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The Scales of Sea-Trout of Known Age

by

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Tagging experiments on sea-trout were carried out in the years 1957, 1958 and 1959. The tagged fish were 1 3/4 years old, their length varying between 14.5 cm to 22 cm, the average being 17.8 cm. The fish tagged in particular years were liberated into the lower part of the Balda river flowing into the Vistula Firth (geographical position of the place of release: lat. 54°21'36"N, long. 19°43'44"E). Though in different years the tagged fish as a rule were liberated into the river at about the middle of October. Only few of the specimens were released in later months. In general, the fish remained in the river until spring showing at that period a rather large increase in length. The experiments have shown that the largest number of smolts migrate to the sea via the Vistula Firth in April.

The scales were collected at various times during catches both at sea and in the Vistula Firth at the mouth of the river. Since the fish were measured upon being captured and since their age was known, we, therefore, had the possibility of interpreting the scale structures in the way similar to the usual scale reading method.

The material collected for sea-trout was elaborated according to Dr. Carlin's method given in his paper "Scales from salmon of known age" (Salmon and Trout Committee, ICES, No.86). The picture of each scale corresponds to the table showing the length of sea-trout in its different zones of growth. Except the figures relating to the length of fish during tagging and recapture all other figures were back-calculated by a simple linear ratio. In the second column of the table an effort was made to ascertain fish age for particular scale zones. In spite of the fact that fish age was known the scale reading met with difficulties in some cases.

Comments on Scale Pictures

1 - P.1461

From the time when the fish was released into the Balda river and to its recapture in the Gulf of Bothnia 1½ year passed. Taking into consideration the stay of the fish in the river it may be assumed that this specimen remained in the sea during a year. Before migrating into the sea it reached a length of 21 cm. Its increase in the river during winter consequently amounted to 4 cm. On the margin of the scale of this fish, caught in May, the winter rings may still be seen. Evidently, summer rings of the fish in the Gulf of Bothnia appear later than those of the fish in Gdańsk Bay. The slow growth of this specimen possibly results from its living under worse ecological conditions.

2 - P. 13318

On releasing, this specimen migrated within a short time into the sea, since its length increase in the river amounts to only 1 cm, and widely spaced rings up to the margin follow instantly. At a length of 31 cm the check appears. This sea-trout was recaptured in the southern Baltic at the beginning of winter when the rate of growth had not yet been arrested.

3 - P. 2296

The length increase of about 7 cm from the time of liberation till its migration into the sea shows that this specimen had stayed pretty long time in the river. Until being recaptured in April a very slight diminishing of growth rate during winter is seen. A more rapid rate of growth during winter is being observed in young specimens than in old ones.

4 - P. 2697

Two years old smolt of 22 cm length is growing so rapidly in the sea that until the middle of November it reached 48 cm. Though at 37 cm the rate of growth declines, still the winter rings on the scale mark themselves very slightly.

5 - P. 13104

Scale from grilse taken in the Firth of Vistula near the mouth of the Balda river. On examination of the scale it appears that after being tagged this sea-trout remained for about $1\frac{1}{2}$ year in the fresh water. Its increase during one summer season in the sea is therefore rather small.

6 - P. 1457

The sea-trout of the same size as the previous one but with scale of a different type. Figure 6 shows that the two year old smolt of 16 cm length during the next two seasons in the sea has got widely spaced zones. At a length of 29 cm the check is seen.

7 - P. 12557

Grilse taken near the river mouth has the scale with widely spaced rings at the margin. It shows that in the second year of its stay in the sea this fish suddenly stopped feeding and commenced migration into the river.

8 - P. 2228

A somehow different structure of this grilse scale, captured at the river mouth. The first year band with the check and year's growth is not marked distinctly. Narrowly spaced rings at the margin indicate that in the autumn this fish commenced its migration into the river.

9 - P. 529

The fish was captured shortly after regular spawning time but at the mouth of the Vistula river, nearly 100 km from the native river. The picture of the scale does not indicate with certainty whether the fish had spawned or not. Very interesting are, however, the zones of the 2nd and 3rd year. They are rather narrowly spaced and the winter rings show erosion to a slight degree. This slight erosion may be attributed to the circumstance that the late-running fish spend a short time in the Balda river. The erosion on the lower part of the scale may be distinctly seen. It is connected with the rings of 2nd and 3rd year. Thus the examination of the scale shows that the fish had made at least two spawning migrations.

10 - P. 12396

The growth of the second year is nearly over.

11 - P. 1597 and 12 - P. 675

The two sea-trouts of the same size, taken in the same area and both after two years of their sea-life. They may be considered as specimens of rapid growth, but difference in the structure of the scale exist. The fish did not live in the same years and therefore not in the same ecological conditions. Figure 11 shows two distinct zones in the first year of sea-life, which are not marked, however, in the Figure 12.

13 - P. 1598

The check in the first summer of sea-life is present. The rings at the margin are getting to the narrowly spaced.

14 - P. 934

The scale has the check in the first summer. In the first and second winter rings it has traces of corrosion, being in its appearance like spawning marks. On the basis of the scale the corrosion is much more distinct.

15 - P. 627

This scale is very distinctly corroded at the margin. The fish, in the stadium of being spent, was captured at the river mouth in the Vistula Firth at the time when spawning still took place. It might indicate that some fish start directly after spawning their migration to the sea. A rather difficult scale for reading.

16 - P. 1223

The growth of the second year is over. This fish may be considered to belong to the rapidly growing ones.

17 - P. 5903

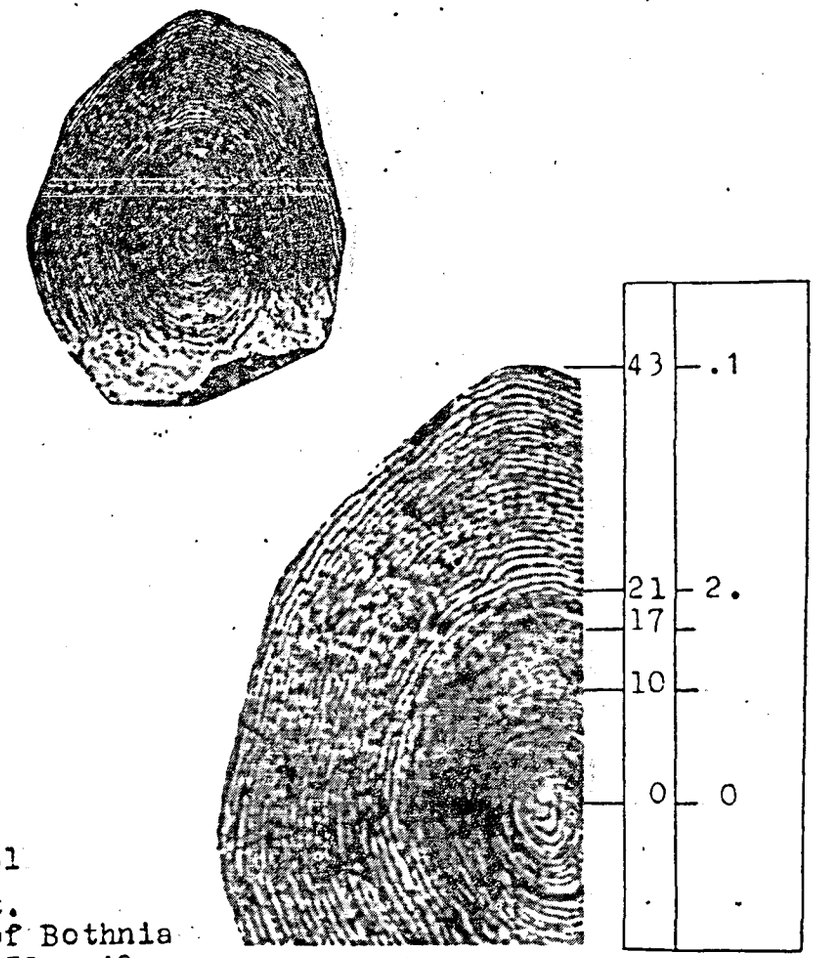
The scale has the spawning mark at the margin. This sea-trout was caught in the Firth of Vistula near the mouth of the Balda river. The date and place of capture indicate that immediately after spawning the fish migrated from the river to the Firth.

18 - P.1552

This rapidly growing specimen has not yet winter rings marked on its scale margin.

