

THE FOUNDERS OF MODERN NUTRITION

# Cleave

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THE FOUNDERS OF MODERN NUTRITION

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*Cleave*

THE FOUNDERS OF MODERN NUTRITION

# Cleave



**Surgeon Captain T L Cleave FRCP**

(1906 - 1983)

by **Kenneth Heaton**

## **Introduction**

Half a century ago the British Medical Journal published an editorial saying 'all the evidence goes to show that the human alimentary tract, from the teeth to the colon, rebels against refined foodstuffs, and in eating a quantity of refined foods people do indeed dig their graves with their teeth.' In 1986 the British Medical Association summarised all the reliable scientific evidence on food and good health now known to us in its report 'Food, Nutrition and Health', recommending 'an increase in consumption of fresh food and vegetables, wholemeal and other bread and cereals generally'.

The McCarrison Society is the British professional association committed to the promotion of good health and the prevention of disease by sound nutrition. To this end the Society has published this paper on one of the founders of modern nutrition, Surgeon-Captain T L Cleave, whose thesis, built on the rock of Darwin's general theory, is that the human race is not adapted to processed food of the type now eaten in Western countries.

Cleave's short book 'The Saccharine Disease' is succinct, and written in language that anybody interested in food and health can readily understand. In this book, his masterpiece, he proposes that many deadly, disabling or disagreeable diseases, such as heart disease, common cancers, diseases of the lower gut, diabetes, ulcers, varicose veins, obesity and tooth decay, are all manifestations of one master 'Saccharine Disease', caused by Western food, overloaded with refined sugar and flour, stripped of fibre, protein, vitamins, minerals and trace elements, and literally unfit for human consumption.

Manufactured food of the type typically supplied to the British Nation is stuffed with cheap processed fats and sugars; and it is no surprise that food manufacturers, and their defenders, reject Cleave's message. But in essentials, Cleave is right. This paper, written by Dr Kenneth Heaton, an authority on Western food and Western health and disease, is offered as an introduction to T L Cleave's own writings.

**Geoffrey Cannon**



Son of a Royal Navy captain and engineer, Peter Cleave (as he was always known) was born in Exeter and educated at Clifton College. Entering the Bristol Medical School at the age of sixteen, he passed his primary FRCS at eighteen but decided to be a physician. He finished his training at St Mary's Hospital and went straight into the Royal Navy. There he was a medical specialist in various hospitals at home and abroad, ending up as surgeon captain and director of medical research until he retired in 1962.

In the 1970s Cleave received international acclaim as the father of the dietary fibre hypothesis, but for twenty years before that he had been an obscure and ridiculed writer. As a boy he had become convinced of the importance of diet to health. His desire to prevent as well as to treat disease was strengthened by his eight-year-old sister's death from perforated appendicitis. At medical school he was taught by Rendle Short, who proposed that appendicitis is caused by lack of cellulose in the diet. At this time also he was profoundly influenced by the writings of Charles Darwin, and henceforth he built all his theories on the rock of the adaptation of species to their environment. His great vision was to see that the human body must be maladapted to the

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artificial foods of civilisation of which the most artificial are the refined carbohydrates, chiefly sugar and white flour. He reasoned that if man avoided unnatural foods he would surely avoid unnatural diseases, that is, diseases absent in wild animals or primitive communities. He spent his life gathering evidence and developing arguments to support this view, which culminated in his grand hypothesis of a range of diseases caused by maladaptation to the foods and drinks containing refined carbohydrate. These diseases include obesity, diabetes, coronary heart disease, peptic ulcer, dental caries, constipation, appendicitis and varicose veins. Since they all had a common cause he viewed them as a single master disease, the Saccharine Disease. His book of this name, published in 1974, sold many thousands of copies. His previous books were 'A Molecular Conception of Organisms and Neoplasms' (3rd edition 1955); 'Fat Consumption and Coronary Disease' (1957); 'On the Causation of Varicose Veins' (1960); 'Peptic Ulcer' (1962); and 'Diabetes, Coronary Thrombosis and the Saccharine Disease' (1966), jointly with G D Campbell; (1969) jointly with G D Campbell and N S Painter. The last of these had a wide readership; the rest were ignored.

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Cleave was slow to achieve recognition for several reasons. At a time when others were learning to trust only randomised trials and probability value, he trusted in the lessons of nature and logical argument. He was recording differences in disease patterns over time and space long before the epidemiology of chronic diseases was a recognised discipline. He looked for big differences and had no use for statistical analysis. He painted with broad strokes on the biggest possible canvas when others were focussing on ever more minute areas of investigation. At his own expense, he published his lofty ideas and findings in books, while ordinary mortals submitted humbly to peer review and the rule of editors. In his crusade he bombarded would-be converts

with letters. His letters were always colourful. Sometimes they had the impact of grapeshot, if not a broadside. Sensitive colleagues and admirers became alienated. He expected complete loyalty and hated criticism.

