

W H I T E F I S H A U T H O R I T Y

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Technical Report 136

Hall test research on  
Blue Whiting

June 1976.

**SUMMARY OF THE REPORT**

**of**

**HALL TEST RESEARCH**

**on**

**BLUE WRITING**

**from the original prepared by**

**David Elliott & Associates**

**June 1976.**

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## SUMMARY

Three sets of hall tests were held in February/ March 1976, using blue whiting caught by the Arctic Privateer in April 1975. In each set, 200 housewives were served samples of both crumbed and pan-fried and of grilled fillets and their responses to the appearance, flavour and texture of the cooked fish obtained.

Bearing in mind that, although it was an exploratory voyage, the fish were caught under commercial fishing conditions, and had been in cold store for ten months, it is encouraging to record a favourable response.

On average a majority of the housewives thought the fish to be "quite good" or better, 82% in the case of fried fish and 72% for the frilled fish and fewer than 10% rated the fish at less than "fair".

Colour of the cooked samples was adversely commented upon, by 43% for the fried and by 58% for the grilled fish. However over 50% stated that they thought the fish tasted better than it looked, and in fact 91% thought that the fried samples looked appetising.

An estimation of inclination to purchase uncooked fish showed a reluctance when compared to present purchasing habits, which agrees with the previously formed opinion that if sold in the filleted form, blue whiting is better suited to the catering and frying outlets.

## 1. INTRODUCTION

The Blue Whiting is considered to be of economic potential to the United Kingdom. As part of the overall Blue Whiting market and consumer trials planned by the White Fish Authority, it was necessary to determine the reactions of the ordinary housewife to the fish. Therefore, an initial series of Hall Tests was planned in 3 different areas throughout the United Kingdom.

Respondents were asked to taste two samples of Blue Whiting - one grilled and one fried - whilst trained interviewers probed their overall reactions to the appearance and taste of the fish in general, and their possible future inclination to purchase in specific.

During previous experiments it was discovered that the appearance of Blue Whiting raw was not particularly appetizing because of its darkish colour.\* However, upon cooking, the flesh appeared white and flaky with a taste similar to its more famous cousins - cod, haddock, and whiting. For these first three Hall Tests, therefore, the fish was not exhibited to the housewives in a raw state.

This report is a summary of the full report prepared by David Elliott & Associates (Ref 2), which can be made available upon request to the White Fish Authority.

## 2. BACKGROUND

Blue Whiting is a member of the cod and haddock family, and congregates in large shoals at medium depths to the west of the British Isles during spring and early summer. It ranges in length from 20 to 35cm and in weight from 50 to 200g. It gives fillets mainly in the range 40 to 80g which look slightly dark in colour.\*

\* The fillets from the 1976 catch are noticeably whiter in colour.

In March/April 1975, the Ministry of Agriculture, Fisheries and Food released their newly acquired research vessel Arctic Privateer for a fishing voyage under the White Fish Authority's control. She returned to port carrying nearly 400 tons of the fish most of which was block frozen whole at sea (Ref.1). Because the fish shoal densely, large quantities were caught in a short period which, without machine filleting, made processing at sea impossible.

Of the total fish on the Arctic Privateer about 80% were Grade 1 - over 27cm in length and frozen within 3 to 3½ hours of being caught. However, the fish were more varied in shape than expected, many being slim in relation to length, and thus difficult to fillet. Nevertheless, for the White Fish Authority Hall Tests, a quantity of these fish were carefully thawed, hand filleted to produce block (butterfly) fillets and then refrozen until needed.

### 3. OBJECTIVES

The White Fish Authority undertook to assess the reactions of housewives in various cities throughout the United Kingdom to the relatively unknown Blue Whiting. Objectives of the Hall Tests were to determine:

- a) likelihood of general acceptance
- b) ratings of appearance/texture/flavour
- c) inclination to purchase

### 4. HALL TEST DESIGN

#### 4.1 Halls

Halls with suitable space and cooking facilities were rented in 3 city centres where the flow of pedestrian traffic was maximum and consistent.

