

The Belgian Trawl Fishery on the Full-Herring Concentrations.

A. Activity — Landings — Value.

The first full-herring catch was landed on 19. July 1950. It came from the Fladen ground where the herring fishery was carried on until the end of August. From early September until 15. October most trawlers were fishing south of this area, viz. the "Gut". As from the second fortnight of September until the end of October, the herring trawlers were mainly active around the western and south-western part of the Dogger bank. In November and December, full-herring concentrations were only exploited in the southern area of the North Sea, particularly around the light-ships "Ruytingen" and "Sandettié". There the fishery ended on 6. December 1950.

40 trawlers took part in the full-herring fishery. This total comprised 2 trawlers of Class II (motor trawlers of 80 to 119 H.P.), 9 of Class III (motor trawlers of 120 to 239 H.P.), 16 of Class IV (motor trawlers of 240 to 349 H.P.), 7 of Class V (motor trawlers of 350 to 500 H.P.) and 6 of Class VI (steam trawlers of 480 to 850 H.P.).

213 catches or voyages were recorded totaling 1,684 sea days or 15,997 effective fishing hours.

The H.P. developed is equal to the driving power of the trawler multiplied with the number of effective fishing hours. If, for instance, a trawler is driven by a 240 H.P. motor, it is considered as having developed 240 H.P. per hour.

Table 8. Number of the Belgian Herring Trawlers (t), and of their Voyages (v).

| | Cl. II | | Cl. III | | Cl. IV | | Cl. V | | Cl. VI | | Total | |
|-----------------------------------|--------|----|---------|----|--------|----|-------|----|--------|----|-------|-----|
| H.P. | 80— | | 120— | | 240— | | 350— | | 480— | | | |
| | 119 | | 239 | | 349 | | 500 | | 850 | | | |
| | t. | v. | t. | v. | t. | v. | t. | v. | t. | v. | t. | v. |
| (a) According to fishing grounds. | | | | | | | | | | | | |
| FL. ¹⁾ | — | — | — | — | 7 | 10 | 7 | 16 | 6 | 15 | 20 | 41 |
| C. ²⁾ | — | — | — | — | 12 | 40 | 7 | 46 | 6 | 35 | 25 | 121 |
| S. ³⁾ | 2 | 3 | 9 | 31 | 4 | 12 | 3 | 5 | — | — | 18 | 51 |
| (b) According to monthly periods. | | | | | | | | | | | | |
| July.. | — | — | — | — | — | — | 2 | 2 | 1 | 4 | 3 | 6 |
| Aug. . | — | — | — | — | 7 | 14 | 6 | 16 | 6 | 15 | 19 | 45 |
| Sept. . | — | — | — | — | 13 | 26 | 7 | 23 | 6 | 17 | 26 | 66 |
| Oct. . | 2 | 2 | 2 | 2 | 4 | 11 | 7 | 19 | 5 | 13 | 20 | 47 |
| Nov. . | 1 | 1 | 9 | 26 | 4 | 11 | 4 | 7 | 1 | 1 | 19 | 46 |
| Dec. . | — | — | 3 | 3 | — | — | — | — | — | — | 3 | 3 |

¹⁾ Fladen Ground.

²⁾ Central Area of the North Sea, chiefly the Gut and the western and south-western parts of the Dogger.

³⁾ Southern Area, chiefly around the light vessels "Ruytingen" and "Sandettié".

During the 1950 season 7,555 tons of herring were landed. The catches in the various regions and in each month are shown in Table 9, and the average catch per vessel and per fishing hour and H.P. are shown in Table 10.

From the whole herring fleet 35 tons were landed per voyage, 4.5 tons per sea-day and 116 Kg. per fishing hour and per 100 H.P.

B. Biological Statistics.

The material studied comprises 1200 herrings. 280 were from the Fladen ground, 175 from the Gut and 745 from the south-western and western parts of the Dogger bank.

