St Albans Soroptimists International
22nd February, 2021

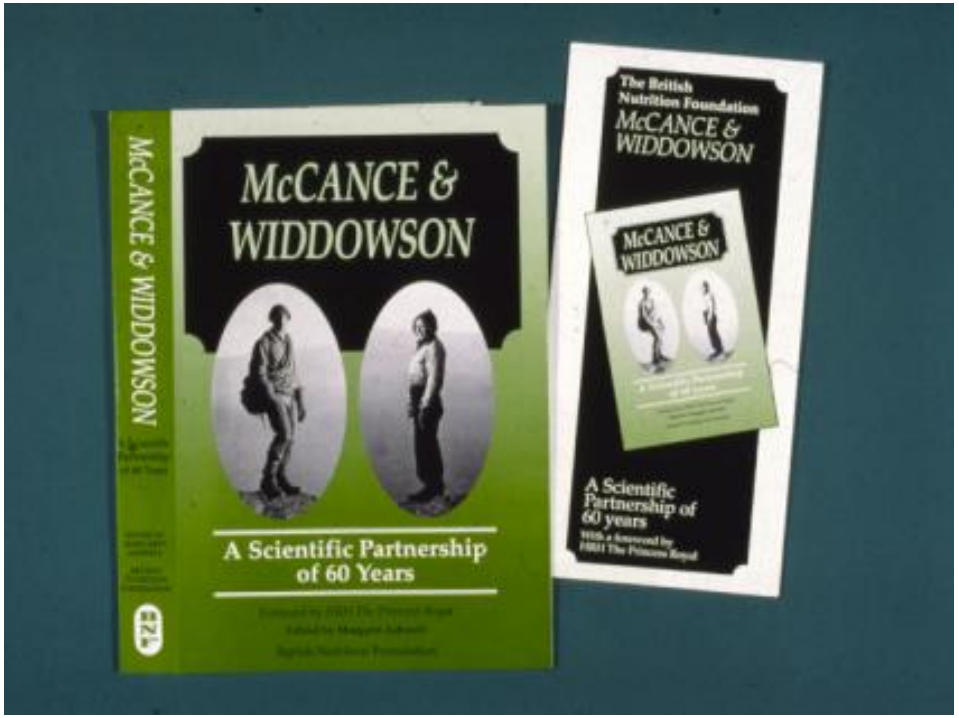
Dr Elsie Widdowson CH, FRS, CBE, DSc

"A woman who inspired action
in the world of diet and health"

Dr Margaret Ashwell OBE
President, Association for Nutrition

www.ashwell.uk.com

What is my involvement with Elsie Widdowson ?



1993

1993

When and where did I decide to write the book?
St Albans Cathedral in 1991

When will Elsie's blue plaque be unveiled? Sunday, June 27th, 2021

Elsie Widdowson CH FRS
1906 - 2000

Pioneer nutrition scientist

Developed and tested wartime rations with bread made in the bakery formerly on this site

Lived in Barrington

Where will the plaque be?
Barrington, Cambs

These highlights are based on one of Elsie's favourite radio programmes

BBC Radio 4

Nicholas Parsons, Chairman

You must speak for minute on a subject WITHOUT:
- **repetition**
- **hesitation**
- **deviation**

BUT In science, you MUST include:
- **repetition**
- **hesitation**
- **deviation**

Advice to a young scientist

Repetition

- You must be able to repeat/replicate your results before you publish:
  - In different data sets
  - In different people, places etc
  - Using different methods,
  - Using different outcome measures etc.

Hesitation

- You must hesitate and think what your results mean in the context of your own work
- You must hesitate and think what they mean in the context of those published by others.

Deviation

- You must deviate and walk around your research problem. Think outside the box.
- Do things need to be done differently?

Examples from Elsie Widdowson's career on deviation, repetition, hesitation in scientific research

Deviation

Dictionary definition

=Departure from the standard or norm

=Doing things differently

Elsie: “Be prepared to tell others if you think they are wrong and that something should be done differently”

Widdowson meets McCance in 1933

King's College Hospital where McCance and Widdowson worked from 1933 to 1938

The kitchen of King's College Hospital where McCance and Widdowson met in 1933

Elsie: "I was training in the general hospital kitchen.
Professor McCance would put food in the steamer and take it out again.
I was curious and asked the cook what was going on.
She said "Professor McCance was doing research on cooking."

Deviation example 1: The start of the partnership begins when Elsie tells Mac he is wrong

Mac: "I remember the first thing that came about ..was the discovery that all the work that I had done .. on carbohydrates in fruit and vegetables would have to be done all over again. Because you quickly put across to me that the method I had used had given me results that were far too low for fructose.