4.2 Questionnaire (See Appendix I)

The questionnaire was drafted to elicit responses in detail on the appearance, taste, texture, and likes and dislikes of Blue Whiting grilled and fried, plus inclination to purchase wet or frozen.

4.3 Quota

The quota was representative in terms of age and social class based on information from Marketing and Survey Research statistics published by the IPA.

200+ housewives within the quota were interviewed in each location.

4.4 Interviews

Interview time averaged approximately 15 minutes. Subjects were recruited from the street, were seated, and were shown a copy of the WFA Blue Whiting leaflet (Appendix II) in order to approximate a retail situation in which the fishmonger describes the 'new' species.

Daily supervision was provided by David Elliott & Associates and the White Fish Authority.

#### 4.5 Cooking Methods

Each subject was given two portions consisting of one-half of a Blue Whiting butterfly fillet:

- a) brushed with butter and grilled
- b) coated with raw beaten egg, dusted with breadcrumbs, and pan fried in oil

Salt was provided at the interview table, if requested, and subjects were encouraged to drink water between tasting the two fish recipes.

Order of presentation was rotated throughout the test in all locations, 50% of the housewives tasting grilled first, followed by the other 50% tasting fried first, or vice-versa. The recipe tasted first was noted on all questionnaires for possible influence on results.

#### 5. RESULTS

See tables I to VIII.



## 6. DISCUSSION AND CONCLUSIONS

- 6.1           The tests took place in 3 locations (London, Leeds, Walsall) with samples of approximately 200 each, using fish which had been frozen whole in blocks, thawed, gutted, block filleted by hand and refrozen and held in cold store for 10 months.
- 6.2           The filleted fish was not therefore the pride of an outstanding catch, but reflected simply the best quality obtainable from an average catch of that season. It did not display well raw, and was therefore not shown uncooked to respondents.
- 6.3           The order of presentation of the crumbed and pan-fried and the grilled samples was rotated.
- 6.4           Geographically, Walsall housewives were in general more enthusiastic than those of London and Leeds: but there was no significant overall difference in their reactions other than of degree.
- 6.5           In general, the fried fish was considered more appealing in appearance, texture and flavour than the grilled, especially in Walsall.
- 6.6           In appearance, (Table II) from 87% to 94% of the respondents in the three samples considered that the fried fish would be 'appetizing' compared to 36% to 50% for the grilled fish. However only 2% to 5% of the respondents considered the fried fish would be unappetizing in appearance compared to 27% to 43% for the grilled.

6.7 After tasting (Table III), in terms of overall opinion, the fried fish scored excellent/very good/quite good ratings in the range of 79% - 87% compared to ratings in the 69% - 75% range for the grilled fish.

6.8 Comparison of the ratings after tasting with the expectation of taste from seeing the cooked fish beforehand (Table II & III), showed little change of opinion for the fried fish, (96% to 93%) but a marked improvement (63% to 89%) for the grilled fish. In answer to the direct question "is the taste better, the same or worse than expected", for the grilled fish, there was a nett improvement of 44% (55% answering "better", to 11% "worse"), which is in line with the foregoing comparison (see Table IV). For the fried fish the corresponding improvement was 42% (53% better, to 11% worse), which showed despite the high rating for visual appeal, the recipients were still agreeably surprised upon tasting.

6.9 Of its taste (Table V), 63% to 77% of the respondents (with a marginal advantage to the fried fish) thought the flavour 'just about right', but 17% to 24% found it had 'not quite enough flavour', and less than 10% thought its flavour too strong.

6.10 Texture (Table VI) provided a significant point of divergence between grilled and fried Blue Whiting. While 12% to 22% found the fried fish "chewy". The 'just right' was accordingly lower for grilled (approximately 45%) versus fried (approximately 55%).

6.11 Colour (Table VII) presented a problem, particularly for the ungarnished grilled fish: crumbs improved the general appearance of the fried fish. 49% to 68% thought the grilled fish was 'too dark' compared to 37% to 52% for the fried fish. In each trial it was the Leeds housewives whose dislike was the most marked and the London housewives the least marked.