The material from the Fladen ground was collected in August; that from the Gut in August and September, and that from the south-western and western parts of the Dogger bank in September and October. (See Tables 13—16 A.)

The census for the vertebrae covered 1200 specimens of which there were 32, or 2.66 %, with one or more fused vertebrae and 4, or 0.33 %, with damaged vertebrae. These specimens have been eliminated from our material. (See Table 16 B).

Stomachal Contents.

Among the 1200 stomachs examined, 310, or 25.83 %, were found to have contents and of these 4 or 0.33 % were full, 12 or 1 % half full, and 293 or 24.38 % a quarter full.

The contents observed consisted mainly of copepods and smaller quantities of schizopods. One stomach contained a small mackerel of

Table 9. Number of Sea-Days (S.D.) and of Effective Fishing Hours (F.H.).

| Classes of Vessels | | | | | | | | | |
|-----------------------------------|------|------|------|------|------|------|------|------|------|
| II | | III | | IV | | V | | VI | |
| S.D. | F.H. | S.D. | F.H. | S.D. | F.H. | S.D. | F.H. | S.D. | F.H. |
| (a) According to fishing grounds. | | | | | | | | | |
| — | — | — | — | 115 | 1214 | 160 | 1650 | 159 | 1790 |
| — | — | — | — | 385 | 3989 | 383 | 3191 | 274 | 2205 |
| 12 | 66 | 123 | 1188 | 40 | 406 | 33 | 298 | — | — |
| (b) According to monthly periods. | | | | | | | | | |
| — | — | — | — | — | — | 21 | 279 | 43 | 593 |
| — | — | — | — | 157 | 1702 | 160 | 1569 | 149 | 1620 |
| — | — | — | — | 253 | 2843 | 185 | 1415 | 138 | 1029 |
| 7 | 54 | 5 | 72 | 85 | 634 | 163 | 1444 | 90 | 663 |
| 5 | 12 | 107 | 995 | 45 | 430 | 47 | 432 | 13 | 90 |
| — | — | 11 | 121 | — | — | — | — | — | — |

**Table 10. Total Weight landed
(in 1000 Kg.).**

| | Cl. II | Cl. III | Cl. IV | Cl. V | Cl. VI | Total |
|------------------------------------|--------|---------|--------|-------|--------|-------|
| (a). According to fishing grounds. | | | | | | |
| Fladen ... | — | — | 230 | 459 | 708 | 1397 |
| C. Area... | — | — | 1141 | 2159 | 2574 | 5875 |
| S. Area... | 3 | 153 | 70 | 56 | — | 282 |
| % of total. | 0.04 | 2.0 | 19.1 | 35.4 | 43.4 | 99.9 |
| (b). According to monthly periods. | | | | | | |
| July..... | — | — | — | 49 | 138 | 187 |
| August... | — | — | 358 | 590 | 959 | 1907 |
| September | — | — | 685 | 1314 | 1386 | 3385 |
| October... | 2.5 | 10 | 322 | 648 | 793 | 1775 |
| November | 0.8 | 131 | 77 | 74 | 7 | 289 |
| December. | — | 12 | — | — | — | 12 |

