MINISTERIE VAN LANDBOUW
Bestuur voor Landbouwkundig Onderzoek
Kommissie voor Toegepast Wetenschappelijk Onderzoek
in de Zeevisserij (T.W.O.Z.)
(Voorzitter : F. LIEVENS, directeur-generaal)

AN APPLICATION OF THE TRESHEV METHOD ON FISHERY EFFORT MEASUREMENT

G. VANDEN BROUCKE, P. HOVART and G. CLEEREN

Onderwerkgroep " Techniek in de Zeevisserij "

Mededelingen van het Rijksstation voor Zeevisserij (CLO Gent)

Publikatie nr. 89 - TZ/57/ 1973

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Introduction

At the ICES Meeting of 1972 countries were invited to evaluate the merit of the method proposed by Dr. A.I. Treschev in measuring fishing effort.

This method was applied to Belgian beam trawlers fishing for flatfish on the same fishing grounds. A comparison was also made between the catch and the brake horse power.

Material and methods.

The statistical material employed relates to the year 1972. Data relating to catches made by 49 trawlers in statistical rectangles IV b, IV c, VII d and VII a, f and g (Figure 1) were available.

Data regarding catches were obtained from the auctions and those concerning the fishing area and hours fishing were taken from the skippers' logbooks.

The length of the beams, the height of the trawl heads and the towing speed were obtained through a questionnaire.

The brake horse power was the power recorded in the ship certificate.

Table 1 gives the characteristics of the vessels and the gear.

The gear used consists of twin beam trawls towed over the port and starboard side of the vessel and measuring approximately 3.5 to 8 m along the beam. The two beam nets are equipped with anti-stome chains.

For the Treschev method the independent variable was the volume of the water swept by the net. This volume (in m^3 per hour) is the product of the total length of the two beams, the height of the trawl heads and the average towing speed as given by the skippers.

The dependent variable was the catch per hour fishing.

As regards the second series of calculations the dependent variable was again the catch per hour fishing whereas the independent variable was the brake horse power.