6.12 In a free response question (Ref.2) on taste/flavour, most housewives thought it 'pleasant/nice/good flavour' and compared it to cod, haddock, herrings and plaice. A significant number (16 to 24%) continued to affirm that it lacked flavour. Other than the tendency to a bland taste the principal specific criticisms were "oily/greasy/sweet/milky" from about 15% both for fried and grilled and in all 3 locations. Principal specific likes were "not too strong" (about 30%) and "fresh/sea-food flavour/salty".

6.13 In a further free response question (Ref.2) on likes/dislikes, the flavour was generally considered quite good, and a significant number of respondents (10 to 20%) said they thought it "tastes like other fish" which is an encouraging finding. No major additional response was recorded. A majority preferred the fried fish, which linked to texture can be interpreted as finding that grilled makes the fish dry and chewy, whereas frying retains a moist and flaky texture. Responses in favour outnumber those against by a factor of two to one. In fact 45%, on average across the 3 samples, found nothing to dislike about Blue Whiting. Some remarks made about the presence of bones are a commentary on the problems of removing the dorsal fin from the block fillet, without splitting the two halves.

6.14 A hypothetical inclination to purchase rating (Table VIII) was obtained both for wet and frozen Blue Whiting. There was a distinct tendency in favour of purchasing wet fish (71% - 82%) compared to frozen (45% - 57%). If the "might/might not" category is included the ranges are 80% to 87% for wet and 61% to 67% for frozen which comparisons are unfavourable when set against the stated purchasing habit of some 92% average buying wet fish, and 69% average buying frozen fish.

6.15 Previous experimental work has shown that in the main a good, fresh fillet of Blue Whiting, although slightly dark uncooked, quickly assumed a firm, white texture while cooking. It is obvious that overall inclination to purchase Blue Whiting wet or to repurchase frozen will depend on the appearance of the fish in the raw/thawed state. This is only relevant if the fish is to be sold through the retail trade, as well as through catering and frying outlets which are considered more suitable.

## 7. RECOMMENDATION

With improved fishing, handling and filleting, techniques it is thought likely that a more acceptable raw fillet will be possible. It is therefore recommended that a further series of tests is set up as soon as the new catch becomes available, with a preliminary showing of the fish uncooked as part of the research design.

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TABLE IV Expectation vs. overall opinion

	LONDON	LEEDS	WALSALL
	%	%	%
<u>Fried</u>			
Better	54) 91	57) 87	57) 91
Same	37) 91	30) 87	34) 91
Worse	9	13	9
<u>Grilled</u>			
Better	50) 88	55) 87	53) 90
Same	38) 88	32) 87	37) 90
Worse	12	13	9

TABLE V Taste

	LONDON	LEEDS	WALSALL
	%	%	%
<u>Fried</u>			
Much too strong	0	1	0
Little too strong	6)	4)	2)
Just about right	66) 96	67) 95	77) 97
Not quite enough flavour	24)	24)	18)
Not nearly enough flavour	4	4	3
<u>Grilled</u>			
Much too strong	1	1	0
Little too strong	9)	8)	9)
Just about right	65) 95	69) 94	63) 94
Not quite enough flavour	21)	17)	22)
Not nearly enough flavour	4	5	6

TABLE VI Texture

	LONDON	LEEDS	WALSALL
	%	%	%
<u>Fried</u>			
Soft & mushy	6	3	3
Flaky & light	26)	25)	23)
Just right	55)93	50)97	61)96
Chewy	12)	22)	12)
Tough	1	0	0
<u>Grilled</u>			
Soft & mushy	2	1	1
Flaky & light	20)	18)	15)
Just right	48)96	43)97	48)97
Chewy	28)	36)	34)
Tough	2	2	2

TABLE VII Colour

	LONDON	LEEDS	WALSALL
	%	%	%
<u>Fried</u>			
Too pale	3	3	2
Nice & white	60	45	58
Too dark	37	52	40
<u>Grilled</u>			
Too pale	11	6	5
Nice & white	40	26	38
Too dark	49	68	57