**Table 11. Average Catch (1000 Kg.) per
voyage (C/V) and per fishing hour for 100 H.P.
developed (C/H).**

| | Cl. II | | Cl. III | | Cl. IV | | Cl. V | | Cl. VI | | Total | |
|-----|--------|-----|---------|-----|--------|-----|-------|-----|--------|-----|-------|-----|
| | C/V | C/H | C/V | C/H | C/V | C/H | C/V | C/H | C/V | C/H | C/V | C/H |
| — | — | — | — | — | 23 | 66 | 29 | 68 | 47 | 61 | 34 | 64 |
| — | — | — | — | — | 29 | 102 | 47 | 164 | 74 | 181 | 49 | 152 |
| 1.1 | 47 | 5 | 72 | 6 | 63 | 11 | 47 | — | — | — | 6 | 63 |
| — | — | — | — | — | — | — | 25 | 44 | 35 | 29 | 31 | 32 |
| — | — | — | — | — | 26 | 71 | 37 | 91 | 64 | 91 | 42 | 88 |
| — | — | — | — | — | 26 | 86 | 57 | 224 | 82 | 217 | 51 | 167 |
| 1.3 | 43 | 5.0 | 75 | 29 | 180 | 34 | 109 | 61 | 207 | 38 | 151 | 151 |
| 0.8 | 69 | 5.0 | 73 | 7 | 64 | 11 | 43 | 7 | 15 | 6 | 56 | 56 |
| — | — | 4.2 | 59 | — | — | — | — | — | — | — | 4 | 59 |

about 7 cm. Some stomachs were found to contain eggs and scales of herrings and a few contained sand; this was most probably swallowed during the trawling or during the hauling of the nets.

C. Considerations about the Exploitation and on the Results.

I. Activity—Landings—Value.

In comparison with the full-herring season of 1949, there was, in 1950, a slight increase in the activity of the herring trawlers; 40 trawlers took part in the fishery as against 30 in 1949. The number of voyages increased from 172 to 213, the number of sea-days from 1,680 to 1,684 and the number of effective fishing hours from 15,545 to 15,997.

The total landings were 7,554,860 Kg. as against 8,794,195 Kg. in 1949. The average catch per sea-day was also lower at 4,486 Kg. as against 5,235 Kg., whilst the average catch per hour for 100 H.P. developed was somewhat higher at 116 Kg. as against 103 in 1949.

It seems peculiar that only the catch per hour's fishing for 100 H.P. developed had a higher average in 1950 than in 1949 while all other averages recorded in 1950 were lower. This was due to the average number of H.P. developed per fishing hour being con-

siderably lower than in 1949, viz. 406 H.P. against 550 H.P. The density of the herring concentrations exploited by the Belgian herring trawlers tended to show an increase in 1950.

If we calculate the average catch per hour's fishing for 100 H.P. developed for each fishing ground separately we find that the density differs considerably from area to area.

It was in the central part of the North Sea (Gut and the western and south-western part of the Dogger bank) that the average catch per hour's fishing for 100 H.P. developed reached its highest level, viz. 152 Kg. against only 64 Kg. on the Fladen and 63 Kg. in the southern North Sea. The corresponding 1949 averages were: Fladen 96 Kg., western part of the central area of the North Sea, 124 Kg., southern North Sea, 59 Kg. Thus, from 1949 to 1950 the average catch for one hour's fishing for 100 H.P. developed decreased considerably on the Fladen ground but showed a substantial increase in the central North Sea and a slight increase in the southern North Sea area.

II. Biological Statistics.

In comparison with 1949, the average length of the herring in 1950 was 1 mm. lower at 161 mm. against 162 mm.

**Table 12. Recapitulation of the Activity of the Herring Trawlers and of the
Results recorded for the Period 1946—1950.**

| Season | Number of | | | | Weight landed (1000 Kg.) | Average Catch per Voyage (Kg.) | Average Catch/ Hour 100 H.P. developed | Value (1000 Frs.) | Average Price per Kg. |
|----------|-----------|---------|---------------|-------------------------|--------------------------------|--------------------------------------|--|----------------------|-----------------------------|
| | Trawlers | Voyages | Fishing Hours | H.P. devel. per hour | | | | | |
| 1946 ... | 46 | 257 | 18,707 | 396 | 10,941 | 42,572 | 147 | 46,191 | 4.22 |
| 1947 ... | 60 | 315 | 33,306 | 440 | 14,365 | 45,604 | 98 | 55,968 | 3.97 |
| 1948 ... | 80 | 332 | 30,199 | 450 | 14,131 | 42,562 | 104 | 46,277 | 3.27 |
| 1949 ... | 30 | 172 | 15,545 | 550 | 8,794 | 51,129 | 103 | 22,555 | 2.56 |
| 1950 ... | 40 | 213 | 15,997 | 406 | 7,555 | 35,469 | 116 | 24,476 | 3.24 |

