49.

| Winter rings | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | + | No. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $+$ |  |
| Year-Classes in |  |  |  |  |  |  |  |  |  |  |
| 1949 catch. | 1946 | 1945 | 1944 | 1943 | 1942 | 1941 | 1940 | 1939 | before |  |
|  |  |  |  |  |  |  |  |  | 1939 |  |
| Northern Area. | 1.1 | 3.4 | 11.3 | 12.8 | 18.5 | 20.8 | 19.2 | 9.1 | 3.8 | 265 |
| Central Area | 8.0 | 15.1 | 13.2 | 10.0 | 19.9 | 7.9 | 13.5 | 6.4 | 6.0 | 251 |
| August.... | - | 2.6 | 13.5 | 12.9 | 20.2 | 21.8 | 17.1 | 8.3 | 3.6 | 193 |
| September | 3.1 | 4.6 | 10.1 | 9.3 | 19.4 | 16.3 | 20.9 | 10.1 | 6.2 | 129 |
| October | 9.8 | 18.6 | 12.4 | 11.3 | 18.0 | 6.2 | 12.9 | 5.7 | 5.1 | 194 |
| 1946 | 4.4 | 9.5 | 11.5 | 23.9 | 14.3 | 10.7 | 11.3 | 7.4 | 4.8 |  |
| 1947 | 5.3 | 8.7 | 17.2 | 13.7 | 18.7 | 11.9 | 10.9 | 4.4 | 9.1 |  |
| 1948 | 1.1 | 16.7 | 9.4 | 17.6 | 15.3 | 16.7 | 9.7 | 4.5 | 8.7 |  |
| 1949 | 4.5 | 9.1 | 12.2 | 11.4 | 19.2 | 14.5 | 16.5 | 7.7 | 4.9 |  |

Table 11. Average Size (cm.) observed for each Year-Class.

Table 12. Average Value of $L_{1}(\mathrm{~mm}$.$) of each$ Year-Class.

| Year-Classes |  |  |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Areas | 1946 | 1945 | 1944 | 1943 | 1942 | 1941 | 1940 | 1939 |
| Northern .. | 133 | 109 | 113 | 115 | 115 | 118 | 119 | 120 |
| Central.... | 123 | 109 | 109 | 113 | 113 | 112 | 115 | 118 |
| Total..... | 124 | 109 | 111 | 114 | 114 | 117 | 117 | 119 |

General Average value of $L_{1}$ :
Northern Area: 116 mm ., August : 116 mm .
Central Area : 113 mm .; September: 119 mm .
Total : 115 mm .; October : 110 mm .

Table 13. Percentage Distribution of the Number of Vertebrae and the vertebral Average.

| Number of vertebrae | 55 | 56 | 57 | 58 | 59 | Total | Averages |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | 1st group | 2nd group |
| Northern Area. | 2.5 | 46.8 | 45.3 | 5.0 | 0.4 | 56,541 | 56.73 | 56.53 |
| Central Area | 3.4 | 45.5 | 46.4 | 4.5 | 0.2 | 56,525 | 56.73 | 56.52 |
| Total. | 2.9 | 46.2 | 45.8 | 4.8 | 0.3 | 56,533 |  |  |
| August | 2.2 | 48.2 | 44.6 | 4.3 | 0.7 | 56,532 | 56.69 | 56.52 |
| September | 0.2 | 44.3 | 47.5 | 5.7 | 2.3 | 56,573 | 56.77 | 56.57 |
| October. . | 4.3 | 46.2 | 45.2 | 4.3 | - | 56,495 | 56.50 | 56.50 |
| Total. | 2.9 | 46.2 | 45.8 | 4.8 | 0.3 | 56,533 | 56.74 | 56.52 |
| 1st group | 0.9 | 34.9 | 54.7 | 8.5 | 0.9 | 56.735 |  |  |
| 2nd group ........ | 3.1 | 47.2 | 45.0 | 4.5 | 0.2 | 56,515 |  |  |

Table 14. Percentage Distribution of the Number of cervical Vertebrae and the cervical vertebral Average.