TABLE I. Trials location & respondents

Location	LONDON Romford & Wimbledon		LEEDS		WALSALL	
Dates of trials	4th & 5th Feb. 1976		25th & 26th Feb. 1976		23rd & 24th March 1976	
No. Interviewed	201	(100%)	225	(100%)	206	(100%)
<b>Age group</b>						
16 to 34	91	(45%)	92	(41%)	87	(42%)
35 to 44	54	(27%)	70	(31%)	59	(29%)
45 to 54	<u>56</u>	(28%)	<u>63</u>	(28%)	<u>60</u>	(29%)
TOTAL	201		225		206	
	==		==		==	
<b>Social Class</b>						
AB	26	(13%)	34	(15%)	28	(14%)
C1	59	(29%)	60	(27%)	50	(24%)
C2	75	(37%)	72	(32%)	73	(35%)
DE	<u>41</u>	(21%)	<u>59</u>	(26%)	<u>55</u>	(27%)
TOTAL	201		225		206	
	==		==		==	
<b>Recipe tasted first</b>						
Fried	106	(53%)	112	(50%)	105	(51%)
Grilled	<u>95</u>	(47%)	<u>113</u>	(50%)	<u>101</u>	(49%)
TOTAL	201		225		206	
	==		==		==	



TABLE II: Expectation based on appearance of cooked fish(before tasting).

	LONDON			LEEDS			WALSALL		
	%	Cum. %		%	Cum. %		%	Cum. %	
		F.	A.		F.	A.		F.	A.
<u>Fried</u>									
V. appetizing	22	22		27	27		42	42	
Appetizing	69	91		60	87		52	94	
Neither one/other	5	96	9	8	95	13	4	98	6
Unappetizing	4	4		4	5		1	2	
V. unappetizing	0	0		∅	∅		∅	∅	
<u>Grilled</u>									
V. appetizing	5	5		5	5		4	4	
Appetizing	45	50		31	36		33	37	
Neither one/other	23	73	50	21	57	64	23	60	63
Unappetizing	26	27		35	43		34	40	
V. unappetizing	1	1		8	8		6	6	

TABLE III: Overall opinion of cooked fish(after tasting).

	LONDON			LEEDS			WALSALL		
	%	Cum. %		%	Cum. %		%	Cum. %	
		F.	A.		F.	A.		F.	A.
<u>Fried</u>									
Excellent	9	9		7	7		9	9	
V. good	38	47		35	42		44	53	
Quite good	32	79		39	81		34	87	
Fair	16	95	21	11	92	19	8	95	13
Not v. good	4	5		5	8		5	5	
Poor	1	1		2	3		0	0	
V. poor	0	0		∅	∅		0	0	
<u>Grilled</u>									
Excellent	8	8		4	4		2	2	
V. good	29	37		32	36		26	28	
Quite good	38	75		36	72		41	69	
Fair	15	90	25	14	86	25	21	90	31
Not v. good	6	10		8	11		8	10	
Poor	3	4		2	3		1	2	
V. poor	1	1		∅	∅		1	1	

TABLE VIII Inclination to purchase

WET

	<u>LONDON</u>		<u>LEEDS</u>		<u>WALSALL</u>	
	%	Cum %	%	Cum %	%	Cum %
	F. A.		F. A.		F. A.	
Definitely	40	40	53	53	47	47
Probably	31	71	29	82	32	79
Might/might not	9	80	5	87	8	87
Probably not	11	20	7	13	6	13
Definitely not	9	9	6	6	7	7

FROZEN

Definitely	23	23	25	25	27	27
Probably	29	52	20	45	30	57
Might/might not	11	63	16	61	10	67
Probably not	11	37	13	39	11	33
Definitely not	26	26	26	26	22	22

-15-  
Appendix I

RAS 4390

RESEARCH & AUDITING SERVICES LTD

'Randa House' 5 - 11 Westway  
London W12 0PY

Cells, 17343	6784
X 4390	

FISH HALL TEST

Mrs \_\_\_\_\_

AGE GROUP

(10)