Table 13. Percentage Distribution.

| A. Centimetre Class, Mean Length (cm.). Average Weight, and Sex. | | | | | | | | | | | | |
|--|-----|------|------|------|------|------|------|------|-----|------|--------------|---------|
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | Mean | Aver. Weight | % Males |
| Fladenground | 2.9 | 6.1 | 16.0 | 16.0 | 20.4 | 17.1 | 18.2 | 2.9 | 0.4 | 26.3 | 164 gr. | 52.1 |
| Gut..... | 1.1 | 1.7 | 8.0 | 14.3 | 16.0 | 20.6 | 27.4 | 10.9 | — | 27.1 | 174 » | 48.0 |
| Doggerbank | 2.8 | 13.1 | 21.1 | 20.5 | 14.8 | 13.6 | 12.2 | 1.8 | 0.1 | 25.7 | 148 » | 50.3 |
| Total | 2.6 | 9.8 | 18.0 | 18.6 | 16.3 | 15.4 | 15.8 | 3.3 | 0.2 | 26.1 | 155 » | 50.4 |

B. Stages of Maturity and Quantity of Mesenteric Fat.

| | Stages of Maturity | | | | | | | | | Mesenteric Fat | | | |
|---|--------------------|-----|------|------|------|------|-----|---------|------|----------------|------|------|--|
| | I | II | III | IV | V | VI | VII | VIII-II | 0 | 1 | + | M | |
| (a). According to origin | | | | | | | | | | | | | |
| Fladenground | 1.4 | 1.8 | 37.9 | 34.6 | 23.9 | — | 0.4 | — | 0.7 | 28.9 | 32.2 | 38.2 | |
| Gut | — | 1.7 | 12.6 | 18.9 | 65.7 | — | — | 1.1 | 22.3 | 44.6 | 21.1 | 12.0 | |
| Doggerbank | 0.3 | 0.1 | 4.2 | 12.7 | 36.5 | 36.5 | 2.6 | 7.1 | 32.9 | 39.1 | 17.8 | 10.2 | |
| Total | 0.5 | 0.7 | 13.2 | 18.8 | 37.8 | 22.7 | 1.7 | 4.6 | 23.8 | 37.5 | 21.7 | 17.0 | |
| (b). According to groups | | | | | | | | | | | | | |
| 1st group (Stages I to III) . | 3.4 | 5.2 | 91.4 | — | — | — | — | — | — | 0.6 | 11.5 | 87.9 | |
| 2nd group (Stages IV to VIII-II) | — | — | — | 21.9 | 44.3 | 26.5 | 1.9 | 5.4 | 27.9 | 43.7 | 23.4 | 5.0 | |

C. Year-Classes observed and Age-Groups of Total Catch compared for 1946-50.

| | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|----------------|
| Number of Herrings with readable scales in 1950 : 425. | | | | | | | | | |
| Winter rings | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | + |
| Age (Years) | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | ++ |
| Year-Classes in 1950 catch | 1947 | 1946 | 1945 | 1944 | 1943 | 1942 | 1941 | 1940 | before 1940 |
| Fladenground . . . | 15.5 | 33.0 | 8.2 | 6.2 | 8.2 | 14.4 | 7.2 | 5.2 | 2.1 |
| Gut | 2.0 | 13.3 | 11.2 | 10.2 | 13.3 | 13.3 | 18.4 | 10.2 | 8.1 |
| Doggerbank | 10.9 | 31.7 | 20.9 | 7.4 | 7.4 | 6.1 | 2.6 | 5.6 | 7.4 |

Table 14. Average Length (cm.) observed for each Year-Class.