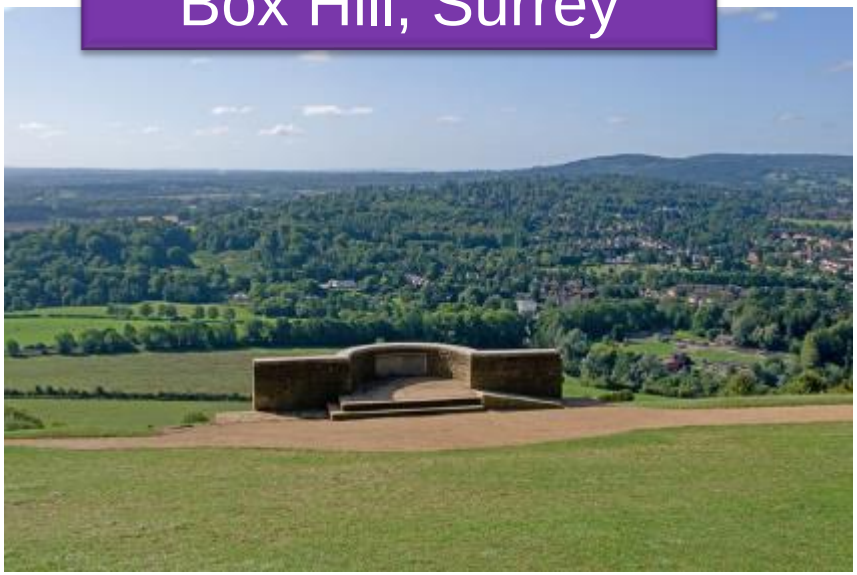
Naturally I asked if you would possibly like to come and help me get them right, and I approached the Medical Research Council for a grant for you."

The spiritual home of the British Food Tables

Elsie: "..one Saturday afternoon in 1934, while I was on a family outing to Box Hill, …the idea came to me that **meat, fish, fruit and vegetables** would soon have been completely analysed, so there **only remained cereal foods, dairy products and some miscellaneous items** ...

If these were also analysed, we would have all the material available for making a practical set of tables showing the composition of British foods."

Box Hill, Surrey



"I put the idea to Dr McCance the following Monday morning. He was willing, and this is how *The chemical composition of foods* came to be conceived and born."

Elsie says the US Atwater 1900 food tables are wrong because they are based on raw foods and their carbohydrate values were calculated ‘by difference’

Elsie: “I thought a lot about the need for British food tables..”
The only food tables available at the time were **wrong**”

“They were based on American data on **raw** foods derived from Atwater and the carbohydrate values were **‘by difference’**

We needed new tables to serve a dual role:
• for calculating nutrient intakes from dietary surveys
• and devising diets for patients with medical conditions.”

Modern Dietary Treatment (1937) scoops the Composition of Foods (1940)

THE CHEMICAL COMPOSITION OF FOODS

Food	Grams per oz. Carbo-hydrate	Protein	Fat	Calories per oz.	Milligrams per oz. Sodium	Potassium	Calcium	Magnesium	Iron	Copper	Phosphorus	Chlorine
Ale - per pint	18·2	1·8	Tr	290	98·0	286	68·5	54·2	0·35	0·48	101·0	195·0
Apples, eating, raw (weight includes skin and core)	2·6	0·1	Tr.	11	0·5	26	0·8	1·0	0·06	0·03	1·7	0·3
Apples, cooking, stewed	1·2	Tr.	Tr.	6	0·3	16	0·5	0·4	0·04	0·01	2·1	0·6
Apricots, fresh, raw (weight includes stone)	1·7	0·2	Tr.	8	Tr.	84	4·5	3·2	0·10	0·03	5·6	Tr.
Apricots, dried, raw	12·3	1·4	Tr.	56	16·0	535	26·3	18·6	1·16	0·08	33·6	9·8
Apricots, dried, stewed	5·1	0·6	Tr.	23	6·7	223	10·9	7·7	0·48	0·03	13·9	4·1
Artichokes, Jerusalem, boiled	0·9	0·5	Tr.	6	0·7	119	8·6	3·2	0·12	0·03	9·4	16·4
*Asparagus, boiled (weighed as served)	0·2	0·5	Tr.	3	0·3	34	3·7	1·5	0·13	0·03	12·0	4·5
Bacon, raw (streaky or back)	0·0	4·0	10·6	115	(348)	71	3·8	4·1	0·37	0·05	34·6	(530)
Bacon, fried (streaky or back)	0·0	6·9	14·2	159	(837)	139	9·1	7·2	0·86	—	66·4	(1268)
Banana	5·5	0·3	Tr.	24	0·3	99	1·9	11·9	0·12	0·05	8·0	22·3
Beans, baked, tinned	4·9	1·7	0·1	28	(168)	98	17·4	10·4	0·58	0·07	52·9	(230)
Beans, Broad, boiled	2·0	1·2	Tr.	13	5·6	66	6·0	7·8	0·28	0·12	28·9	4·0
Beans, Butter, or Haricot (boiled) ..	4·8	2·0	Tr.	28	4·4	102	11·8	11·1	0·59	0·05	29·5	0·5