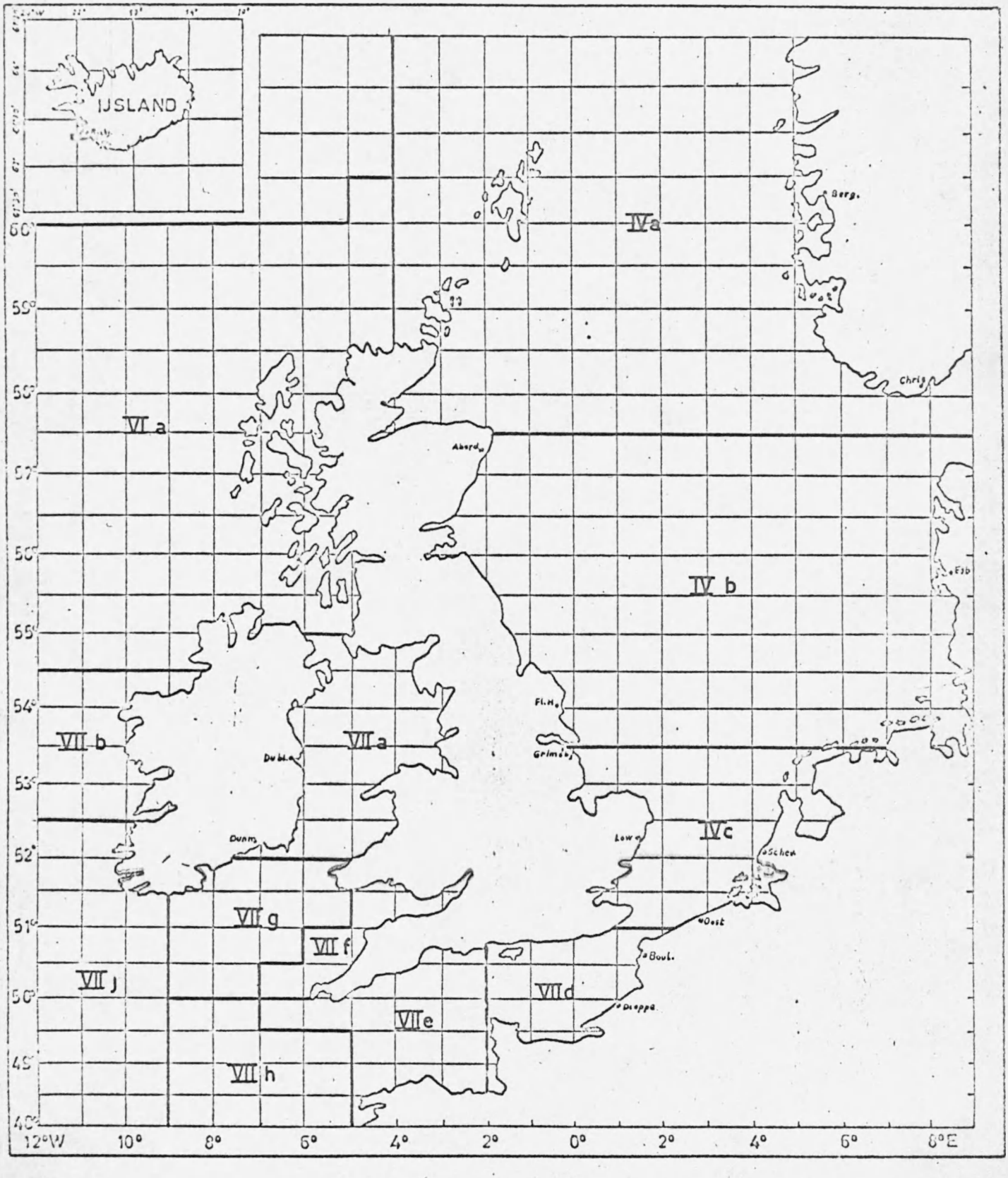

Figure 1 – Fishing areas

Using these variables, linear regression equations were calculated for all vessels operating in all areas as well as for the vessels fishing on each of the different grounds.

Results.

1. Table 2 shows the linear regressions with the swept volume as independent variable. Figures 2 a-d give the individual distribution of the data.

   Rather low correlation coefficients are obtained. For all areas R was 0.529, whereas for the different fishing areas the correlation coefficients varied between 0.631 and 0.259. Only for the areas IV b, IV c and all fishing areas significant regression coefficients were obtained.

2. Table 3 gives the linear regression with the brake horse power as independent variable. Figures 3 a-d show the individual distribution of the data.

   Again rather low correlation coefficients are obtained. For all vessels R = 0.673 and for the different areas the correlation coefficients lay between 0.630 and 0.152.

   The regression coefficients were significant for all areas, area IV c and VII a, f, g.

3. Comparing tables 2 and 3 it appears that the correlation coefficients in the Treschev method are smaller than in the second series of calculations, except for area IV b.

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Table 1 - The characteristics of the vessels and gear.

Fishing areas	No. of vessels	G.T.		H.P.		L of single boa	
		Range	Average	Range	Average	Range	Average
All fishing areas	49	21.04-198.77	94.81	145-610	365.86	3.5-8 m	5.8 m
IV b	15	48.18-143-12	101.34	180-610	372	4-7.3	6.3
IV c	40	21.04-188.49	87.44	145-610	360	3.5-8	5.76
VII d	12	65.47-198.77	101.55	200-500	380	3.5-8	5.9
VII a f and g	36	48.18-198.77	118.39	180-610	408.42	4-8	6.2

Table 2 - Regressions : Y = a + b X (X = volume of the water swept).

Fishing area	Regression equation	R
All fishing areas n = 49	Y = 27,138 + 0,000404 X (0,000095)(sss) t = 4,253	0,529
IV b n = 15	Y = 18,100 + 0,000718 X (0,000238)(ss) t = 3,016	0,631
IV c n = 40	Y = 27,597 + 0,000348 X (0,000106)(ss) t = 3,283	0,472
VII d n = 12	Y = 27,797 + 0,000330 X (0,000390)(ns) t = 0,846	0,259
VII a, f, g n = 36	Y = 29,925 + 0,000370 X (0,000202)(ns) t = 1,832	0,299

(sss = significant $p < 0,001$; ss = significant $p < 0,01$;
s = significant $p < 0,05$; ns = not significant).