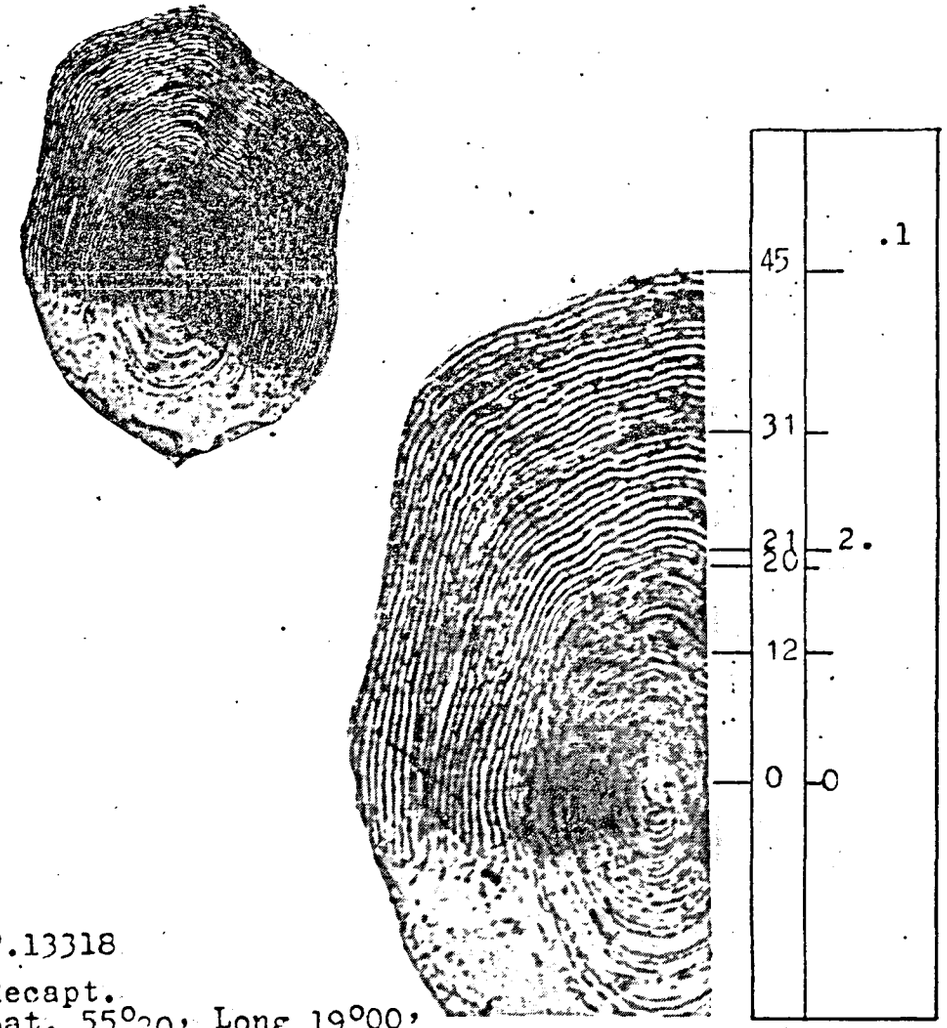
19 - P. 2239 and 20 - P. 1950

The scales of rapidly growing fish. Figure 20 shows the damage of the scale, the cause of which is unknown.



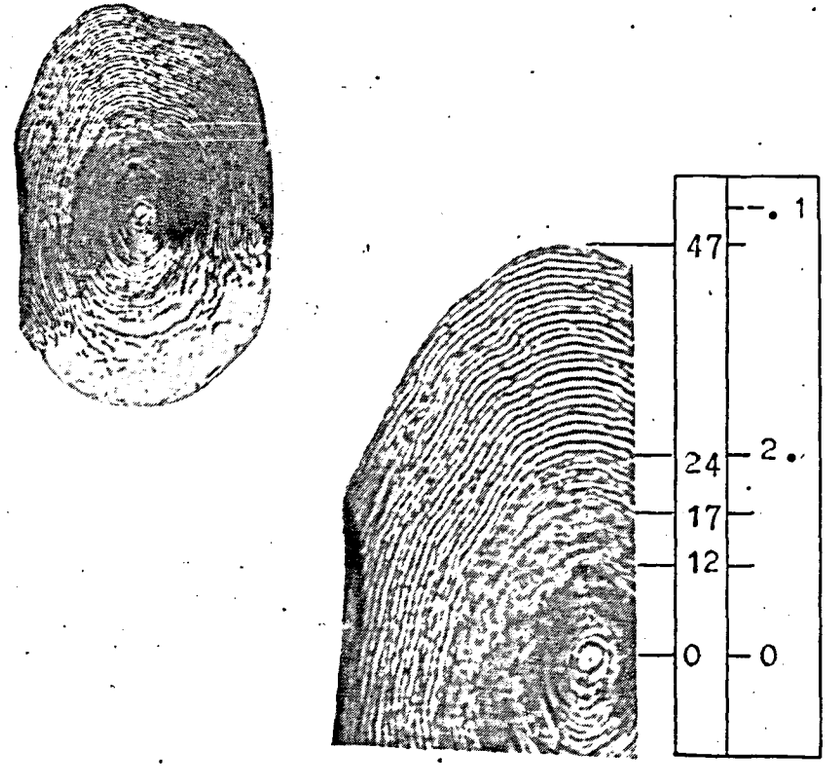
P. 1461

Recapt.
Gulf of Bothnia
9.5.1959 - 43 cm
Tagg. 19.10.1957 - 17 cm

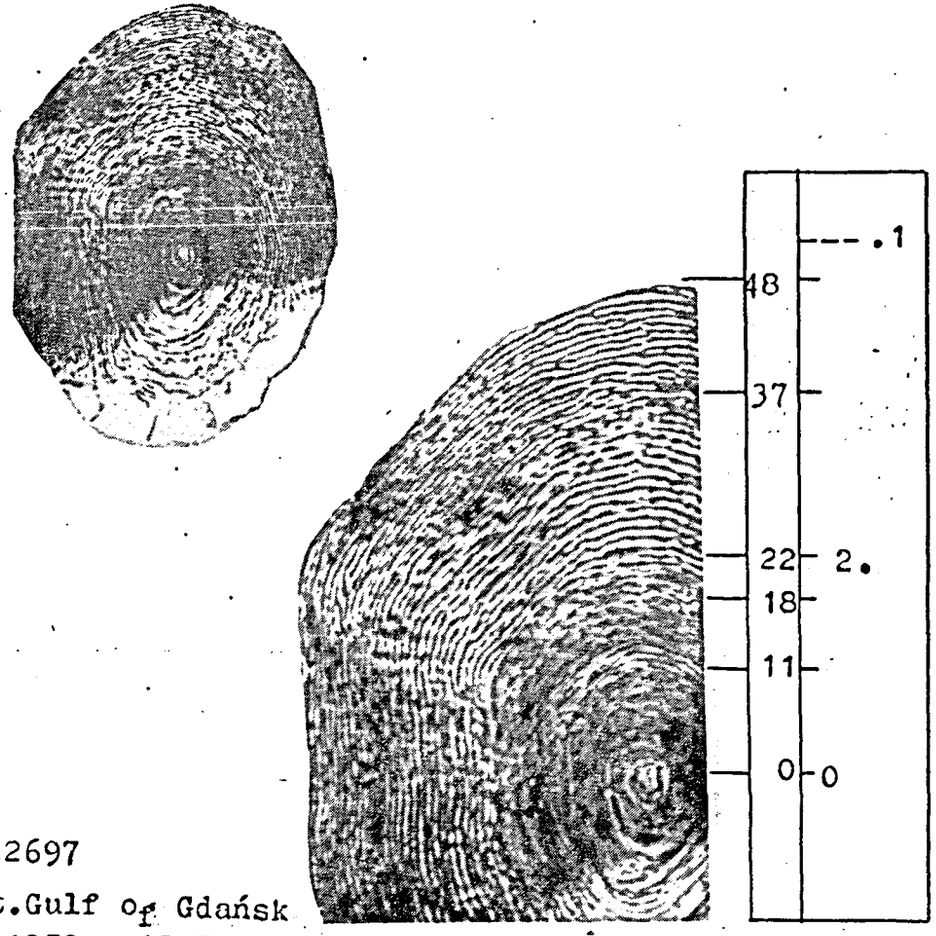


P.13318

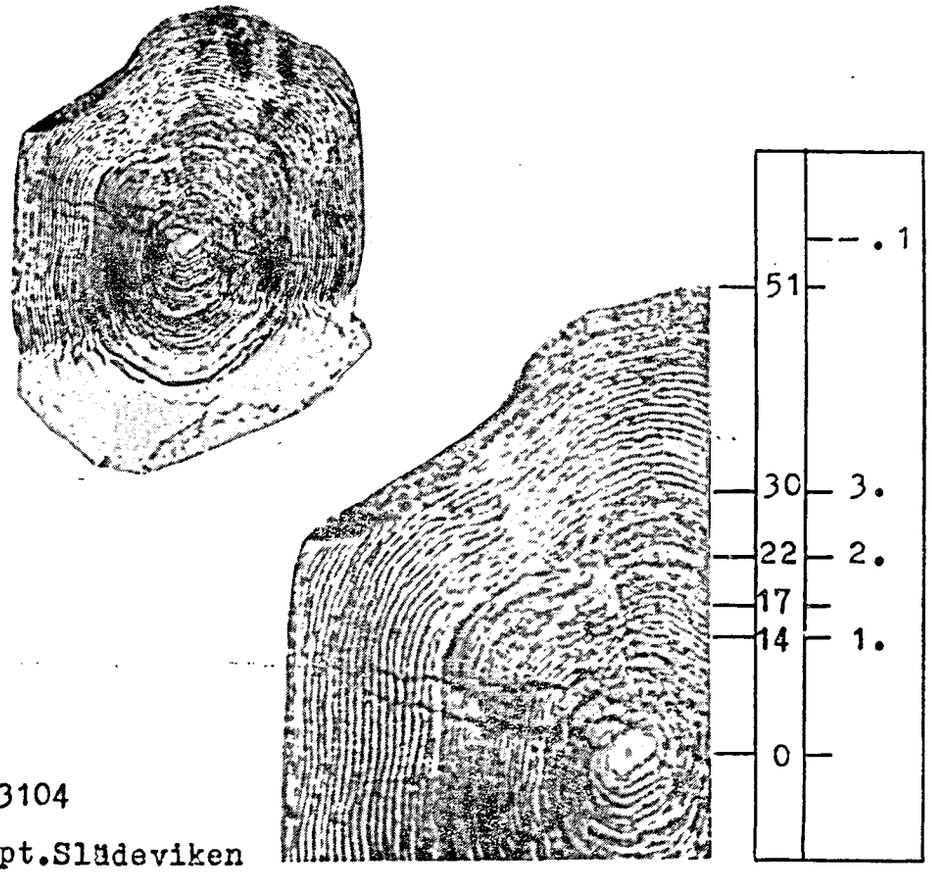
Recapt.
Lat. 55°20, Long 19°00,
17.11.1960 - 45 cm
Tagg. 14.10.1959 - 20 cm