| Numb. C. Ver. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 1st group 2nd group |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Northern Area. | 0.2 | 2.4 | 29.4 | 46.5 | 17.9 | 2.9 | 0.4 | 0.3 | 23.92 | 23.96 | 23.91 |
| Central Area | - | 1.8 | 29.5 | 46.5 | 16.0 | 4.7 | 1.3 | 0.2 | อ3.96 | 24.20 | 23.96 |
| August | 0.2 | 3.6 | 29.0 | 49.6 | 14.4 | 2.6 | 0.2 | 0.2 | 23.84 | 23.90 | 23.84 |
| September | - | 0.9 | 29.4 | 43.4 | 20.5 | 3.9 | 1.6 | 0.2 | 24.03 | 24.08 | 24.02 |
| October. | - | 1.8 | 29.9 | 46.6 | 16.1 | 4.7 | 0.7 | 0.2 | 23.95 | 23.50 | 23.95 |
| Total. | 0.1 | 2.1 | 29.4 | 16.5 | 17.0 | 3.9 | 0.8 | 0.2 | 23.94 | 24.00 | 23.94 |
| 1st group | - | 2.8 | 20.7 | 55.7 | 17.0 | 1.9 | 1.9 | - | 24.00 |  |  |
| 2nd group | 0.1 | 2.0 | 30.2 | 45.7 | 17.0 | 4.0 | 0.8 | 0.2 | 23.94 |  |  |

Table 15. Average Number of cervical Vertebrae for each Total Number of Vertebrae.

| Total number of vertebrae | 55 | 56 | 57 | 58 | 59 | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Number of spines observed........ | 38 | 598 | 593 | 62 | 4 | 1295 |
| Average number of cerv. vert....... | 23.29 | 23.77 | 24.11 | 24.44 | 23.75 | 23.94 |

Table 16. Percentage Distribution of the keeled Scales ( $\mathbf{K}_{2}$ ).

| Number of $\mathrm{K}_{2}$ | 12 | $\mathbf{1 3}$ | 14 | $\mathbf{1 5}$ | $\mathbf{1 6}$ | 17 | 18 | Total | Averages <br> 1st group |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
| 2nd group |  |  |  |  |  |  |  |  |  |  |

B. Some Considerations about the Exploitation of the
Full-Herring Shoals and on the Results obtained.

In 1949, the herring trawlers were less active than usual. The number of trawlers as well as of voyages decreased (see Table 5); the same applies to the number of sea-days, the hours of effective fishing and the number of H.P. developed.

This smaller activity of the herring fleet entailed inevitably a marked diminution in the total weight landed (see Table 6). As a set-off, the average weight per catch shows a large increase with reference to the averages recorded in previous years. In comparison with 1948 and 1947, the average catch per hour's effective fishing stayed rather stationary, whereas a maximum was attained in 1946.

Looking at Table 7, we ascertain a formidable regression in the value in reference with previous years. This deficit must for the greater part be attributed to the diminution of the total weight landed and to the average price paid for the herring, which was rather derisory.

A comparison of the activity displayed by the herring trawlers with the results achieved during the post-war years, permits us to infer that the quantities landed in 1949 are in relation to the effort furnished by the herring fleet. Moreover, since 1947, the average catch per hour's effective fishing for 100 H.P. developed, seems to stay around 100 Kg .

If this level could be maintained in the future, the question of overfishing the herring stock of the North Sea would not be raised and the yield of the fishery would be sufficient to guarantee a lucrative exploitation, on condition however, that the prices offered be reasonable.

## C. Biological Statistics.

(Material collected during August, September and October 1949).

In 1946, the results were distributed according to the origin of the material, namely Fladen and Gut. But as the information regarding the samples was later found not always

to be very trustworthy, we have given in 1947 and 1948, the distribution in monthly periods, viz. August, September and October.
However in 1949, we have been able to cover this deficiency, and therefore, in this present study, the results are distributed according to the origin as well as according to the periods.

Besides, we have proceeded with a third distribution, the one covering the most important racial characters (average of the total number of vertebrae, of the cervical vertebrae and of the keeled scales) for each stage of maturity.

The results obtained reveal once more the presence of two very distinct groups or populations: a first group, made up by spring spawners in maturity stage I, II and III, with a relatively high average of vertebrae (ca. 56.70) and a second group made up by "autumn spawners" in maturity stage IV to VIII-II with a remarkably inferior average of vertebrae (ca. 56.50 ).

The material comprises 22 samples from 50 to 90 herrings each, forming a total of 1320 herrings: 690 herrings from the northern area, chiefly the Fladen Ground (August-September), and 630 herrings from the central area, chiefly Turbot Bank, Old Devil Hole, Gut, Dogger Bank and Bruceys Garden (September-October).

The census for the vertebrae covered 1320 spines, of which there were 25 spines or 1.89 $\%$ with fused vertebrae. These spines have been eliminated from our material.

## Stomachal Contents.

Among the 1320 stomachs examined 73 or only $5.53 \%$ were found to have any contents: 6 full and 67 half full. The contents observed consisted for the greater part of copepods and smaller quantities of schizopods. Besides, stomachs have been found to contain eggs and keeled scales of herrings, which have most probably been swallowed during the trawling or during the winding up of the nets.