ADDRESS \_\_\_\_\_

16 - 34

1

35 - 44

2

45 - 54

0

SOCIAL CLASS

(11)

OCCUPATION OF HEAD OF HOUSEHOLD

A B

1

C 1

2

Position \_\_\_\_\_

C 2

3

Industry \_\_\_\_\_

D E

4

Telephone No. (if any) : \_\_\_\_\_

ORDER OF TESTING

(12)

INTERVIEWED BY

Fried tasted 1st

1

Grilled tasted 1st

2

DATE OF INTERVIEW \_\_\_\_\_ / \_\_\_\_\_ 1976

RECRUIT HOUSEWIVES (AGED 16 - 54) IN ACCORDANCE WITH QUOTA

1 Have you purchased any wet or frozen white fish, like cod or haddock from a fishmonger or supermarket in the last month?

(13)

(RECRUIT FOR TEST) Yes

1

(CLOSE INTERVIEW - DO NOT COUNT TOWARDS QUOTA) No

2

IF ELIGIBLE FOR TEST - SAY :-

'We are asking HOUSEWIVES in this area to taste a fish called Blue Whiting, which is a member of the cod and haddock family and is now being caught off the west coast of Scotland.

We would like you to taste two samples of the fish, one grilled and one pan-fried in breadcrumbs, and then answer a few questions about your opinion of the fish. Would you do this for us ?'

IF 'NO' - CLOSE INTERVIEW - DO NOT COUNT TOWARDS QUOTA

IF 'YES' - INVITE INTO HALL

4350

PLACE FIRST SAMPLE OF FISH IN FRONT OF RESPONDENT AND ASK Q. 2

2 Which of the phrases on this card (SHOW CARD A) best describes your opinion of the appearance of this fish? (CODE UNDER APPROPRIATE HEADING)

	Grilled	Fried
	(14)	(15)
Very appetising	1	1
Appetising	2	2
Neither appetising nor unappetising	3	3
Unappetising	4	4
Very unappetising	5	5

NOW ASK RESPONDENT TO TASTE THE SAMPLE OF FISH (CODE SAMPLE TO BE TASTED 1ST ON FRONT PAGE - COLUMN 12)

3 Which of these phrases best describes your overall opinion of this fish? (SHOW CARD B)  
(CODE UNDER APPROPRIATE HEADING)

	Grilled	Fried
	(16)	(17)
Excellent	1	1
Very good	2	2
Quite good	3	3
Fair	4	4
Not very good	5	5
Poor	6	6
Very poor	7	7

4 And is this fish better, about the same or worse than you expected?

	Grilled	Fried
	(18)	(19)
Better	1	1
About the same	2	2
Worse	3	3

Appendix I Cont'd

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ASK ALL - SHOW CARD C

5 Which of these phrases best describes the taste of this fish? (CODE UNDER APPROPRIATE HEADINGS)

	Grilled	Fried
	(20)	(21)
Much too strong	1	1
A little too strong	2	2
Just about right	3	3
Not quite enough flavour	4	4
Not nearly enough flavour	5	5

6 In your own words, could you tell us what you think of the flavour of the fish that you have just tried? (WRITE IN UNDER APPROPRIATE HEADINGS)

GRILLED

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FRIED

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(22)

(23)

(24)

(25)

SHOW CARD D

7 What is your opinion of the texture of this sample of fish? (CODE UNDER APPROPRIATE HEADINGS)

	Grilled	Fried
	(26)	(27)
Soft and cushy	1	1
Flaky and light	2	2
Just right	3	3
Chewy	4	4
Tough	5	5

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ASK ALL

8 And did you think that the colour was too pale, nice and white or too dark? (CODE UNDER APPROPRIATE HEADING)

	Grilled	Fried
	(28)	(29)
Too pale	1	1
Nice and white	2	2
Too dark	3	3

NOW PLACE SECOND SAMPLE OF FISH IN FRONT OF RESPONDENT AND ASK Q's 2-8 FOR THAT SAMPLE - RECORDING ANSWERS UNDER APPROPRIATE HEADING. THEN PROCEED WITH Q. 9