260 S MODERN DIETARY TREATMENT

130·0	5	ACID
1·3	6	ALK.
0·4	3	"
1·6	22	"
46·6	119	"
19·4	49	"
6·1	23	"
6·6	1	ACID
46·0	21	"
85·0	43	"
3·7	23	ALK
14·4	8	"
7·7	5	"
13·3	16	"

* 50% COOKED WT RECKONED AS EDIBLE

1937 edition annotated in 1938 to prepare for second edition

The Chemical Composition of Foods

(MRC Special Report Series No. 235, 1940)

Cereals and Cereal Foods—*continued*

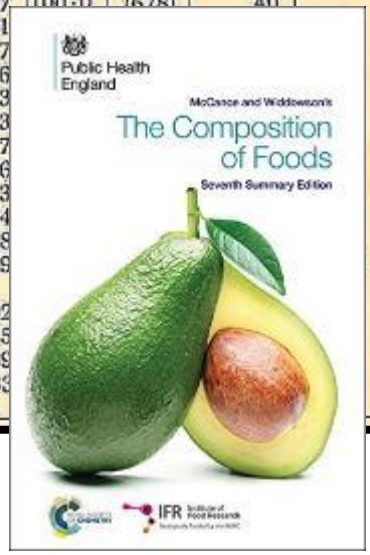
No.	Food.	g. per 100 g. Protein (N × 6·25).	Fat.	Available carbohydrate (as glucose).	Calories per 100 g.	mg. per 100 g. Na.	K.	Ca.	Mg.	Fe.	Cu.	P.	S.	Cl.	Acid-base balance, c.c. per 100 g. N/10 Acid.	N/10 Alkali.
1	All-Bran, Kellogg's ..	13·8	4·5	58·0	336	(1210)	955	82·1	420·0	10·80	0·46	815	182·0	(2020)	43	
2	Arrowroot	0·4	0·1	90·6	374	4·8	18	7·0	7·8	1·95	0·22	27	1·6	7·1	4	
3	Barley, pearl, raw ..	8·4	1·7	81·3	384	2·6	123	9·7	20·2	0·67	0·12	206	107·0	105·0	175	
4	Barley, pearl, boiled ..	2·9	0·6	27·6	130	0·8	40	3·4	6·8	0·23	0·04	70	36·5	35·8	60	
5	Biscuits, cream crackers	9·3	33·0	57·5	579	(438)	128	17·9	19·0	0·96	0·15	82	77·8	(705)	53	
6	Biscuits, digestive ..	10·5	20·5	66·0	505	(435)	312	43·6	32·0	1·57	0·23	134	72·0	(432)		65
7	Biscuits, plain mixed ..	8·1	13·2	75·3	465	(244)	170	45·4	14·3	1·24	0·08	41	83·4	(260)		33
8	Biscuits, rusks	6·6	8·4	73·7	408	(206)	280	86·6	27·3	2·66	0·21	81	107·0	(174)		59
9	Biscuits, sweet mixed ..	6·1	30·7	66·5	583	(216)	136	27·2	14·0	0·83	0·12	66	31·8	(371)	13	
10	Biscuits, water	11·8	12·5	72·8	462	(472)	142	22·1	18·9	0·94	0·08	87	100·0	(678)	40	
11	Bread, currant	7·0	3·4	45·8	248	(164)	250	37·6	24·7	2·35	0·09	121				
12	Bread, Hovis	11·4	3·7	40·6	248	(455)	243	27·5	78·8	2·95	0·09	257				
13	Bread, Hovis toasted ...	13·6	4·4	48·4	296	(541)	289	32·8	93·8	3·52	0·11	306				
14	Bread, malt	9·1	3·3	49·4	271	(275)	381	53·0	77·8	3·21	0·06	253				
15	Bread, white	7·9	0·7	53·7	260	(444)	115	23·1	22·1	1·00	0·07	73				
16	Bread, white toasted ..	9·4	0·8	63·8	308	(528)	137	27·5	26·3	1·19	0·08	87				
17	Bread, white fried	7·0	37·2	47·5	570	(393)	102	20·7	19·9	0·89	0·07	66				
18	Bread,								80·0	2·70	0·16	213				
19	Bread,								95·2	3·22	0·19	254				
20	Cornfl								16·5	2·80	0·09	58				
21	Cornfl								7·2	1·43	0·13	39				
22	Custar															
23	Flour,								23·7	0·92	0·07	102				
24	Flour,								101·0	2·96	0·38	245				
25	Force								148·0	3·98	0·36	339				
26	Grape								153·0	5·64	0·19	333				