× Cleave's most effective advocate was Denis Burkitt FRS, already famous in another field, and the meeting of the two men in 1967 was the turning point in the fortunes of Cleave's hypothesis. Burkitt's connections with 150 third world hospitals enabled him to confirm many of Cleave's epidemiological observations and even to add to his list of Western diseases which can be blamed on refined carbohydrate. In articles and spell-binding lectures, Burkitt woke doctors and scientists all over the world to the idea that diets depleted of fibre are harmful to health. ×

The idea of fibre-depletion is inherent in Cleave's concept but he preferred to stress the dangers of sugar, the fibre-depleted extract of sugar cane and sugar beet. Burkitt and his physician colleague in East Africa, Hugh Trowell, tended to emphasise the positive virtues of a high intake of fibre and especially of bran. But Cleave was the pioneer here too, because in 1941 he had been one of the first to advocate raw bran in medical practice. While serving on the battleship King George V he had sacks of bran brought on board to combat the constipation which was prevalent in the sailors, deprived of fresh fruit and vegetables. Bran was so effective that Cleave became known throughout the navy as 'the bran man'. Research has shown that bran has other valuable properties and its use has spread widely. But it is a serious distortion of Cleave's idea to call it the bran hypothesis. His message is not that we should add fibre to our food (unless we need a laxative) but that we should stop taking fibre out of it.

1979 was his *annus mirabilis*, when he was awarded the Harben gold medal of the Royal Institute of Public Health and

Hygiene (previously awarded to Pasteur, Lister and Fleming) and the Gilbert Blane medal for naval medicine, which is awarded jointly by the Royal College of Physicians and Surgeons but never before to a retired man. A few months later, the Royal College of Physicians published its report 'Medical Aspects of Dietary Fibre' which largely vindicated Cleave's theory and summarised the large body of scientific research which it had stimulated.

But the full implications of overnutrition, and the role of fibre-depleted foods in causing it, have not received the emphasis which Cleave believed they deserved. His last work, published in 1977, was an article entitled 'Overnutrition, now the most dangerous cause of disease in westernised countries'.

Cleave was certainly one of the most original medical thinkers of the twentieth century. His rare combination of panoramic vision, piercing logic and bulldog tenacity deserves the title of genius. He was a true pioneer who started a major revolution in scientific thought.

### **The Cleave hypothesis now**

I wrote the above in the year Cleave died in 1983. How have his ideas stood the test of time? One answer is that the decade or so since Cleave's last publication are too short a time to allow adequate testing of his ideas, and this is true. But, sadly, it is also true that very few people have sought to test the ideas or even to debate them in a scientific manner. Nevertheless, it is possible to evaluate the progress and current status of his thinking and his great theory.

What follows is a personal assessment but, I hope, a fair one. Where possible, it is based on scientifically designed experiments and epidemiological studies.



## **The evolutionary foundation**

The Darwinian theory of natural selection leading to close adaptation of species to their natural environment is the bedrock on which Cleave built and this rock is unshaken. Darwinism is inviolate and will surely remain so.

## **Maladaptation to modern diets**

Cleave's most basic idea is that the diet of modern man is very different from the diet to which the human body is adapted. Food had changed too fast in recent centuries, especially in the last hundred years, for homo sapiens to have had time to adapt. This idea has received powerful support from the studies of Eaton and Konner<sup>11</sup> into the diets of stone-age people. By an ingenious combination of methods they have been able to reconstruct these diets and to calculate their nutritional content. A striking difference between stone-age diets and modern diets is their high fibre content, averaging 15g of Southgate fibre per 1000kcal (assuming 65 per cent of the calories came from plant sources, 35 per cent from meat). Of course, stone age people ate no flour and also no sugar except that naturally present in fruits and vegetables. Honey was but an occasional treat. We can be sure that the food of stone-age people required a lot of chewing.

## **Refined carbohydrates and their ill effects**

Cleave regarded refined carbohydrates as the most changed foods of modern people and therefore the ones to which we are most vulnerable in terms of maladaptation. The main examples of refined carbohydrates in Western countries were white flour and sugar (white or brown). By logical reasoning he classified the

ill effects of refining into four types. First, reduction in fibre intake leading to constipation and all its ill effects, especially diverticular diseases. Second, concentration of carbohydrate leading to too rapid consumption and too rapid absorption of sugars from the gut, resulting eventually in exhaustion of the pancreatic islets (which secrete insulin in response to absorbed glucose) and hence to diabetes mellitus; overnutrition also leads to coronary heart disease and to overgrowth of certain bacteria in the intestine. Third, stripping of protein leads to peptic ulcer. Fourth, dental caries and periodontal disease are due largely to sticky combinations of sugar and white flour. ✕