| Herrings born in | Age (Years) | North Sea | | | |
|------------------|-------------|--------------|------|------------|-------|
| | | Fladenground | Gut | Doggerbank | Total |
| 1947 ... | 3 | 23.7 | 23.7 | 23.9 | 23.8 |
| 1946 ... | 4 | 24.7 | 25.1 | 24.9 | 24.8 |
| 1945 ... | 5 | 25.2 | 26.0 | 25.9 | 25.8 |
| 1944 ... | 6 | 26.1 | 26.8 | 26.8 | 26.6 |
| 1943 ... | 7 | 27.5 | 27.1 | 27.4 | 27.3 |
| 1942 ... | 8 | 27.7 | 28.1 | 27.9 | 27.9 |
| 1941 ... | 9 | 27.9 | 28.4 | 28.1 | 28.2 |
| 1940 ... | 10 | 27.9 | 28.3 | 28.4 | 28.3 |

Table 15. Average Value of L_1 (mm.) of each Year-Class.

| North Sea | Year-Classes | | | | | | | | Mean |
|-----------|--------------|------|------|------|------|------|------|------|------|
| | 1947 | 1946 | 1945 | 1944 | 1943 | 1942 | 1941 | 1940 | |
| Fladen | 115 | 105 | 121 | 99 | 119 | 114 | 112 | 114 | 111 |
| Gut . . . | 98 | 99 | 100 | 110 | 112 | 115 | 114 | 99 | 108 |
| Dogger | 112 | 107 | 109 | 112 | 116 | 97 | 117 | 105 | 110 |
| Total.. | 112 | 105 | 109 | 109 | 115 | 108 | 114 | 104 | 110 |

Table 16. Percentage Distribution.

| A. Number of Vertebrae and Vertebral Average. | | | | | | | B. Keeled Scales (K_2) and Average. | | | | | | | | |
|---|---------------------|------|------|-----|-----|---------|---|-----|------|------|------|-----|-----|-----|---------|
| | Number of Vertebrae | | | | | | Number of K_2 | | | | | | | | Average |
| | 55 | 56 | 57 | 58 | 59 | Average | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| (a). According to origin | | | | | | | | | | | | | | | |
| Fladenground | 3.6 | 45.1 | 49.5 | 1.8 | — | 56.49 | 0.7 | 5.0 | 31.8 | 43.9 | 17.5 | 0.7 | — | 0.4 | 14.76 |
| Gut | 3.5 | 47.4 | 46.2 | 2.9 | — | 56.48 | — | 5.2 | 27.7 | 50.9 | 11.0 | 5.2 | — | — | 14.83 |
| Doggerbank | 4.2 | 46.1 | 45.1 | 4.3 | 0.3 | 56.50 | — | 4.9 | 29.9 | 45.6 | 16.3 | 2.2 | 0.8 | 0.3 | 14.85 |
| Total | 4.0 | 46.0 | 46.3 | 3.5 | 0.2 | 56.50 | 0.2 | 4.9 | 30.0 | 46.0 | 15.8 | 2.3 | 0.5 | 0.3 | 14.82 |
| (b). According to groups | | | | | | | | | | | | | | | |
| 1st group (Stages I to III) .. | 2.4 | 41.0 | 54.2 | 2.4 | — | 56.56 | — | 6.5 | 23.7 | 50.9 | 17.7 | 1.2 | — | — | 14.83 |
| 2nd group (Stages of maturity IV to VIII-II) .. | 4.2 | 46.9 | 45.0 | 3.7 | 0.2 | 56.49 | 0.2 | 4.7 | 31.1 | 45.2 | 15.4 | 2.5 | 0.6 | 0.3 | 14.82 |

On the whole the young year-classes (3 to 6 years) were very well represented; they comprised 61.3 % of the total as compared with 37.2 % in 1949. The year-class 1946 (4-year-old herrings) was by far the best represented with 27.8 %.