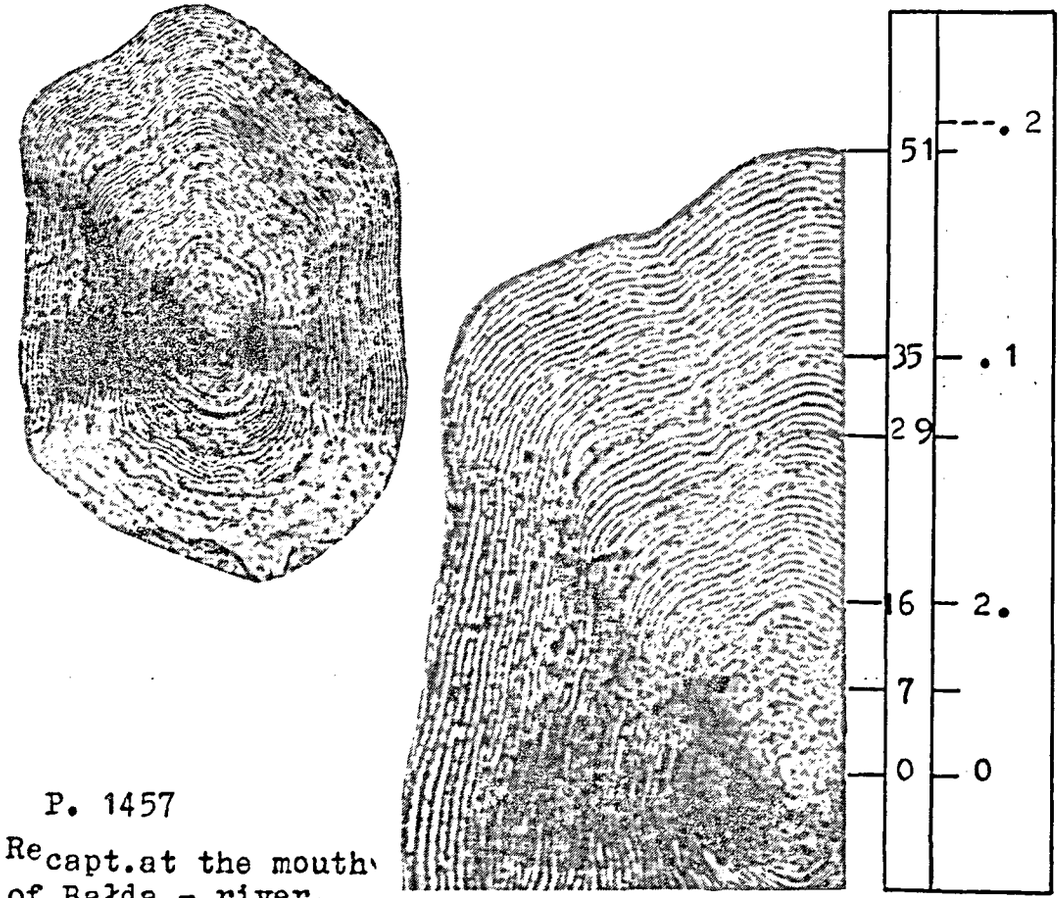
P.2296
Recapt.Sikvik-Gävle
9.4.1960- 47 cm
Tagg. 18.10.1958 - 17 cm



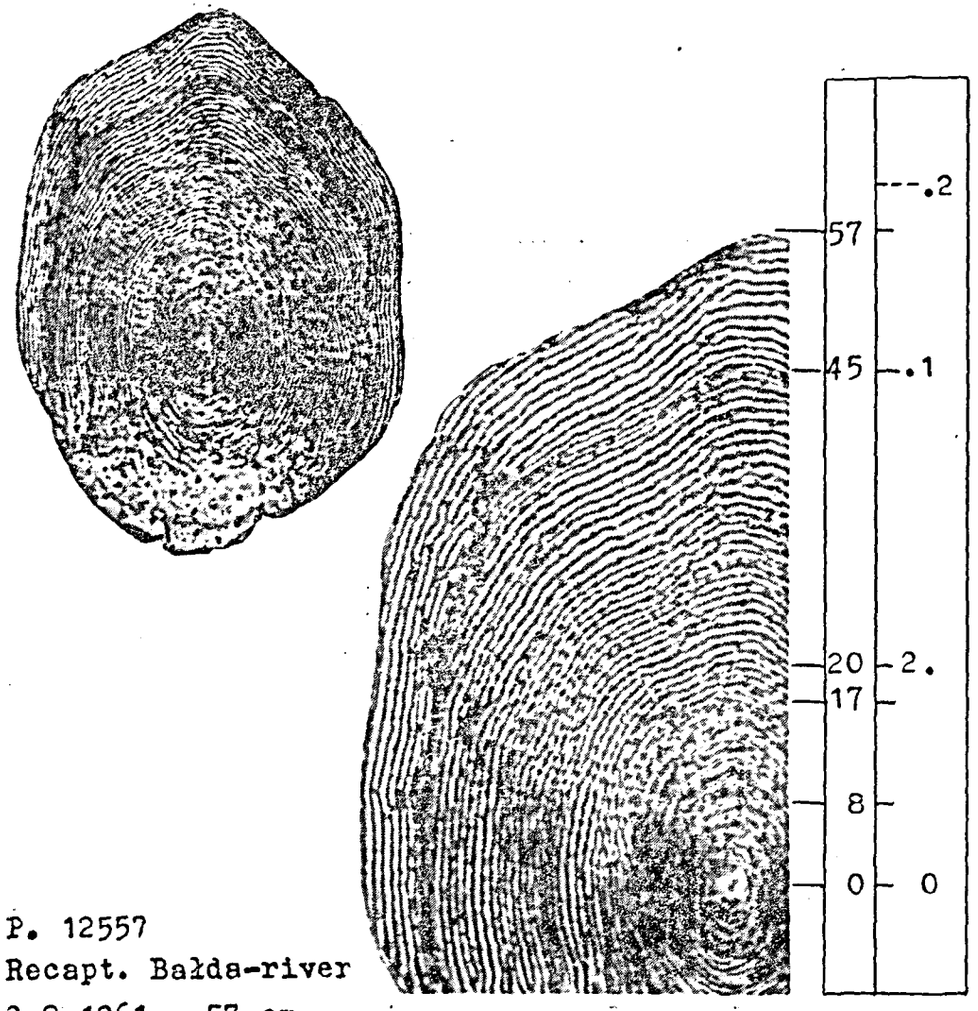
P.2697
Recapt.Gulf of Gdańsk
15.11.1959 - 48,5 cm
Tagg. 17.10.1958 - 18 cm



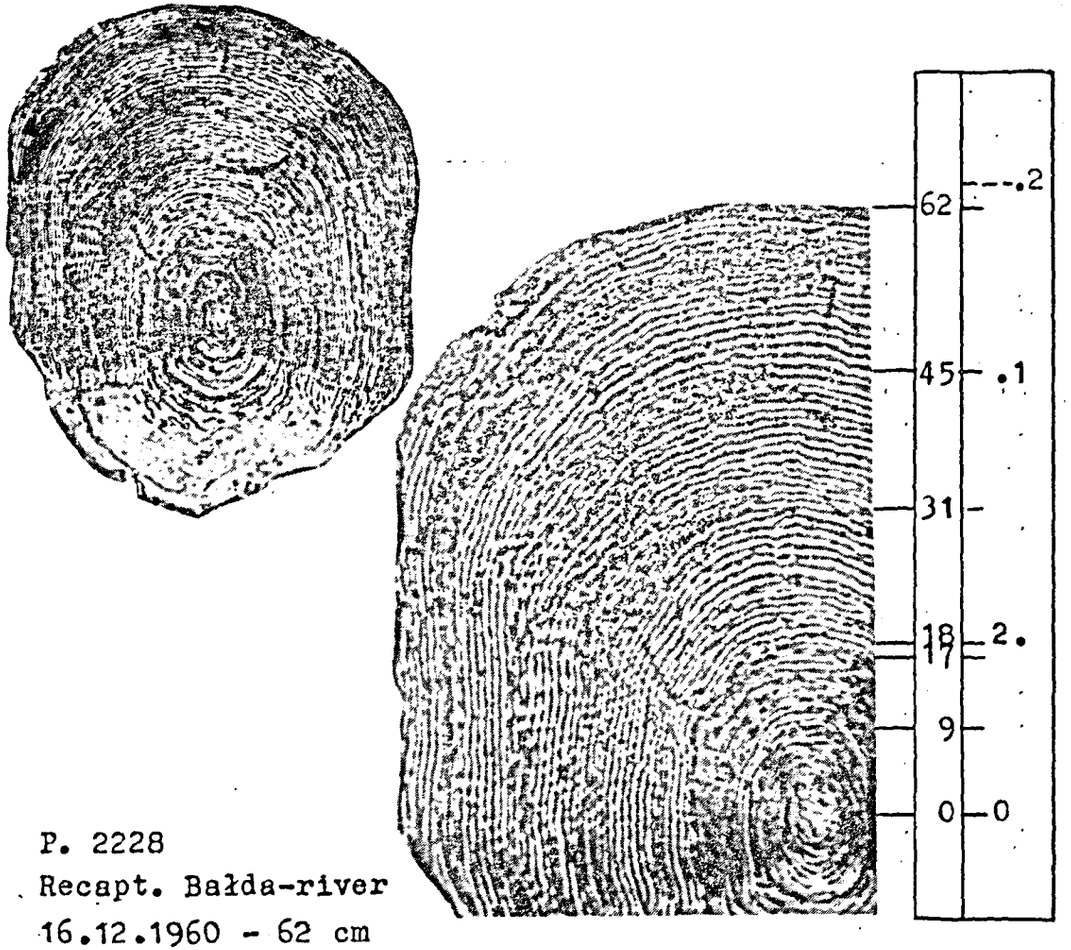
P. 13104
Recapt.Slädeviken
14.4.1960 - 51 cm
Tagg. 18.10.1957 - 15,5 cm