The term 'refined carbohydrate' has not become accepted in scientific circles. It is perhaps prone to misunderstanding since it seems to imply that white flour and white rice are 100 per cent carbohydrate (the true figure is about 70 per cent). By lumping together white rice and sugar it suggests that white rice resembles sugar more than it resembles brown rice. Even the term 'refined sugar' means different things to different people. An alternative term 'fibre-depleted food' has been suggested<sup>(2)</sup>. I like it because it preserves Cleave's idea of a process which selects for human consumption the calorie-rich, fibre-poor part of a plant and rejects the calorie-poor, fibre-rich part, but the term fibre-depleted has not so far received wide currency.

The thinking of many nutritional and biomedical scientists is limited by a chemistry-dominated approach. They find it hard to accept the simple, physical concept of fibre-depletion or carbohydrate-refining. For example, two recent quasi-official reports on sugars and health<sup>(3, 4)</sup> have made no reference to the crucial difference between extracted or fibre-depleted sugars and sugars naturally present in fruit and vegetables. Some scientists speak of added as opposed to natural sugars but as I see it, the crucial distinction is between extracellular and intracellular

sugars, since it is the presence or absence of cellular packaging which decides how easily sugars are eaten and how fast they are absorbed.

With confusion reigning over the names of the foods themselves it is hardly surprising that the concept of refined carbohydrate-induced disease has made little headway. The term 'Saccharine Disease' has not caught on at all.

## f x Sugar

Official-sounding bodies in both the UK and the USA have recently published anodyne reports on sugars and health<sup>(24)</sup> but in Britain there is still a vigorous debate which includes the government's Committee on Medical Aspects of Food (COMA), due to report in 1989. We must not expect too much of this report. Committees are always cautious and tend to escape contentious issues by falling back on the verdict Not Proven. With chronic human diseases it is almost impossible to prove the cause and most dietary studies are easy to criticise on technical grounds.

✧ But the lesson of the teeth is there for all to learn and today's debate about sugar and the teeth does not concern whether it is harmful but why, when and how it is harmful. Perhaps one day the scientific debate about sugar and non-dental health will move on to the same plane but at the moment there is little sign of it doing so. ✧

## f v Dietary fibre

✧ The one aspect of the Cleave hypothesis which has achieved wide, if not universal, recognition is dietary fibre. It is now accepted as an important constituent of food and as the part of our diet which most directly affects the function of the large

bowel.\* This is not wholly new of course. Hippocrates knew that brown but not white bread was laxative 2400 years ago. But we now know that the essence of this laxative property is the family of sugar polymers (polysaccharides) which form the plant cell wall. There have been many international conferences on fibre in the last fifteen years and many books published. This would not have happened without Cleave. Of course it needed the dynamism and international reputation of Burkitt to start this flood of academic activity but it also needed the patient, less publicised, work of Alexander Walker, Hugh Trowell, Neil Painter, David Southgate, John Cummings, Martin Eastwood and many others to gain scientific credibility for dietary fibre. Now fibre is a major industry in both scientific and commercial terms, and every official guide to healthy eating encourages fibre-rich foods.

f † Dietary fibre has succeeded for many reasons. One of them is that people are happy to be told they should add something to their diet. It is quite easy to add something and every time you eat it you feel you are doing yourself good. No wonder people talk about a bran wagon! But there is danger in this approach. Adding bran to a refined diet does not convert it into an unrefined diet. As I said earlier, the essence of Cleave's message is not that we should add fibre to our food but rather that we should stop taking fibre out of it. X

All the same, adding bran to the diet, or eating wholemeal bread instead of white, does prevent constipation in many people and, doubtless, prevents haemorrhoids and other anal problems. The evidence is now quite good and widely accepted that a high fibre diet reduces the risk of diverticular disease of the colon. However this is of limited importance to the public health since diverticulosis of the colon as such seldom causes symptoms. Certainly it causes illness when a diverticulum ruptures but this is quite a rare event. Otherwise, the pain and bowel symptoms

which trouble someone with diverticular disease are those of constipation or coincidental irritable bowel syndrome. The role of diet in the latter is controversial.

## Dietary starch

† An important extension of the dietary fibre concept has occurred since Cleave died. We now know that a small but significant fraction of the starch we eat, perhaps 10 per cent on average but ranging from 2 to 20 per cent, escapes absorption and passes into the large bowel. This is important because, as far as the colon is concerned, starch is similar to fibre. Like a third of the fibre in bran and most of the fibre in fruit and vegetables, starch is fermented by bacteria in the colon. The more nourishment bacteria are given the more they multiply so, on a high-fibre diet, we excrete more bacteria in the faeces. ✕

This is one of the main reasons why a high fibre intake makes the stools bulkier and softer (stools are largely composed of bacteria, dead or living but harmless). Since starch is good nourishment for bacteria a high starch diet should also have a laxative effect (especially in someone who allows 20 per cent rather than 2 per cent of his starch into his colon). So far only one experiment has been published to show that starch is laxative but if this is confirmed we shall have to think again about the lack of constipation and of bowel disease in developing countries. It could be due less to fibre than to a high intake of cheap, starchy foods like rice and maize (which are increasingly eaten in refined or fibre-depleted form).