COMPOSITION PER 100 GRAMMES

27

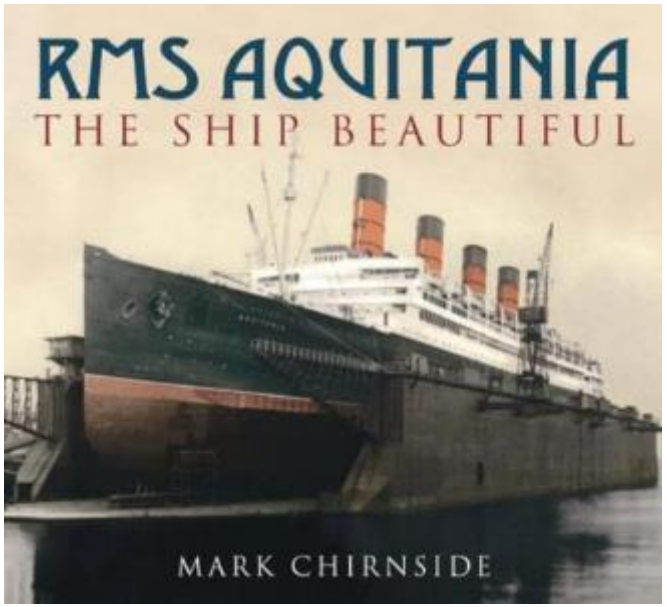
Elsie: “The man who makes no mistakes does not usually make anything.
He certainly does not make food tables.”

“I sometimes think that of all the various aspects of nutrition I have dabbled in, my first venture, on the composition of foods, will be the longest lasting.”



2014

Deviation Example 2: In 1936 Elsie goes to America to tell them they are doing their food tables wrong!



Nutrition Today (2016) 51, 93-101

Elsie travels April 15th 1936; her trunk still not arrived on May 6th

Washington, Iowa City, Ames, Michigan, New York

In 1936 Elsie tells the Americans (USDA) they are wrong because they only compile data

Elsie: “They are quite aware that they are open to criticism that they are not doing any practical work on food analysis, but they feel their collection of data is a full time job…”

Miss Charlotte Chatfield, USDA

“I remember Miss Chatfield and I discussed whether it was better for compilers like herself to prepare tables from the published work of others, or for people like myself, who had analysed the foods, to make the tables.”

“I was in my 20s at the time and very much Miss Chatfield’s junior. She was rather a forceful person and thought she had won the argument, but she did not convince me!”

1940
Dear Elsie,
Your book arrived some weeks ago and I am certainly proud to know you. I can appreciate the amount of work this represented, probably better than people who have worked in other fields.

I am especially impressed with the fact that there is nothing wrong with it, so far as I can tell.

You know from past experience that I am always finding fault with publications in this field.

Charlotte Chatfield

CBBC: Absolute Genius with Dick and Dom

Elsie appears in the same series as:
Isaac Newton,
Leonardo da Vinci,
Michael Faraday,
Isambard Brunel

https://www.youtube.com/watch?v=ThMMAGxoQos

Repetition

Dictionary definition =

the action of repeating something that has already been said or written, the recurrence of an action or event.

Elsie: “vary your conditions”

Repetition Example 1: Early studies of mineral requirements in Cambridge (1938)

"We had injections of iron, calcium and magnesium at the same time. We had one needle with a bit of rubber band tubing on the end and three other syringes sticking into it.

We sat in an armchair every morning and injected ourselves, pushing each syringe ourselves."

Repetition Example 1: Early studies of mineral requirements

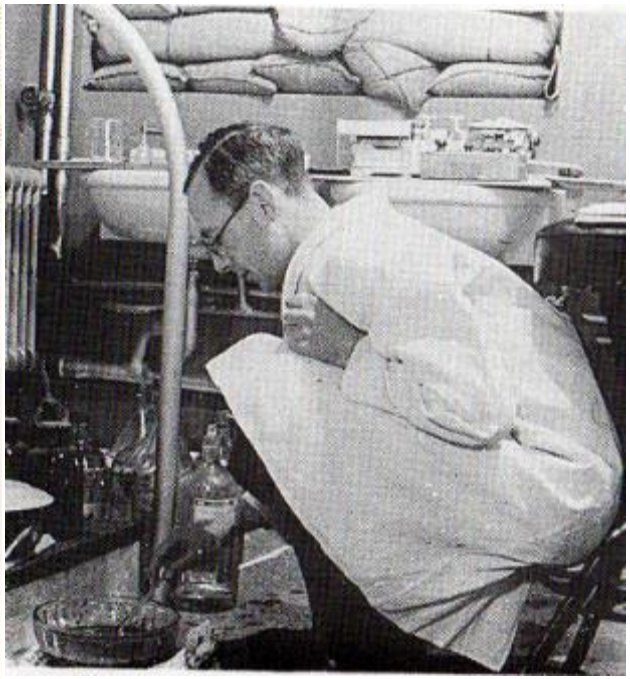
Mac: "You remember that dreadful Saturday afternoon when we had injected some strontium lactate into each other just before lunch to find out how we would excrete it.

After about forty minutes we started to have the most dreadful pyrogen reactions. We lay rolling about on that floor in misery."

Maybe best not to repeat !

Stop press : to appear in Science Museum Permanent Gallery. From Sept 2019 for 25 years

Repetition example 1: Practical Experiments in Cambridge on mineral requirements which led to calcium fortification of flour (1940)



"We measured our intakes and excretions of calcium and of other substances on various breads and we found that there was something (phytate) in wholemeal bread that interfered with the absorption of calcium".