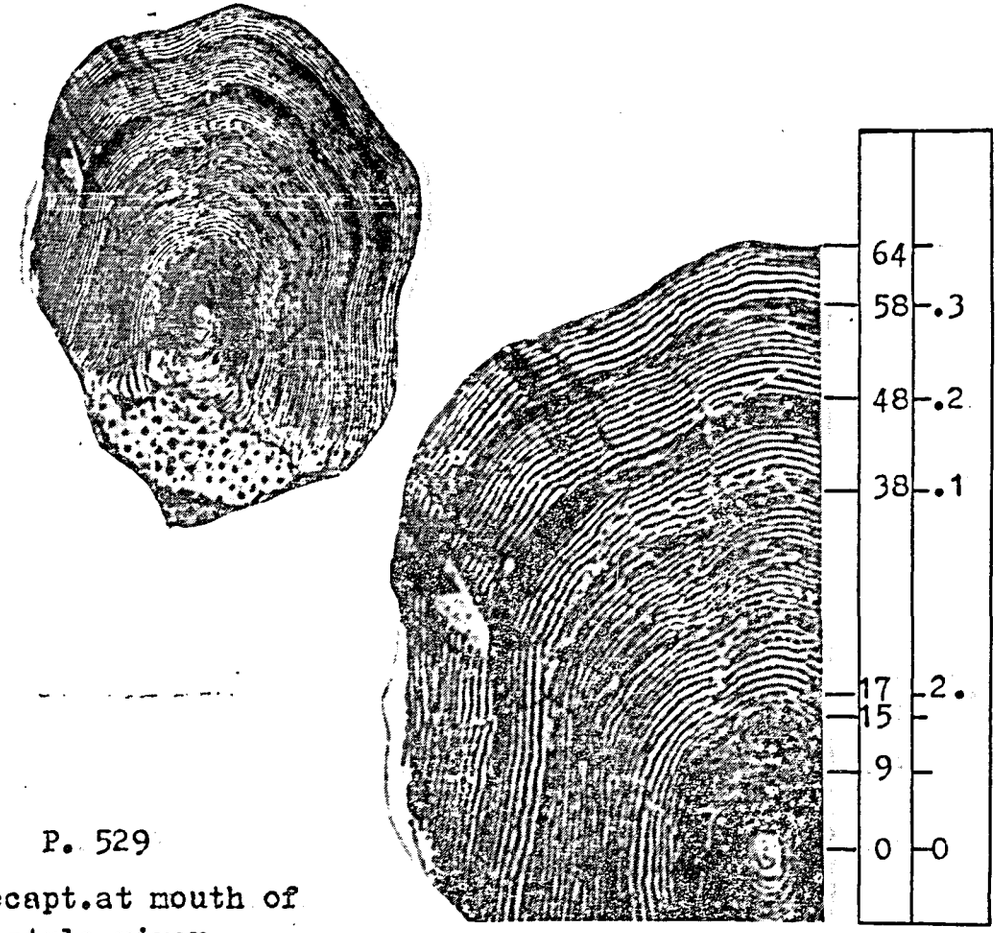
P. 1457
Recapt.at the mouth of Bałda - river.
27.10.1961 - 51 cm
Tagg. 14.10.1959 - 17 cm