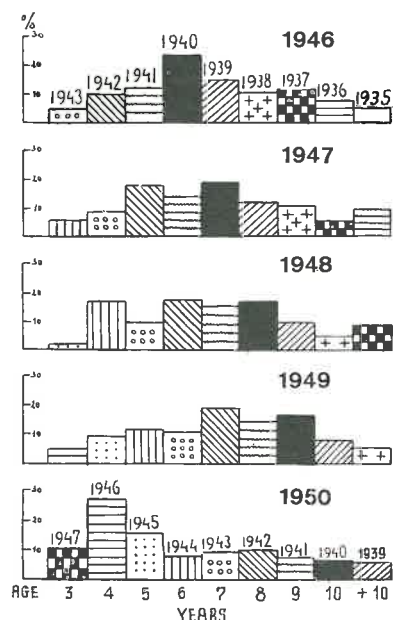


Figure 7. Biological Scale of the Full-Herring Concentrations exploited by the Belgian Herring Trawlers during the years 1946—1950.

The average value of L_1 for the different fishing areas showed little difference; it fluctuated between 108 and 110 mm.

In 1950, the average number of vertebrae was somewhat lower than in 1949—56.50 as against 56.53. This average differed slightly for the different fishing areas and varied between 56.48 and 56.50. This relatively low average number of vertebrae is brought about by the abnormally low average number of 56.56 for the herrings of the first group (herrings with stages of maturity I, II, and III) "spring-spawners" whose average is generally higher e.g. 56.73 in 1949.

In 1950 there was an increase in the number of "spring-spawners", they represented 14.4 % as against 5.1 % in 1949. As in previous years, this group was totally absent from the catches after October.

As the concentrations were composed largely of the younger year-classes (3 to 6 years), we may assume that the full-herring concentra-

tions exploited by the Belgian herring trawlers underwent an appreciable rejuvenation and that they may turn up in dense concentrations during the next season.

Adverse weather and hydrological conditions as well as an unfavourable economic situation could make for a poor full-herring fishery but, if all these factors turn out to be favourable, we may expect next year's full-herring season to be a fairly good one.

CH. GILIS.

La Pêche Française en Sud de la Mer du Nord et de la Manche orientale.

I. Lieux de pêche.

La campagne d'automne et d'hiver de pêche du hareng 1949/50 débuta vers le 10 Novembre dans les parages du Sandettié (chalutiers) et en même temps le long du littoral du Boulonnais (drifters). L'activité des chalutiers dans la région du Sandettié se poursuivit pendant un mois environ, jusqu'à la mi-Décembre, en donnant de bons résultats dans l'ensemble; la plupart des harengs capturés étaient au stade VI. La pêche artisanale des drifters le long du littoral du Boulonnais devait se prolonger sensiblement plus tard que de coutume (jusqu'à la fin de Janvier). Elle fut marquée par d'assez bonnes et régulières captures de harengs au stade VI. (Un certain nombre au stade VIII en fin de saison).

Le fait à la fois dominant et décevant de la campagne fut l'extrême médiocrité de la pêche du hareng «guai» (stade VIII) qui, durant les précédentes années — avec toutefois une activité décroissante pour les dernières campagnes — s'était localisée sur les bancs des Flandres, le long du littoral Belge et Hollandais, en Janvier et Février principalement. Quelques chalutiers de Boulogne ont opéré dans le secteur du Middelkerke Bank, au large de Nieuport, mais les résultats restèrent pour la plupart peu encourageants (Janvier). Les chalutiers se consacrèrent à la pêche du merlan qui se révéla fructueuse dans les parages du West-Hinder et du North-Hinder à partir de la fin de Décembre, jusqu'en Février. Quelques pêches très sporadiques de hareng guai se firent dans ces régions.

Les conditions hydrologiques au cours de l'automne et de l'hiver ont été caractérisées par une salinité élevée dans le secteur du