Elsie's Science not always translated into Policy because of Lobbyists

What the science said:

Type of flour	extraction	Calcium needed per 100g flour
White flour	69%	65mg
National loaf flour (like brown)	85%	120mg
Wholemeal	92%	200mg

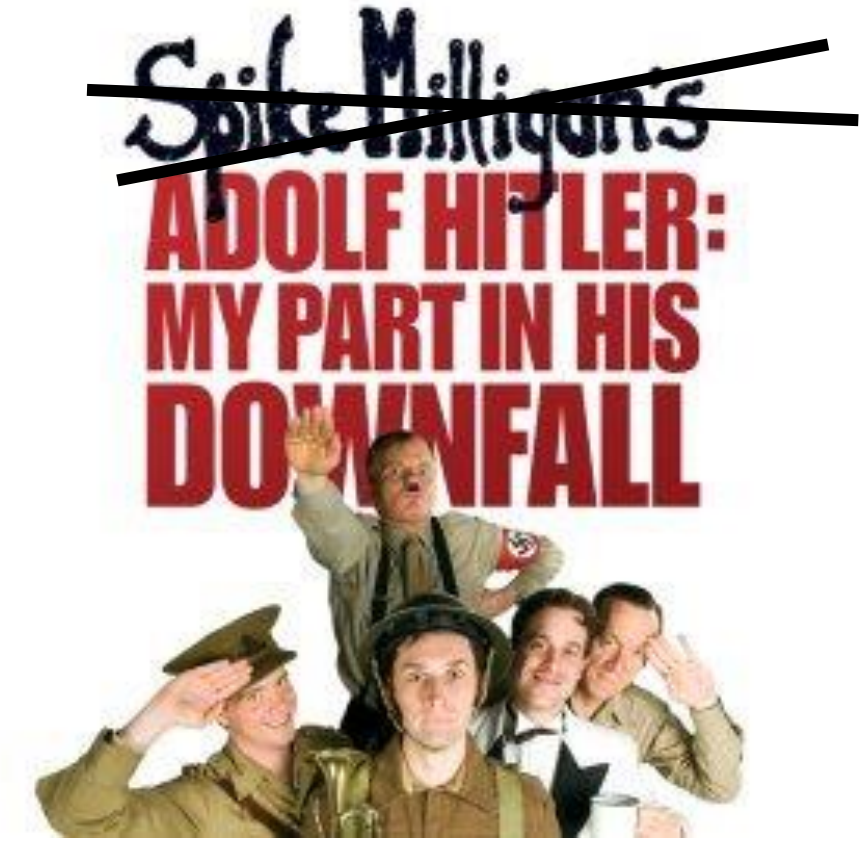
Isaac Harris: The Calcium Bread Scandal,1942
"Over 40 million human beings are compelled to swallow a substance which in excess is a slow acting poison (calcium). We must organise to resist tyranny such as this . It is vital that the overwhelming majority of the population shall join in the protest. If all of us do our duty, we are sure to get rid of the calcium"

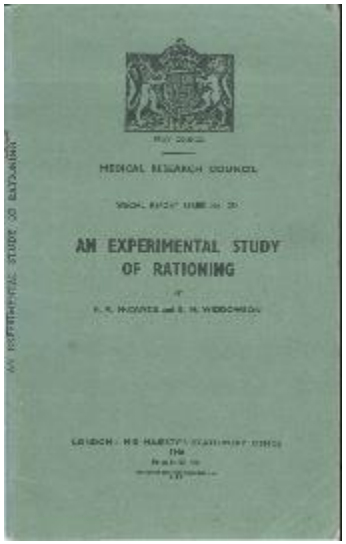
What the policy was:

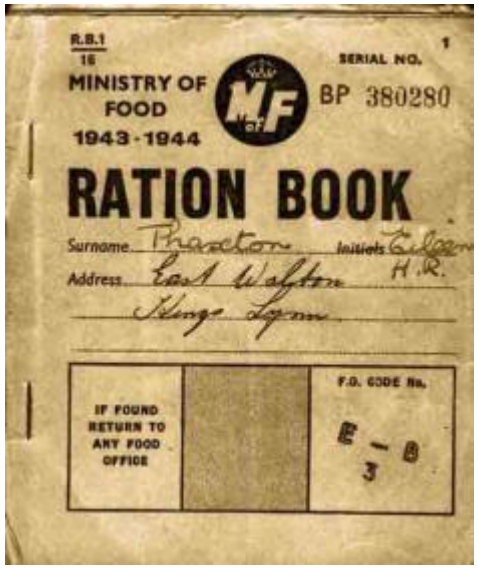
Calcium is only added to the white and brown flours and is still there today. Wholemeal flour, that needs it most, has never been fortified with calcium.

Repetition Example 2: McCance and Widdowson's Research on Rationing.