P. 12557
Recapt. Bałda-river
3.8.1961 - 57 cm
Tagg. 14.10.1959 - 17 cm



P. 2228
Recapt. Bałda-river
16.12.1960 - 62 cm
Tagg. 18.10.1958 - 17 cm

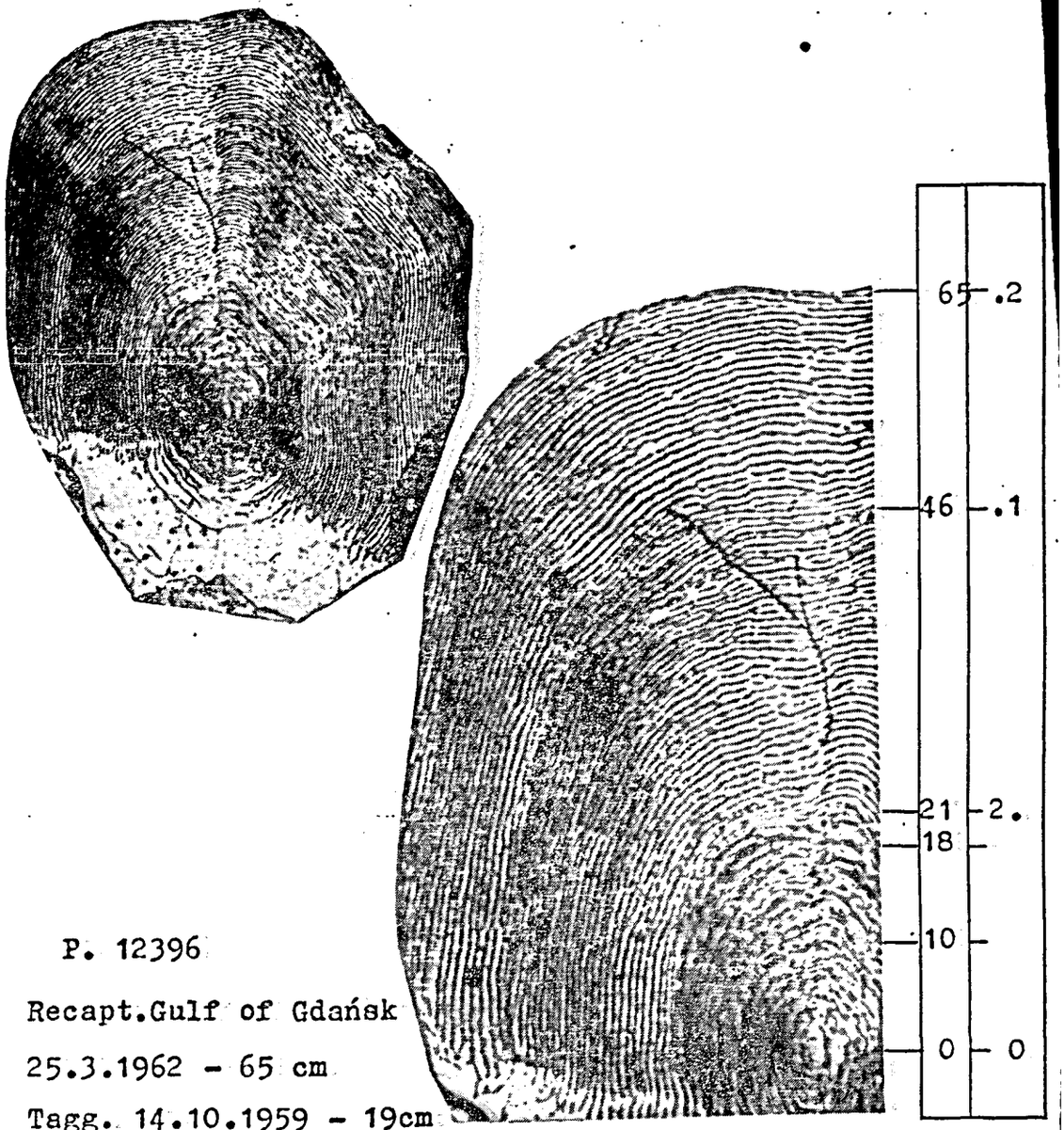


P. 529

Recapt.at mouth of
Vistula-river

12.12.1961 - 64 cm

Tagg. 18.10.1957 - 15 cm

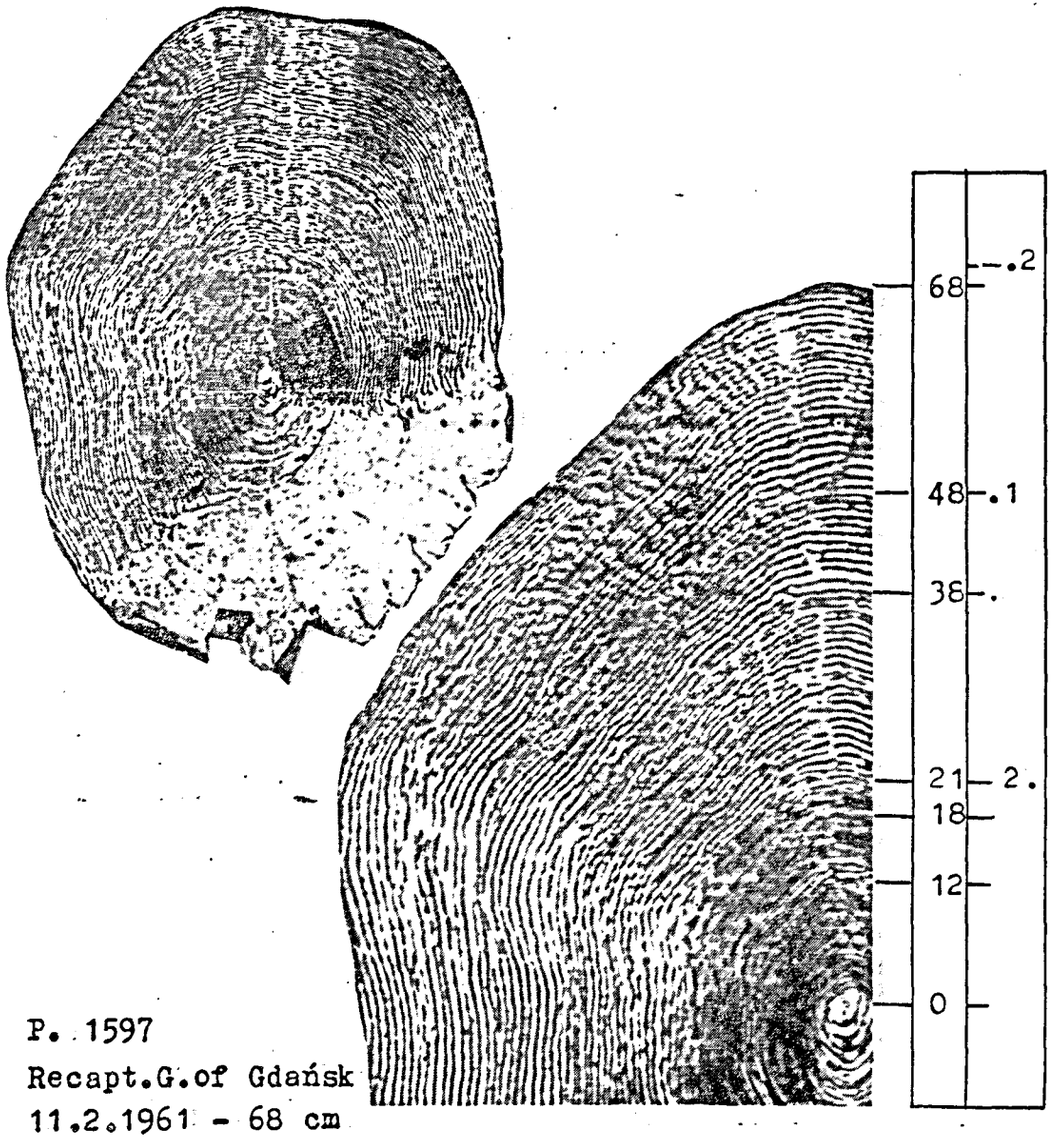


P. 12396

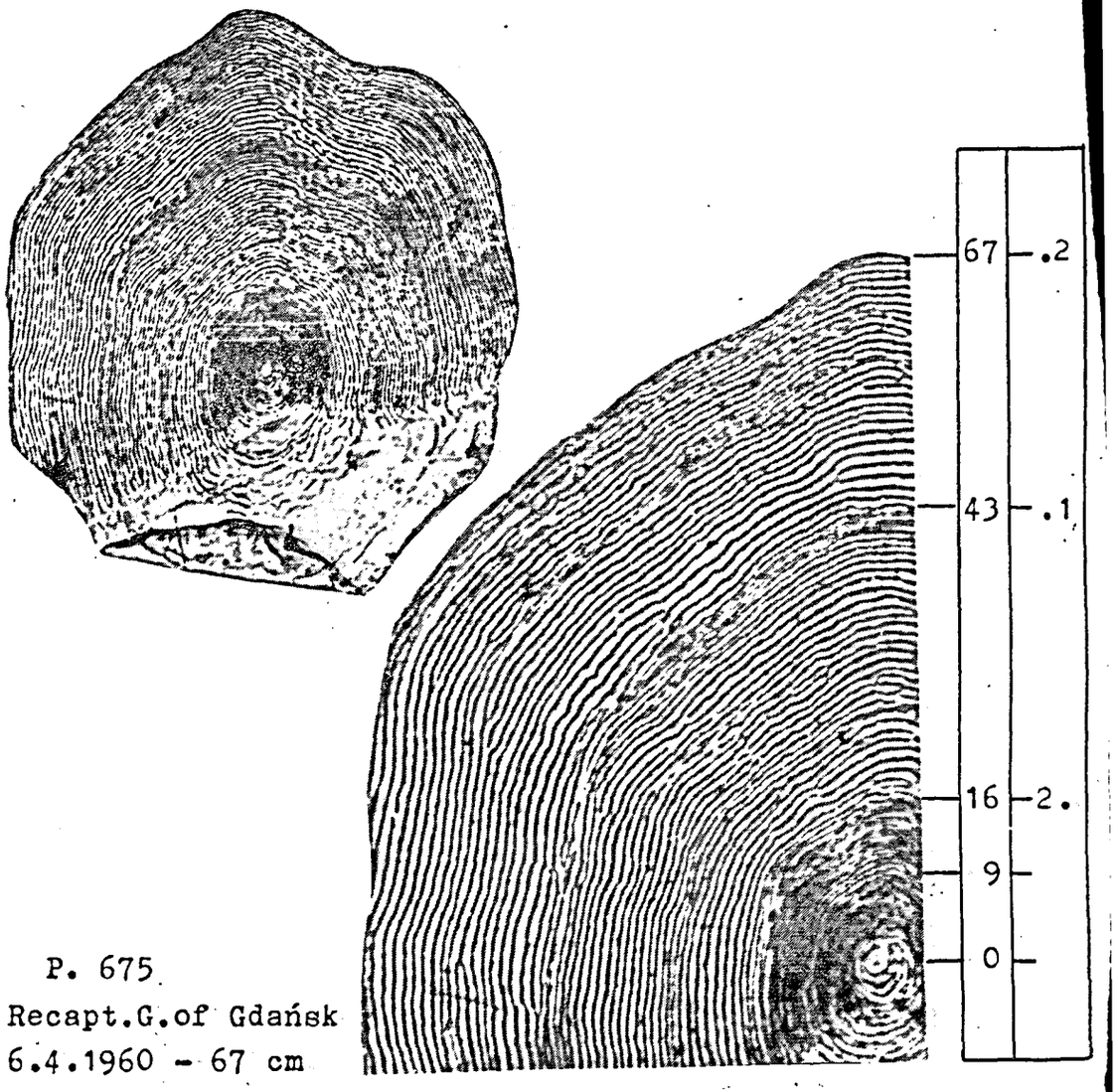