Table 3 - Regressions : Y = a + bX (X = horse power)

Fishing area	Regression equation	R
All fishing areas n = 49	Y = 12,274 + 0,1003 x (0,0161)(sss) t = 6,235	0,673
IV b n = 15	Y = 50,275 + 0,0320 X (0,0579)(ns) t = 0,56	0,152
IV c n = 40	Y = 13,892 + 0,0891 X (0,0187)(sss) t = 4,755	0,611
VIId n = 12	Y = -10,691 + 0,1454 X (0,0696)(ns) t = 2,088	0,551
VII a, f, g n = 36	Y = 18,280 + 0,0858 X (0,0343)(s) t = 2,503	0,630

(sss = significant $p < 0,001$; ss = significant $p < 0,01$;
s = significant $p < 0,05$; ns = not significant)

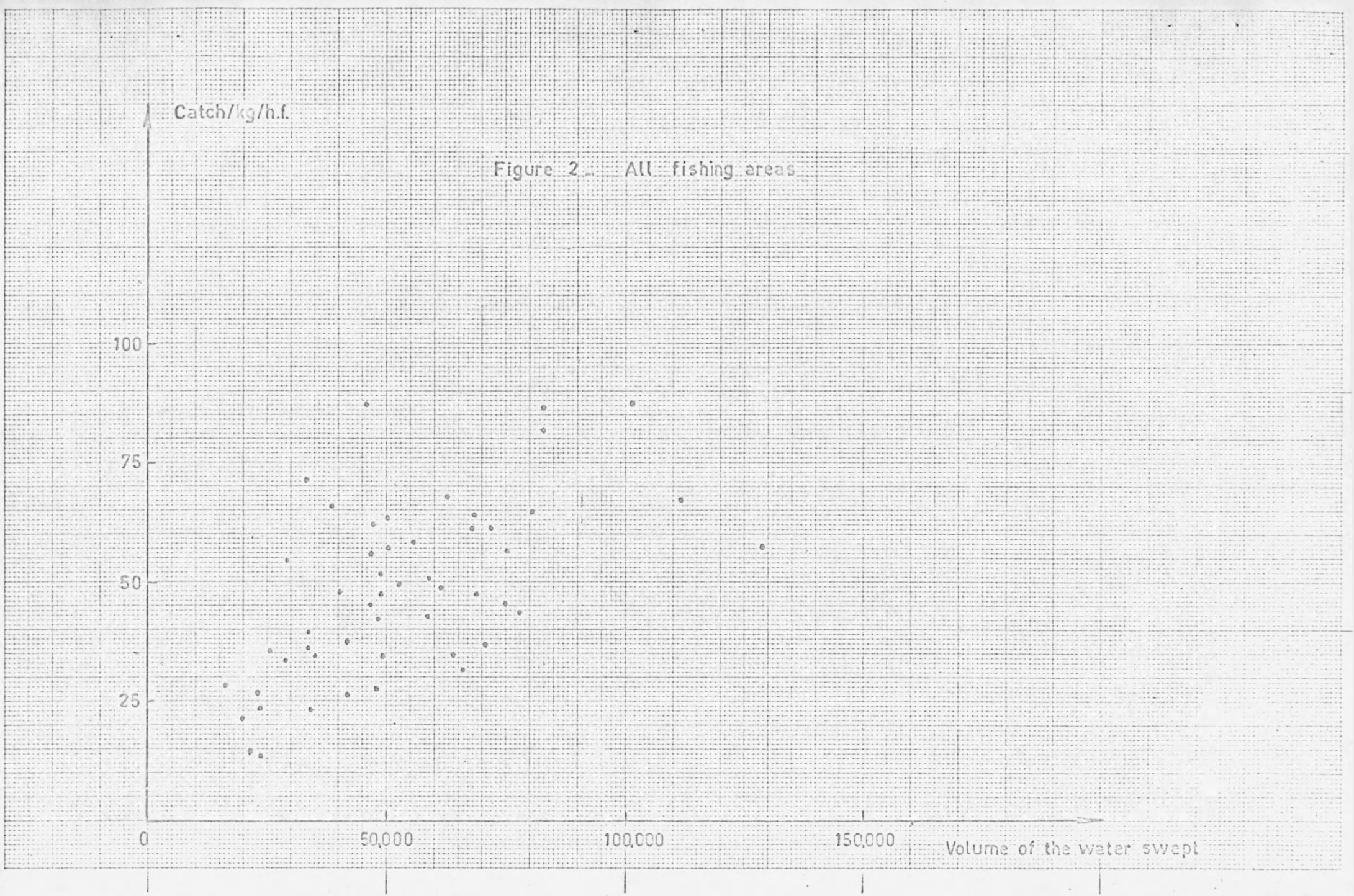

Figure 2 - All fishing areas

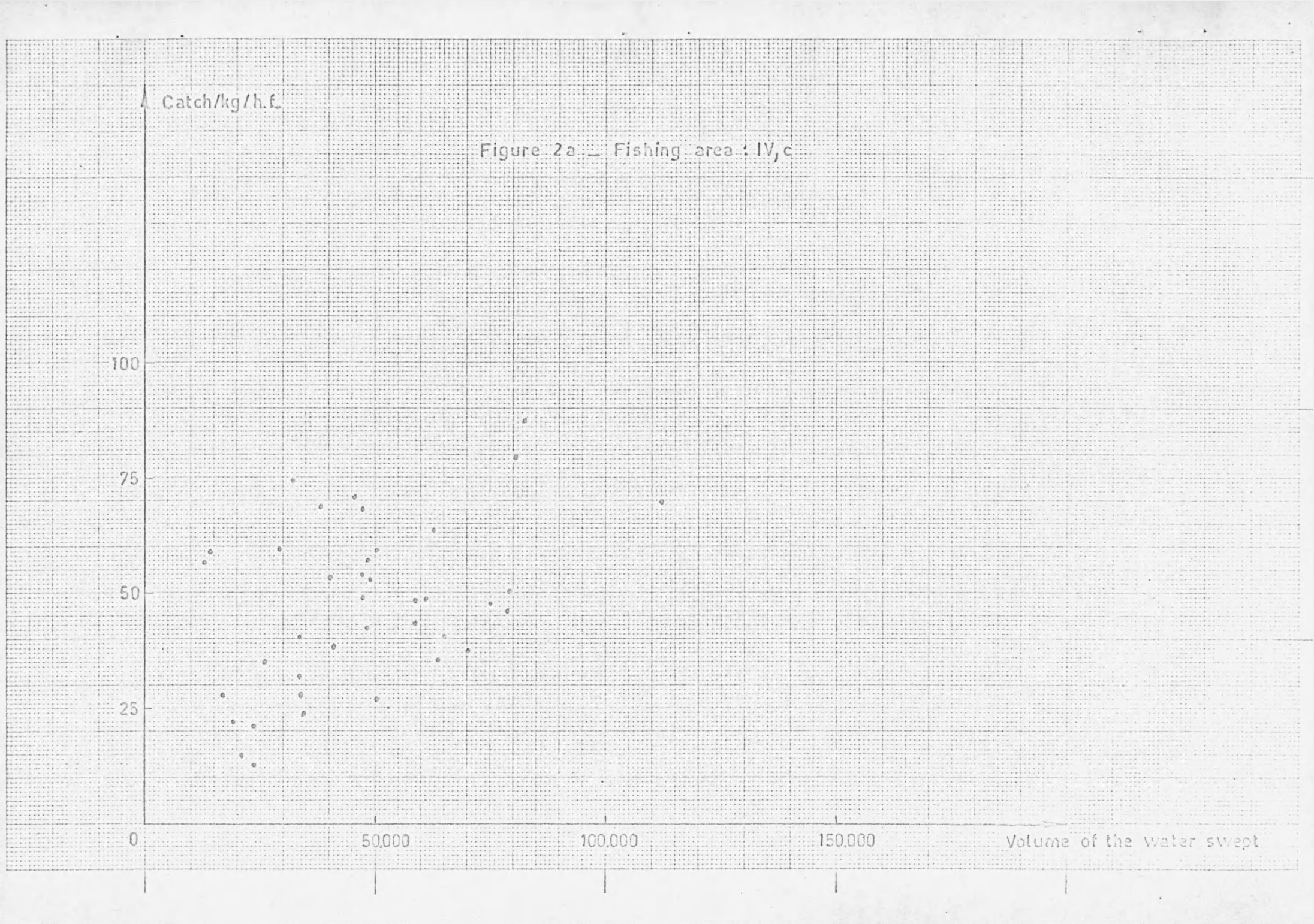

Figure 2a — Fishing area : IV, c

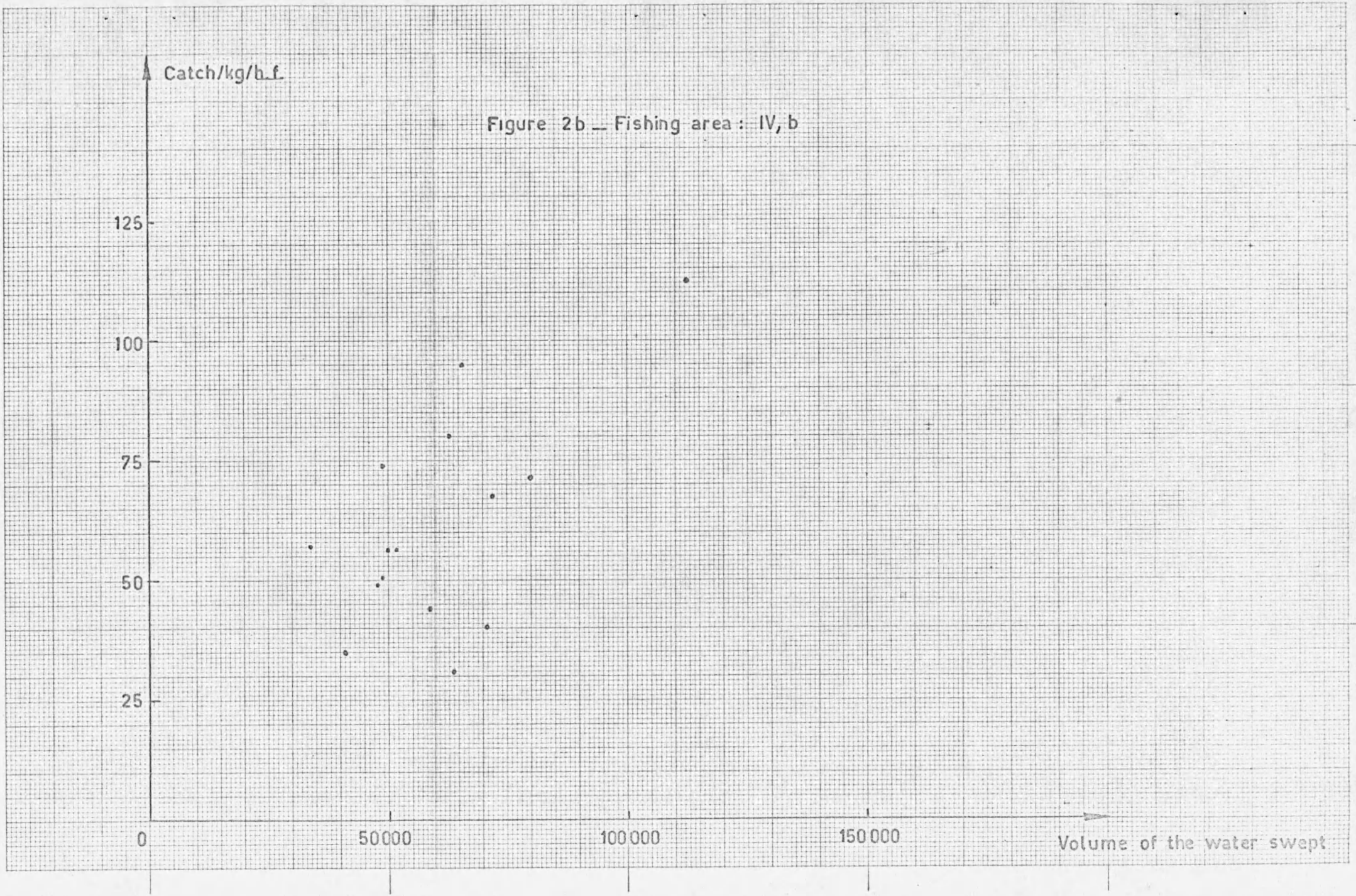