## D. A few Considerations on the Biological Values observed.

The fishing grounds according to the various months have been given under A, p.183. A comparison of the monthly results shows that the material collected in August and September differs hardly or not at all, whereas the results concerning the material assembled in October

Table 17. Values observed during the Periods August-October.


Table 18. Cervical Vertebral Average observed for cach Total Number of Vertebrac.

| Concentrations | Total number of vertebrae |  |  |  |  |  |  | Number of spines obs. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 54 | 55 | 56 | 57 | 58 | 59 | 61 |  |
| Full Herring number . | 4 | 32 | 301 | 273 | 33 | - |  | 643 |
| 1946 average | 22.8 | 23.4 | 23.6 | 24.0 | 24.2 | - | - |  |
| Spent Herring number | 1 | 8 | 157 | 200 | 32 | 1 | 1 | 400 |
| 1946-47 average | 24.0 | 23.9 | 23.8 | 24.1 | 24.4 | 25.0 | 28.0 |  |
| Full Herring number | 3 | 45 | 440 | 449 | 60 | 3 | - | 1.000 |
| 1947 average | 23.0 | 23.3 | 23.8 | 24.1 | 24.6 | 24.7 | - |  |
| Spent Herring number | 2 | 47 | 425 | 517 | 58 | 1 | - | 1,050 |
| 1947-48 average | 23.5 | 23.0 | 23.7 | 24.0 | 24.7 | 24.0 | - |  |
| Full Herring number | 4 | 39 | 400 | 483 | 71 | 3 | - | 1,000 |
| 1948 average | 22.5 | 23.4 | 23.7 | 24.1 | 24.2 | 25.0 | - |  |
| Spent Herring number | 5 | 58 | 434 | 512 | 88 | 3 | - | 1,100 |
| 1948-49 average | 22.4 | 23.4 | 23.7 | 24.1 | 24.4 | 25.0 | - |  |
| Full Herring number | -- | 38 | 598 | 593 | 62 | 4 | - | 1,295 |
| 1949 average | - | 23.3 | 23.8 | 24.1 | 24.4 | 23.8 | - |  |
| Total number | 19 | 267 | 2755 | 3027 | 404 | 15 | 1 | 6,488 |
| average | 22.8 | 23.3 | 23.8 | 24.1 | 24.4 | 24.5 | 28.0 |  |

deviate remarkably from those observed the previous months (see Table 17).

The figures in Table 17 are very instructive on this point and they indicate that the extreme values observed are always found in August and October, except the vertebral average, which attained its maximum value in September, month in which the other values approach those of August. Nevertheless they constitute intermediary values between August and October.

From this we infer that from October onwards, the full-herring concentrations exploited by the Belgian trawlers in the central area of the North Sea had already undergone a rather extensive modification in their composition and that the critical moment of this change takes place in the second fortnight of September or in the areas south of $55^{\circ}$ or $56^{\circ} \mathrm{L} . \mathrm{N}$.

Note also, that the proportion of herrings of the first group (maturities I, II and III) was very poorly represented this year, viz. 5.1\% against $28.7 \%$ in $1948,22.1 \%$ in 1947 and $11.2 \%$ in 1946. As in previous years, this group is missing in our samples from October.

It is also interesting to note, that for the period August-September, the year-class 1945 (4-year-old herrings) barely reaches $3.4 \%$ of the total number of individuals observed, whereas in October it is the best represented year-class with $18.6 \%$. This same year-class was also abundantly represented in the "SpentHerring Concentration" on the Belgian coast during the Winter 1949-50.

The vertebral average, which was 56.57 in September, decreases suddenly to 56.49 in October.

For the spring spawners (1st group), this average is 56.735 , for the autumn spawners (2nd group) 56.515 and together 56.533 .

At the time of the Herring Experts Meeting at Edinburgh, we have insisted on the relation existing between the total number of vertebrae and the total number of cervical vertebrae, that is to say, that the spines constituted of a large number of vertebrae also have a relatively high proportion of cervical vertebrae.

Thus, the cervical vertebral average of a lot of spines with 56 vertebrae, will inevitably be higher than the one with spines of 55 vertebrae. Again, the cervical vertebral average of spines with 57 vertebrae will be superior to the one with spines of 56 vertebrae, etc.

This point of view is again confirmed in this present study.

Table 18 gives a recapitulation of the cervical vertebral averages observed for each total number of vertebrae of the years 1946-49 for the "Full-Herring Concentrations" of the northern and central areas of the North Sea as well as for the "Spent-Herring Concentrations" on the Belgian coast.

The results unquestionably show, that an increase in the total number of vertebrae entails also an increase of the number of cervical vertebrae.

Therefore, the latter value seems to be of little interest for the study of the different populations, which may be met with in the future, and we suggest not to take any more notice of it in our ulterior studies.

Ch. Gilis.