9 How that you have tried Blue Whiting cooked in those two ways, what, if anything, did you like about it?

---



---



---

(30)

(31)

10 And what, if anything, do you dislike about it?

---



---



---

(32)

(33)

SHOW CARD E

11 Finally, using one of the phrases on this card, could you tell me how likely you feel you would be to buy Blue Whiting - (a) wet from the fishmonger (b) if it was frozen from the supermarket.

	Wet	Frozen
	(34)	(35)
Would definitely buy	1	1
Would probably buy	2	2
Might or might not buy	3	3
Would probably not buy	4	4
Would definitely not buy	5	5

Appendix I Cont'd

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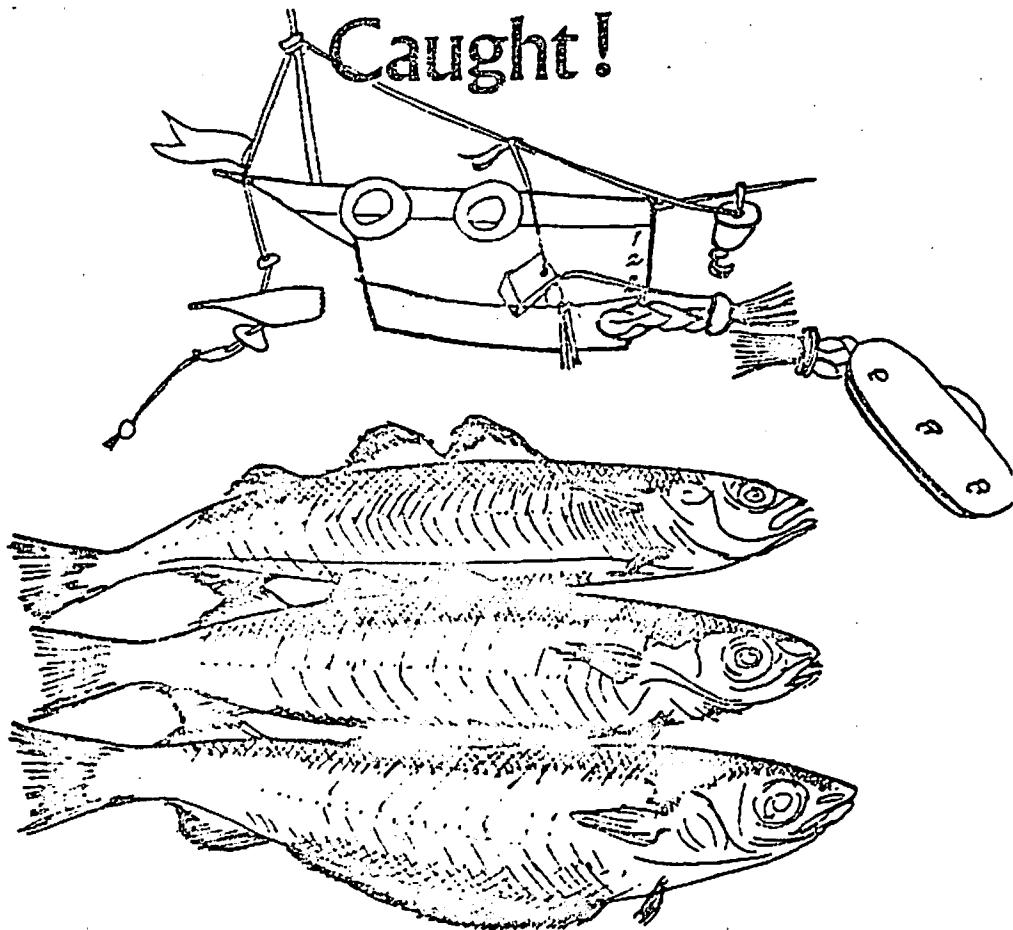
ASK ALL

- 12 Do you ever buy fish (a) wet from the fishmonger ?  
(b) that has been frozen ?