Recapt.Gulf of Gdańsk

25.3.1962 - 65 cm

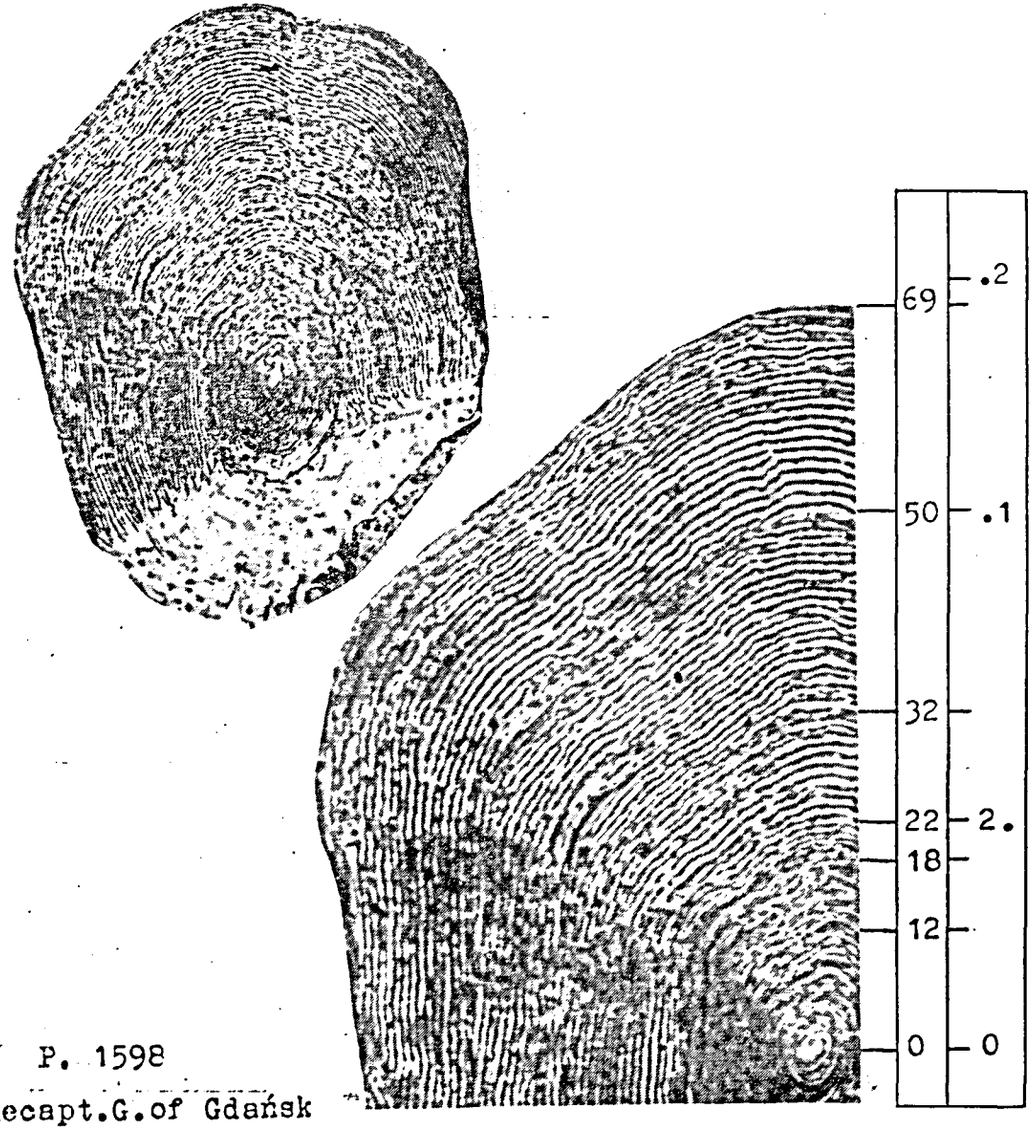
Tagg. 14.10.1959 - 19cm



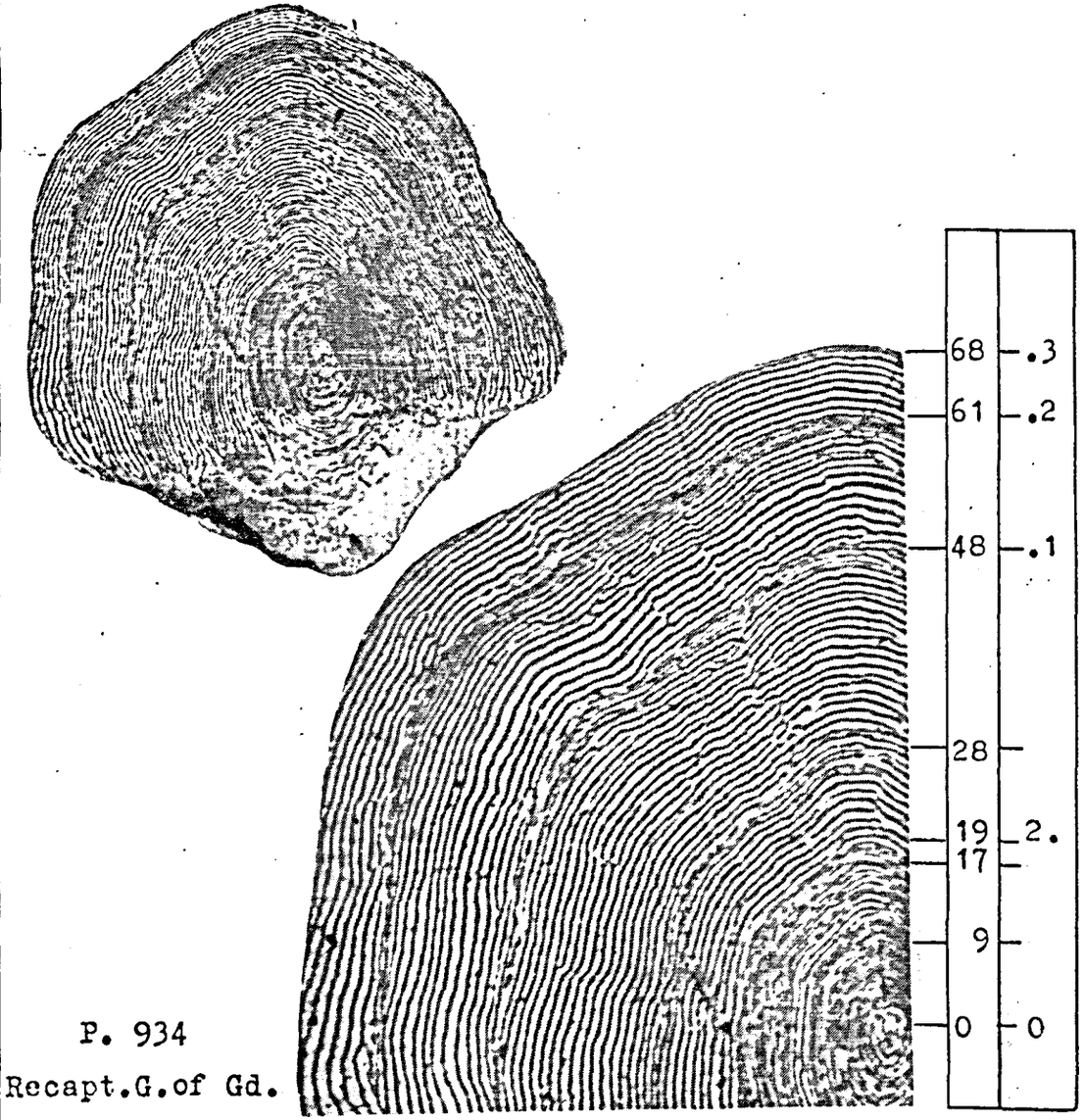
P. 1597
Recapt.G.of Gdańsk
11.2.1961 - 68 cm
Tagg. 18.10.1958 - 19 cm



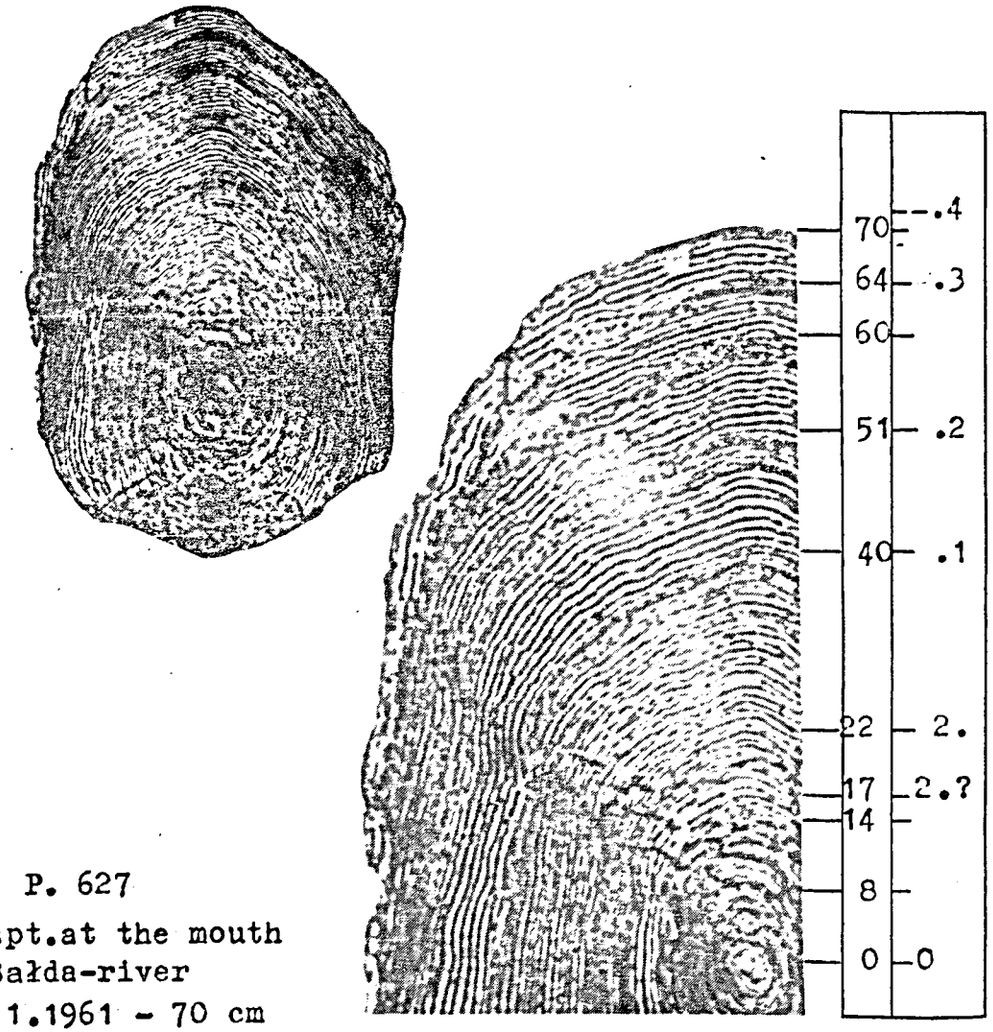
P. 675
Recapt.G.of Gdańsk
6.4.1960 - 67 cm
Tagg. 19.10.1957 - 15,5 cm