Figure 2b _ Fishing area : IV, b

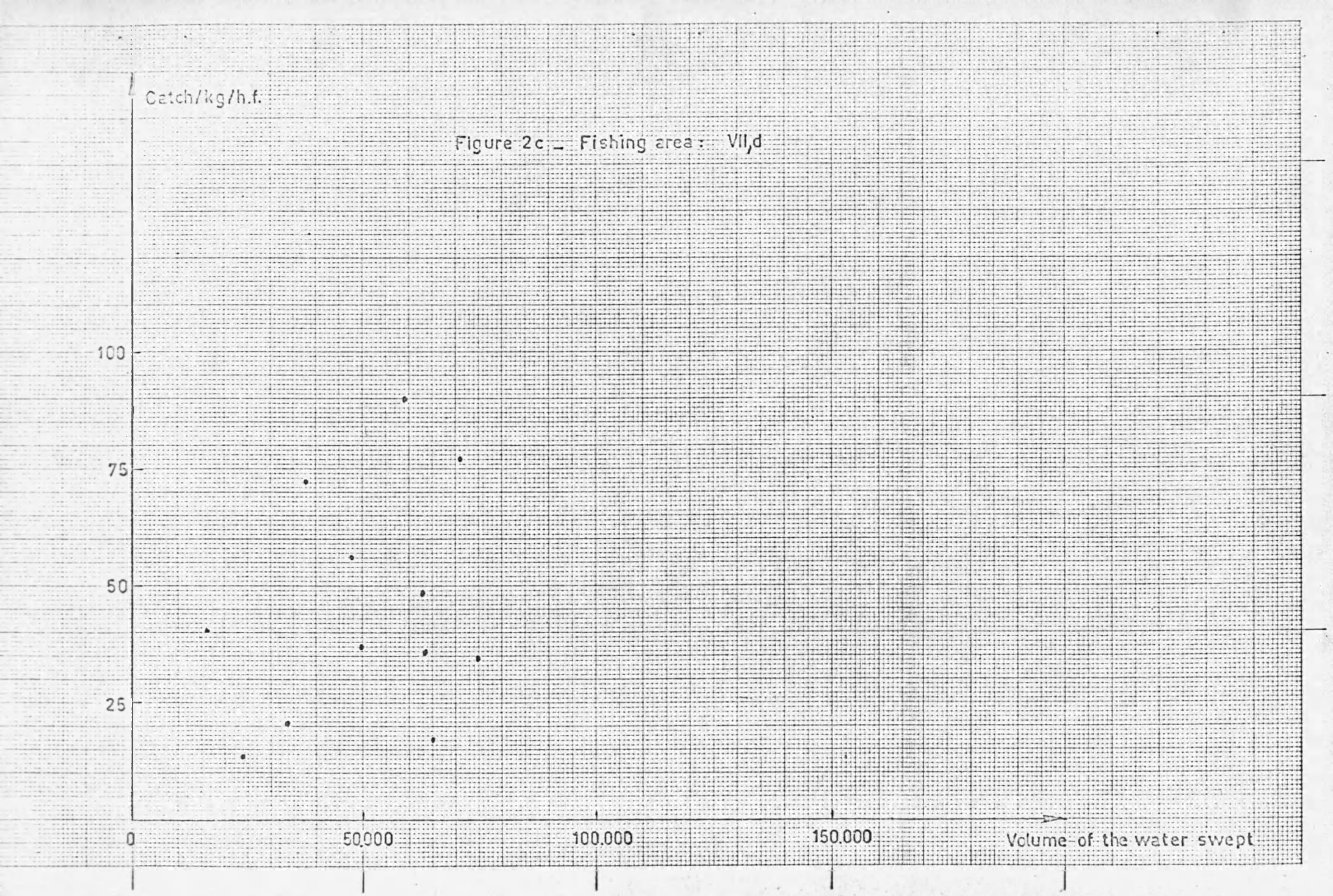

Figure 2c – Fishing area : VII,d

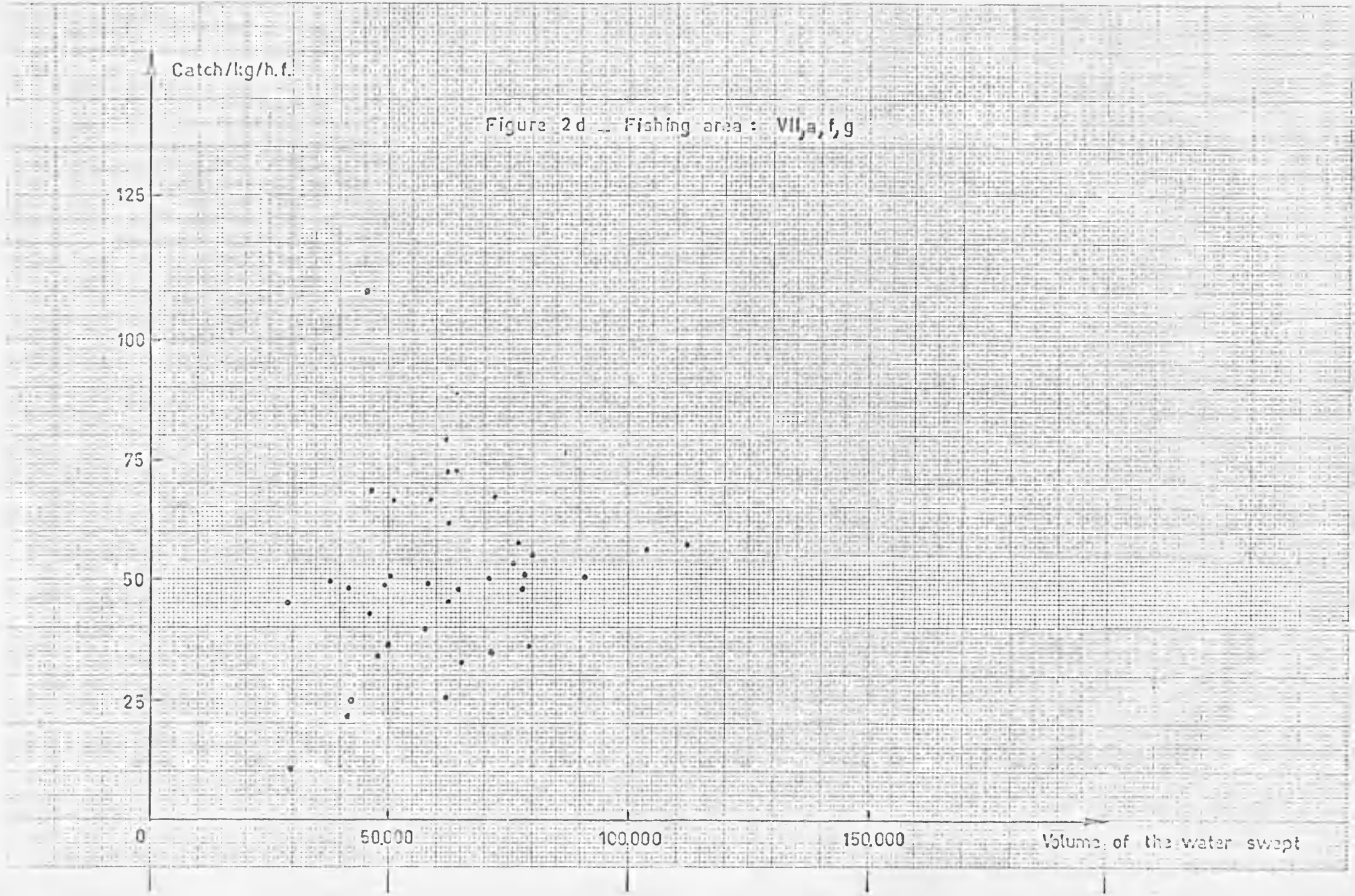

Figure 2 d – Fishing area : VII,a, f, g