Elsie Widdowson's







Published 1946

Testing possible wartime rations in Cambridge in 1939

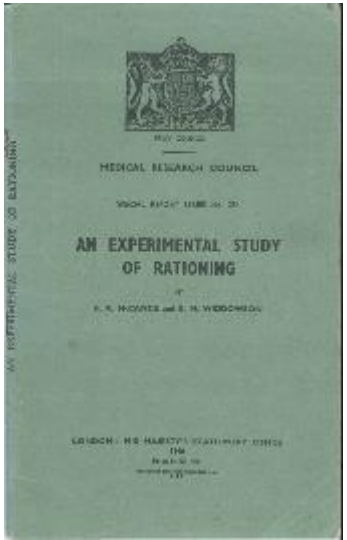
Elsie: “ We all felt we must do something to further the war effort.
So we put ourselves and others (in Cambridge) on the sort of rations that we thought this country would be able to provide for the population.
I remember planning them and making them in the end much more severe than the country ever had to face.”

“Bread, potatoes and vegetables were unrationed;
meat, fish and poultry (combined) were limited (per person per week) to 16oz, 5oz sugar, 1egg, 4oz fat and cheese, 35oz milk”

Repetition
Elsie: “After 3 months we felt so strong that we decided to go to the Lake District to test our physical fitness.”

McCance and Widdowson repeating the testing of rations in the Lake District 1940

Mac: "My longest day in that fortnight was when we covered 36 miles and there was 7000 feet of up and down in it. We did it at an average speed of three to three & a half miles an hour including stops."



Official report to Government in March 1940; only published Jan 1946

Hesitation

Dictionary definition

=Pausing before saying or doing something

Elsie: “If your results seem impossible, think and think again”

Hesitation example: McCance and Widdowson studies in post war Germany demonstrate hesitation

Wuppertal Hospital, 1946-9

Special Articles

MENTAL CONTENTMENT AND PHYSICAL GROWTH

E. M. WIDDOWSON
D.Sc., Ph.D. Lond.

From the Medical Research Council Department of Experimental Medicine, Cambridge

THE observations of Beaumont (1833) on his long-suffering subject, Alexis St. Martin, a Canadian trapper who had had a gunshot wound which resulted in a gastric fistula, showed for the first time "the effect of violent passion on the digestive apparatus." Later, Pavlov (1910), Alvarez and his associates (see Alvarez 1929), and many [illegible] tributions to our knowle[illegible]tions on the processes of [illegible] no scientific doubt that the secretion of the digestive juices may be induced by pleasurable emotions and inhibited by unpleasant ones. It has also been shown that painful emotions will hinder the movements of the digestive tract and that food may remain in the stomach many hours longer than normal if a person becomes frightened or angry after he has eaten a meal.

Lancet 1951

"We weighed and measured the children regularly in two orphanages for 6m while they lived on their same German rations."

"We planned, at the end of the first 6 m, to provide unlimited bread, with some margarine and jam to spread on it, to the children in Home A while nothing extra was to be given to the children in Home B."

Same food supplied- but those in Home A grew better than those in Home B

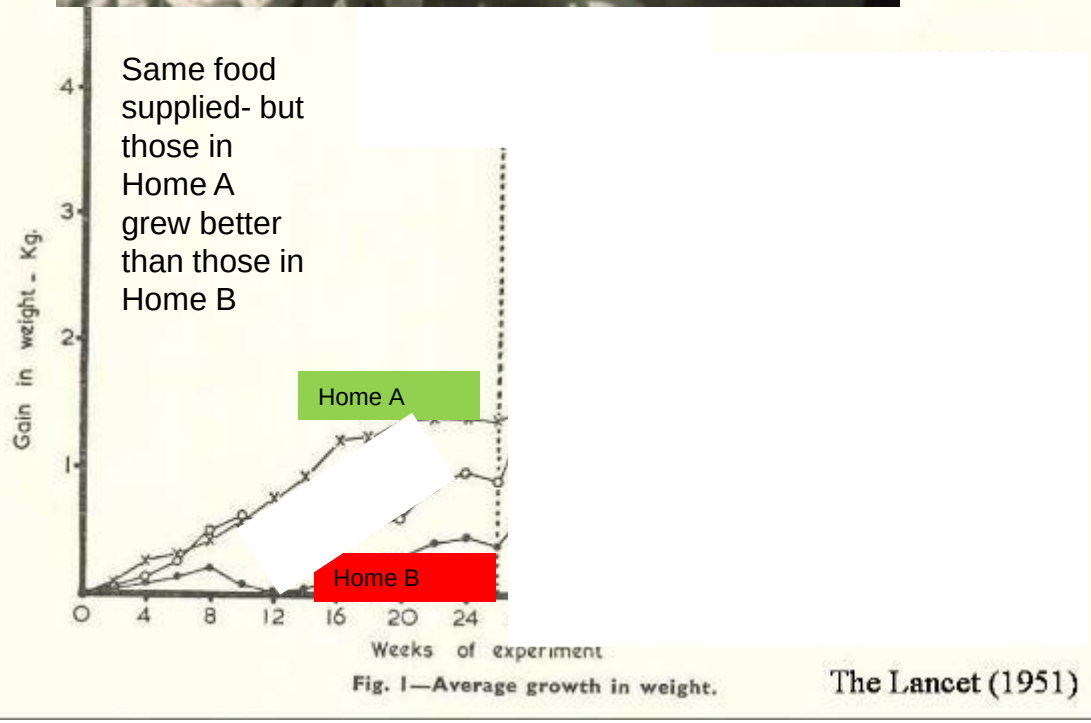


Fig. 1—Average growth in weight. The Lancet (1951)

"We found that during the first six months, when no extra food was supplied, the children in Home (A) were growing faster in height and weight than those in the other Home (B).