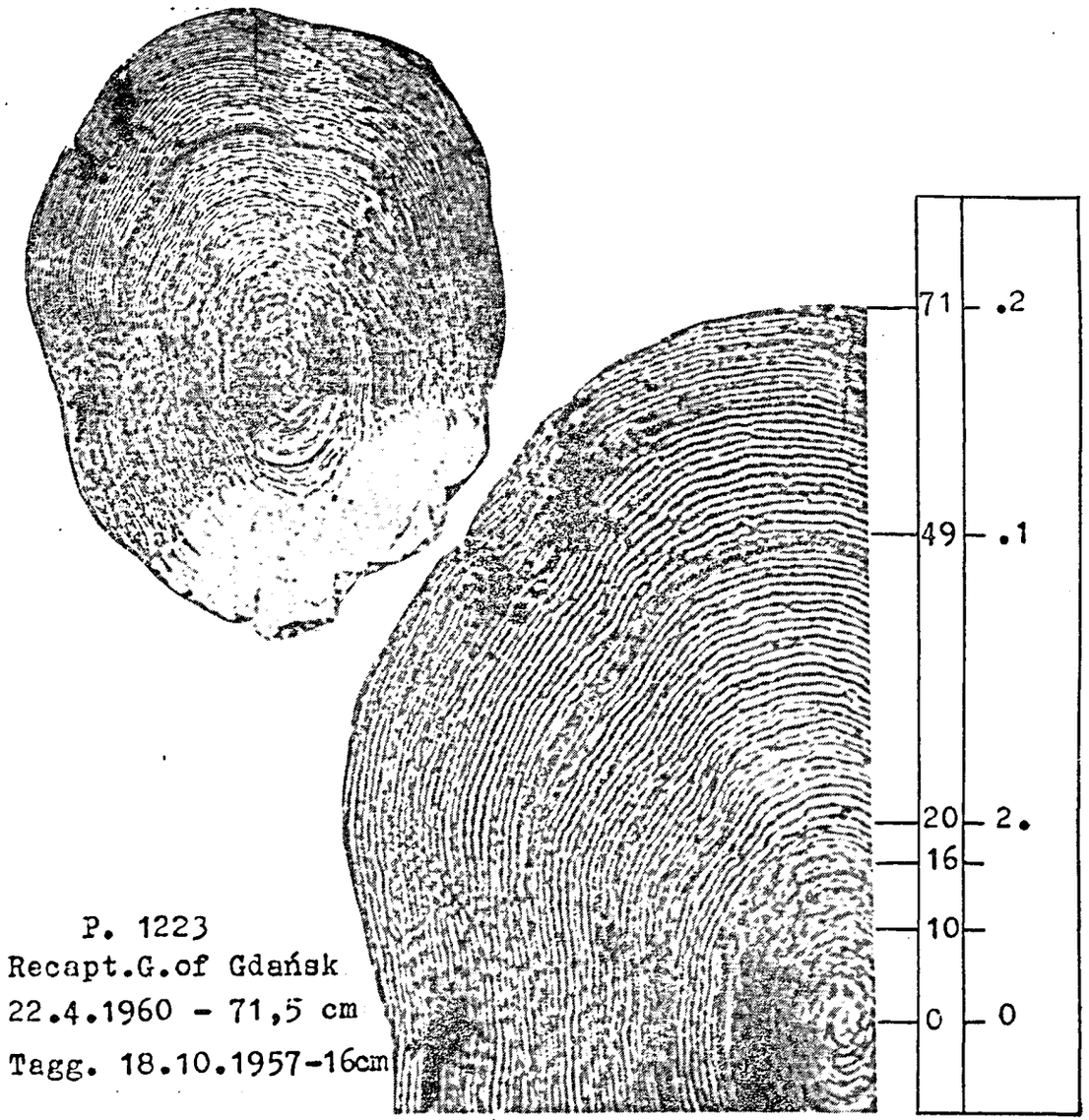
P. 1598
Recapt.G.of Gdańsk
21.11.1960 - 69 cm
Tagg. 17.10.1958 - 18 cm



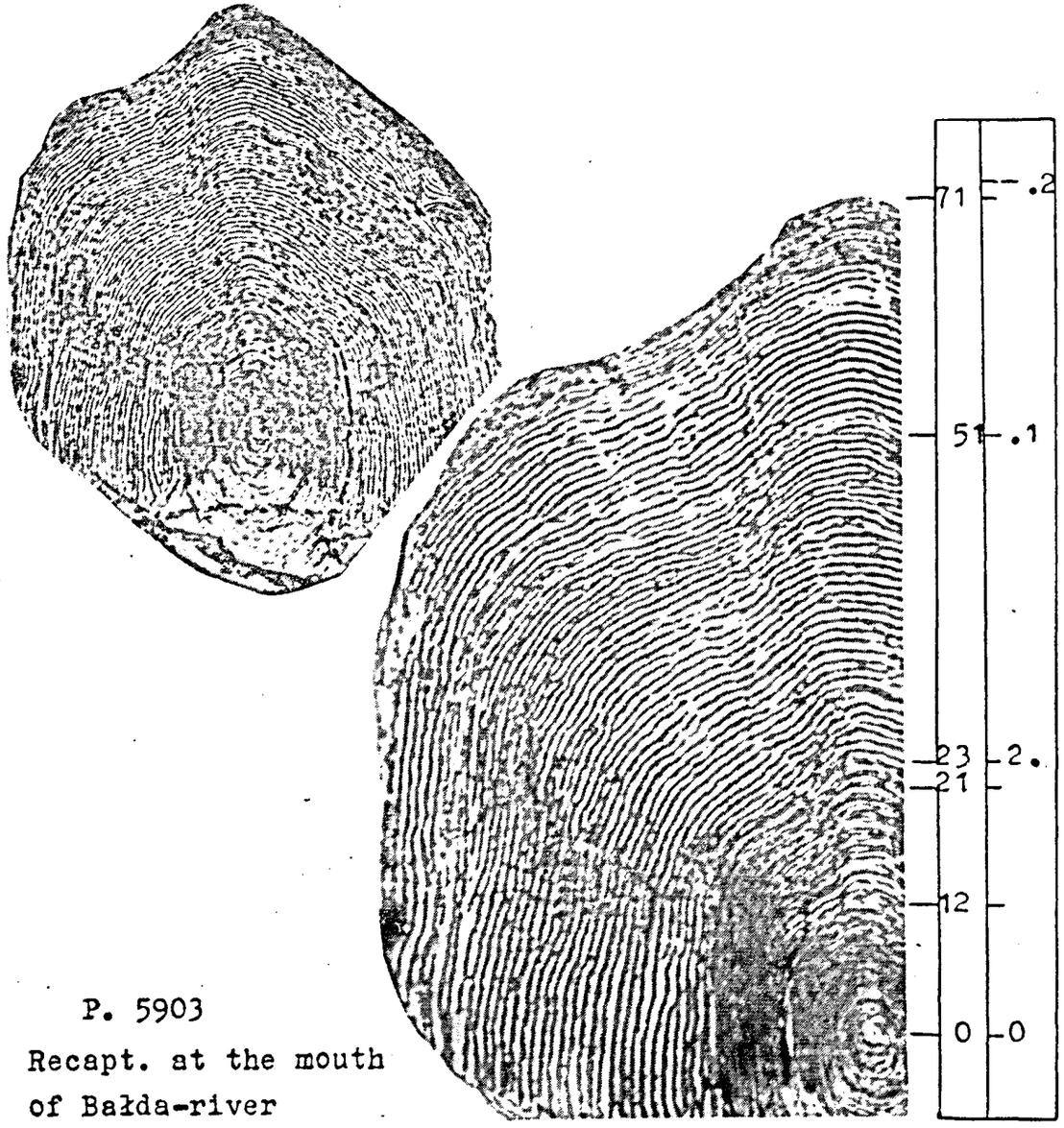
P. 934
Recapt.G.of Gd.
8.4.1961 - 68 cm
Tagg. 18.10.1957 - 17,5 cm



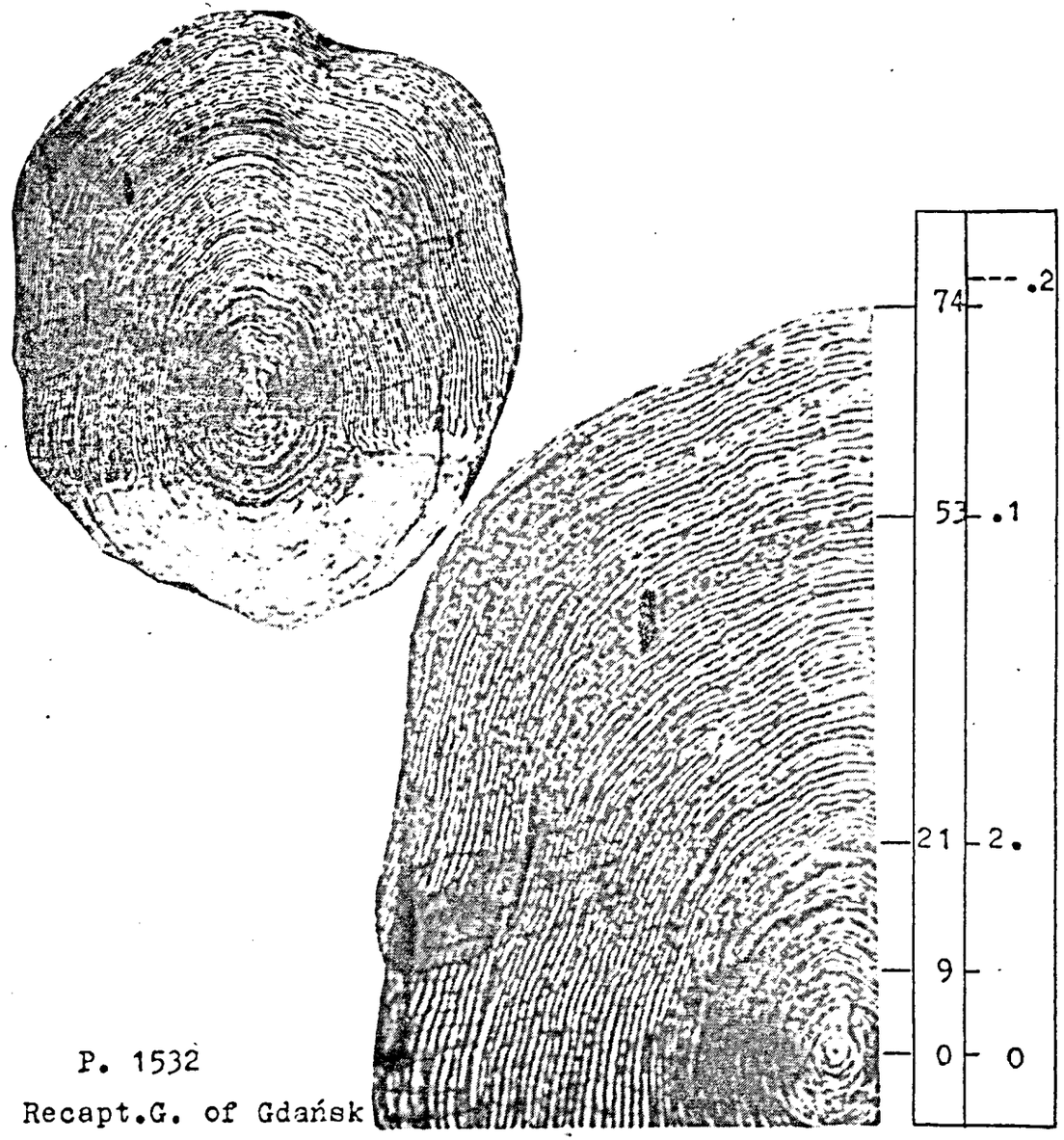
P. 627
Recapt.at the mouth
of Bałda-river
22.11.1961 - 70 cm
Tagg. 18.10.1957 - 14,5 cm