	Wet	Frozen
	(36)	(37)
Yes	1	1
No	2	2

CLOSE INTERVIEW

# Caught!



## the Blue Whiting

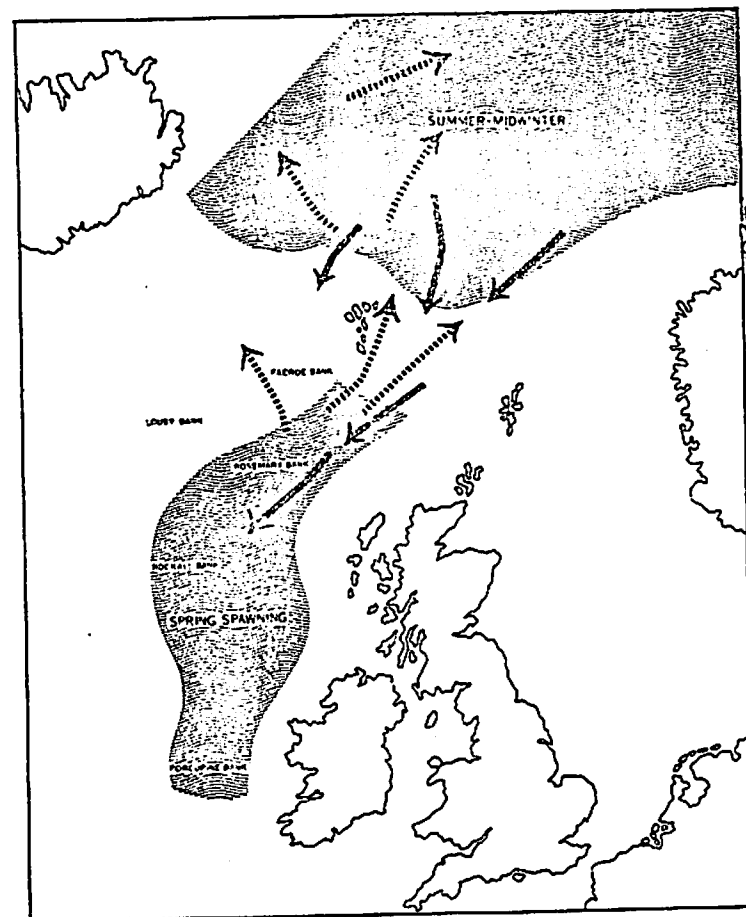
Blue Whiting is a member of the cod and haddock family, and although not yet known to many, has appeared from time to time on the fishmonger's slab. It is a fine-skinned fish, compact in size and with firm flesh. Like the haddock, Blue Whiting has a light, delicate flavour.

Blue Whiting is nutritious, full of protein and rich in vitamins and minerals. Like other members of the cod and haddock family, it is an ideal fish for all types of tasty recipes and is delicious smoked.

Yes, it's caught! Blue Whiting is one of Britain's fish. You may not have heard too much about it yet; but you will, because more and more is coming on the market. Perfect size, perfect texture, perfect taste. And at a good price. Buy Blue Whiting now and give your family a treat.

Thanks to constantly improving fishing techniques, modern boats and powerful equipment, different kinds of fish are becoming increasingly available. Every year fishermen are overcoming the problems of catching fish which were previously beyond their reach. Because of these advances, Blue Whiting can now be brought ashore in good supply.

*Blue Whiting is found throughout the Northeast Atlantic, the Mediterranean, Barents Sea, and off the coast of Nova Scotia. It congregates in large shoals at medium depths to the west of the British Isles during the spring and early summer when it can be caught in large quantities.*





REFERENCES

1. W.F.A. (1975) "Exploratory voyage for blue whiting on M.T. Arctic Privateer." Technical Report 124.
2. David Elliott & Associates (1976) "Results and summary of conclusions of hall test research on blue whiting, prepared for the White Fish Authority." (Original held by the W.F.A.)