It so happened that we had chosen Home (A) to receive the extra food, and we had to go on with our plan.

"To our astonishment the children in Home A, who had originally grown faster and now received the extra food, immediately began to grow more slowly, while those in Home B began to grow rapidly in weight and height, although they had nothing but their German rations."

During first 6m, no extra food supplied but those in Home A grew better than those in Home B

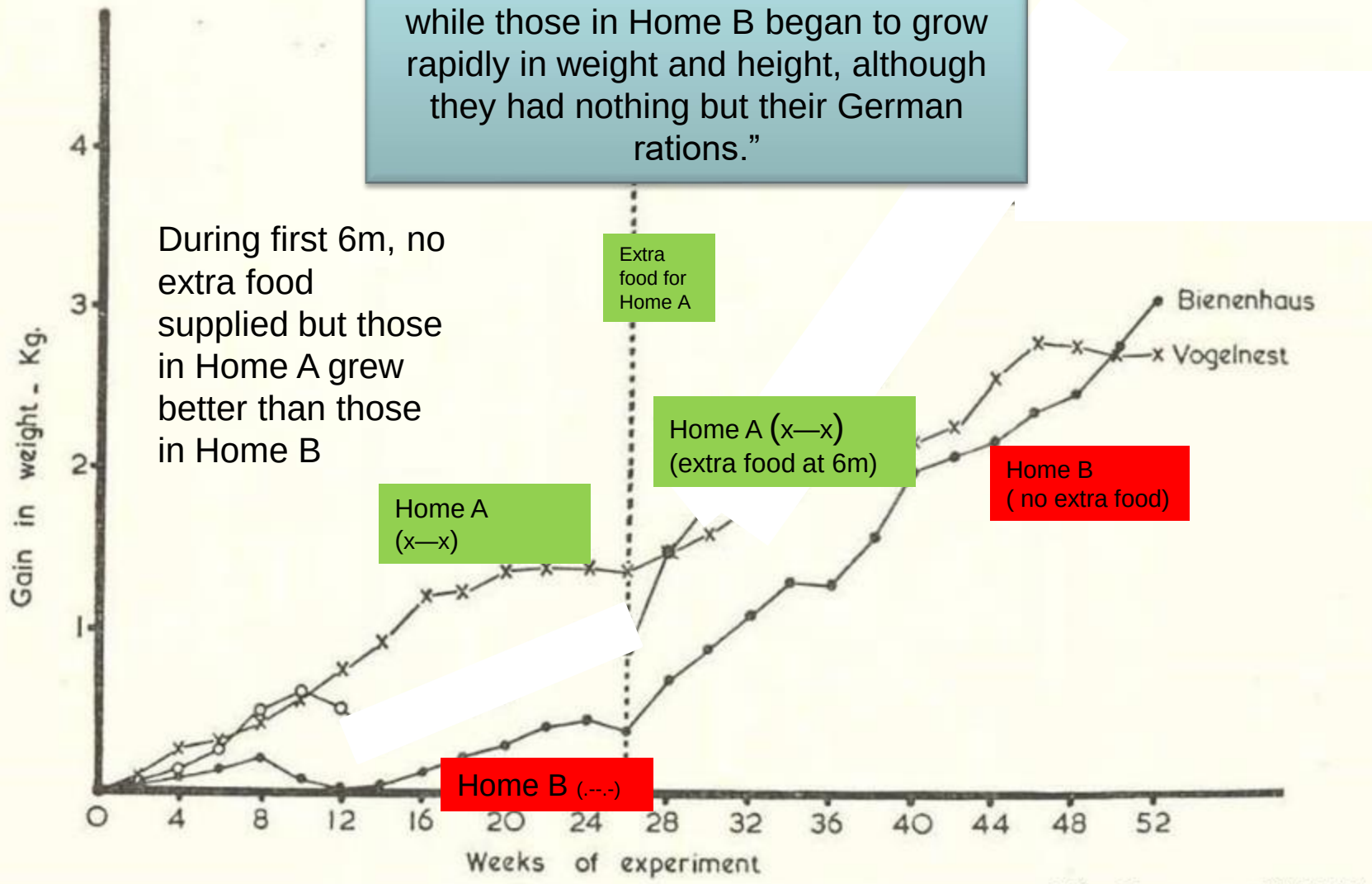


Fig. 1—Average growth in weight.