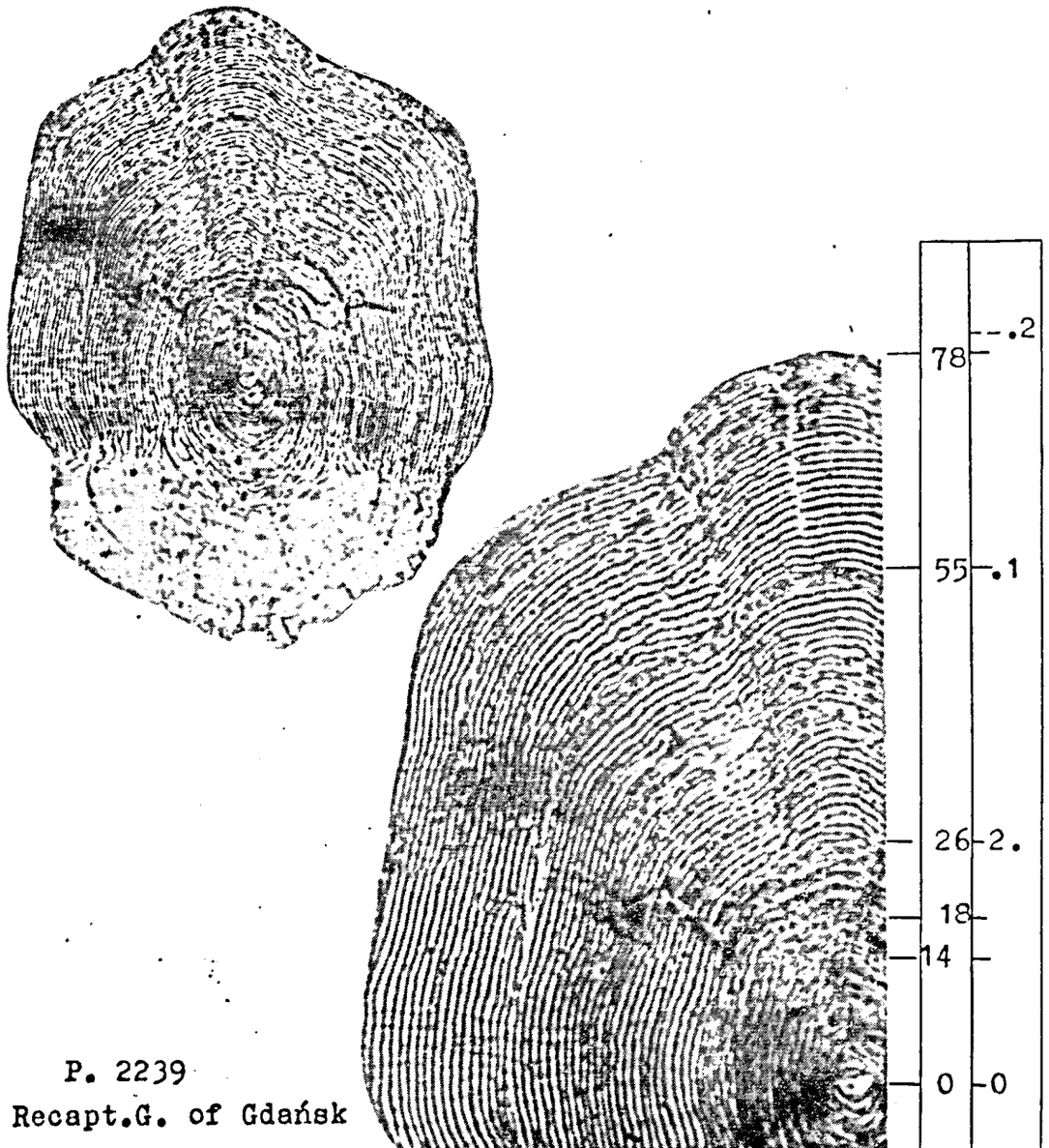
P. 1223
Recapt.G.of Gdańsk
22.4.1960 - 71,5 cm
Tagg. 18.10.1957-16cm



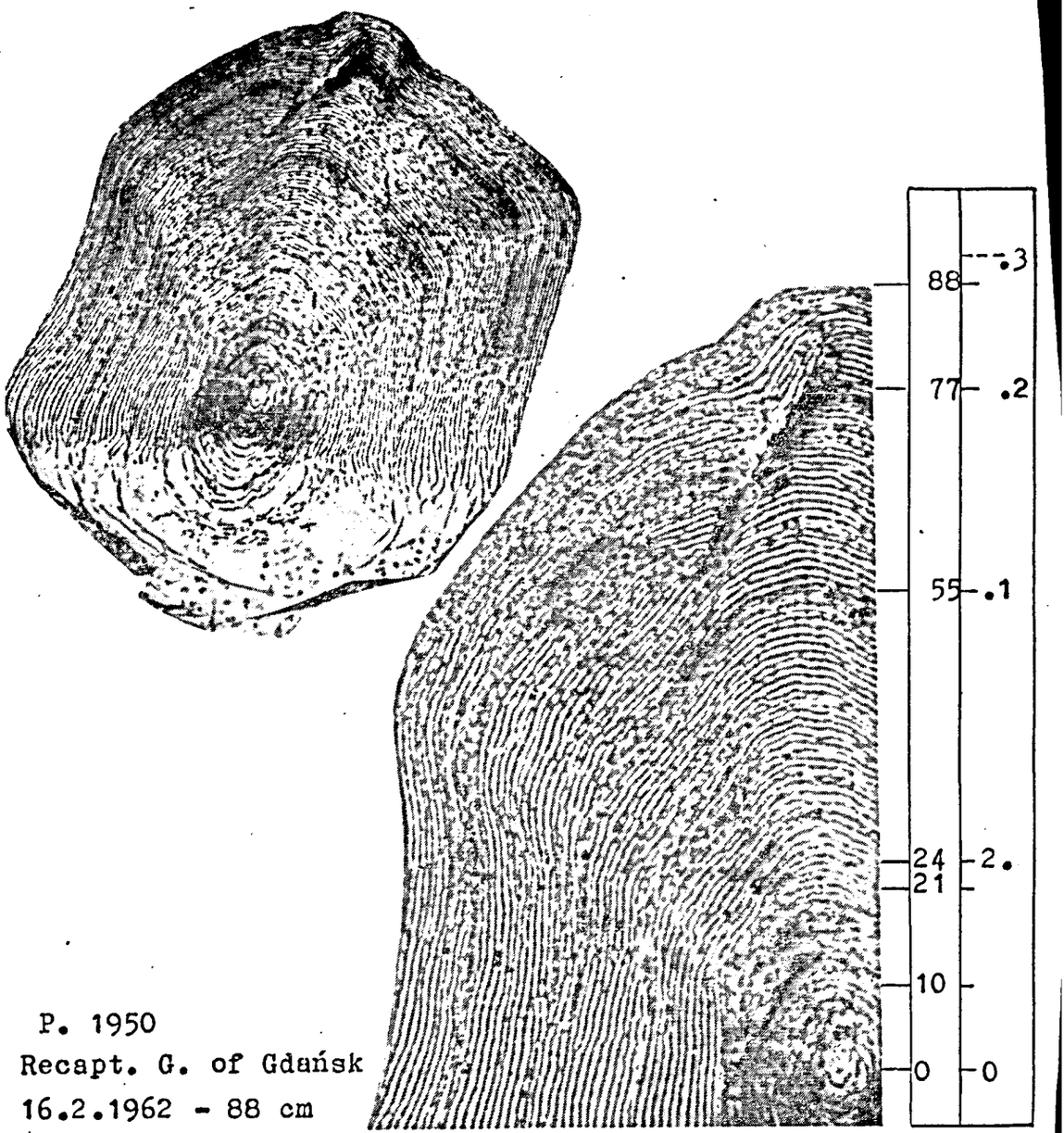
P. 5903
Recapt. at the mouth
of Bałda-river
2.12.1961 - 71,5 cm
Tagg. 22.12.1958 - 22 cm



P. 1532
Recapt.G. of Gdańsk
26.11.1960 - 74 cm
Tagg. 18.10.1958 - 22 cm



P. 2239
Recapt.G. of Gdańsk
22.2.1961 - 78 cm
Tagg. 18.10.1958 - 18 cm



P. 1950
Recapt. G. of Gdańsk
16.2.1962 - 88 cm
Tagg. 18.11.1958 - 21 cm