The Lancet (1951)

Hesitation: “What could the explanation be?

Elsie: “Did the children in Home A eat the extra food?
They did. A dietitian supervised their meals all the time.

Was there some noxious agent that somehow moved from one Home to the other just when we began to give the extra food? There was.

It so happened that the housemother who presided over Home B during the first six months was moved by the authorities to Home A just when we began to give the extra food to Home A.

Thanks to the smartness of our dietitian, we discovered that the housemother was a most unpleasant woman and very unkind to the children.

The unhappiness of the children was sufficient to delay their growth in spite of the extra food.”

“Tender loving care may make all the difference to the successful outcome of a carefully planned experiment.”

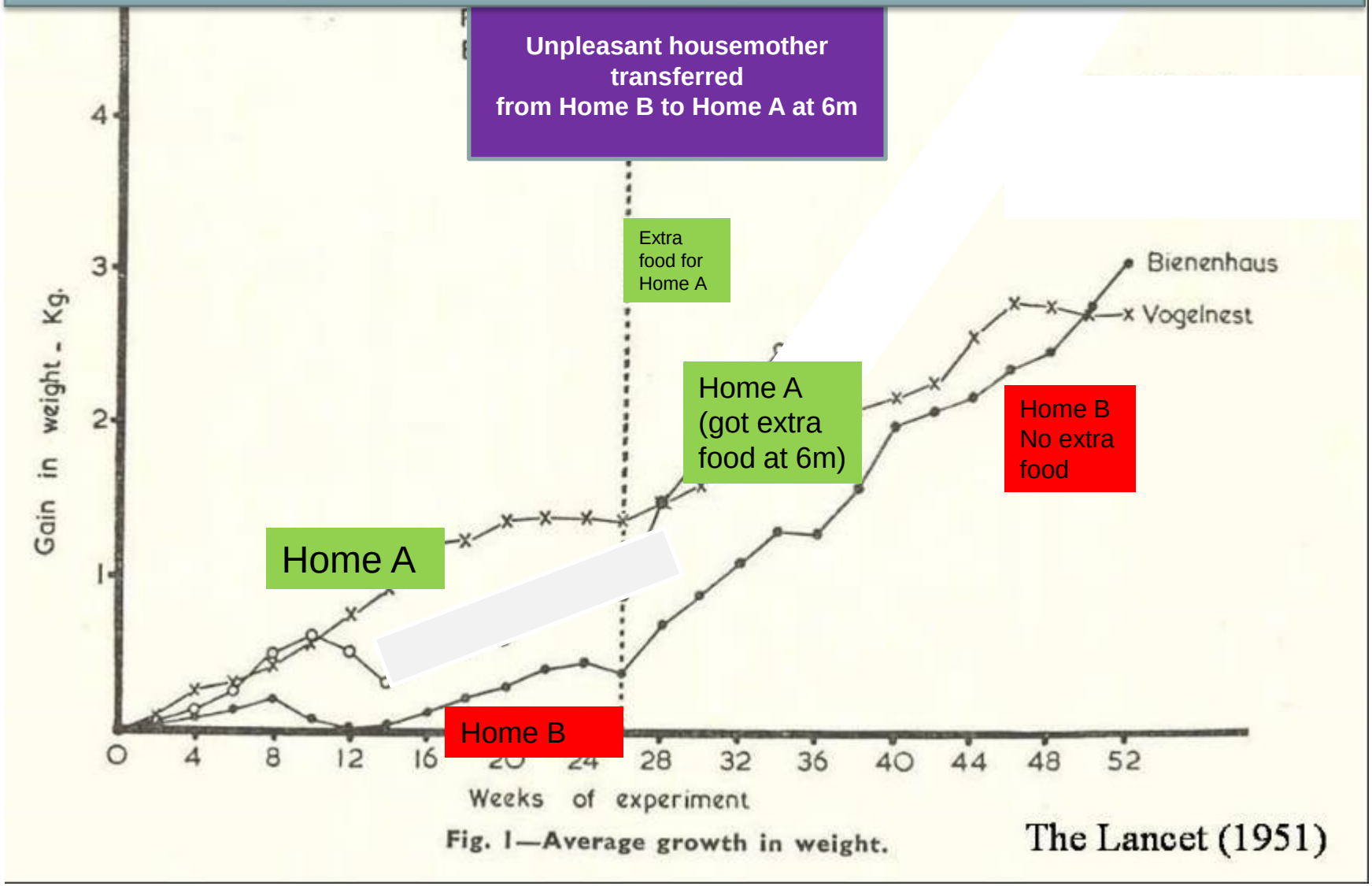


Fig. 1—Average growth in weight.

The Lancet (1951)

Want to know more?

With Helen Sharman
(our first British astronaut)
and Matthew Parris on Great
Lives, BBC Radio 4, 2017

Elsie Widdowson CH FRS

1906 - 2000

Pioneer nutrition scientist

Developed and tested wartime rations with bread made in the bakery formerly on this site

Lived in Barrington

Still available on BBC Sounds

27/6/21