The emerging starch story may seem to weaken the Cleave hypothesis but it does not really do so. The essence of the hypothesis is that the more a food is processed away from its natural state the more likely it is to be harmful to health. We get

most of our starch from cereals or grains and the cereal foods we eat today are very different from the cereal foods eaten down the ages by peasant farmers. The biggest difference is in the size of the particles. Early man pounded his wheat, rye, barley, oats, millet or sorghum in mortars to make a crude meal, more like kibbled wheat than flour as we know it. When the ancient Egyptians invented millstones it became possible to make flour but this would have been coarsely ground by modern standards. Gradually stone-milling technology improved till skilled millers could make a really fine powder but such flour would have been expensive. Probably it is only in the last two or three hundred years that really fine flour has been widely available and cheap. The advent of the steel roller-mill in the 1870s is often blamed as the main disaster in the story of flour and health but, as I see it, all the roller-mill did was to increase the separation of bran from flour. I do not belittle the importance of bran but I do suggest that the most important change in 'the staff of life' had occurred gradually in earlier centuries as stone millers learned how to produce ever finer and finer flour.

In Bristol we have done experiments which show that wheat starch and maize starch are digested much more rapidly if the grains are milled into flour than if they are simply cracked into pieces before being cooked<sup>69</sup>. With wheat we went further and showed that the flour is digested more rapidly if it is ground into the familiar fine powder than if it is ground into a coarse flour like that used traditionally to make soda bread in Ireland. We suggest that this coarse flour is more like what our ancestors ate than what we eat today.

The point of this experiment is that the more rapidly we digest our food the more rapidly does glucose (the sugar unit of starch) enter the blood stream and the more insulin does our pancreas have to push in to the blood to keep the plasma glucose

(blood sugar) within limits. Cleave argued that absorbing glucose too quickly is harmful (for example it puts a strain on the pancreas and leads eventually to diabetes). This proposition has not been proved but it is still plausible and, if it is true, the finger of suspicion must point at excessively digestible starch as well as sugar, and the main way in which starch is made ultra-digestible is by milling wheat into powder-fine flour. This idea does not appear in Cleave's writings but it does not in any way contradict or belittle them. Rather it strengthens his underlying concept that the more we change our food from its natural state the more we should question the ability of our bodies to adapt to it safely.

### **Getting too much out of food**

Many years ago, soon after I had met Cleave, I entered an essay competition on the subject 'Getting the most out of food'. I wrote an essay on Cleave's ideas and provocatively called it 'Are we getting too much out of food?'<sup>(6)</sup>. I stressed that the human digestive system like that of all animals is designed to cope with rough, tough, unprocessed foods and it is courting trouble to provide it only with soft, highly processed foods. I drew an analogy with a factory designed and staffed to process iron ore into steel. If it were supplied with semi-refined iron instead of ore, part of the work force would be idle and idleness leads to trouble. In the human body an underused organ is more likely to get diseased than a fully used one. Good examples are the teeth and the heart. On a fibre-depleted, ultra-digestible diet the digestive system is under-used and the most under-used parts are the lower reaches, the ileum and especially the colon. And it is the ileum and, especially, the colon which are the parts of the gut most prone to unexplained disease in western countries (with the exception of peptic ulcer). Is this just coincidence?

## Peptic ulcer

Cleave believed that peptic ulcer, especially duodenal ulcer, is caused by eating carbohydrate stripped of the acid-buffering protein which always accompanies it in nature. This idea has not been accepted, partly because the buffering power of the protein is too small (and, in any case, protein rather than carbohydrate stimulates the stomach to secrete acid) and partly because peptic ulcer has been shown to occur in some third world communities which eat no refined carbohydrate. But Cleave was partly right. No-one can disprove his evidence that, in Japanese prisoner-of-war camps, it was only those in which the rice given to the men was polished white rice that ulcer symptoms were a problem. We now know that the outer layers of rice contain a lipid-soluble substance which has anti-ulcer properties and this is present in other whole foods but not in white flour or, of course, in sugar<sup>(7)</sup>. Furthermore, a study in Denmark has shown that, after duodenal ulcers have been healed, the ulcers are much less prone to recur if the diet is rich in whole-grain foods than if it is refined<sup>(8)</sup>. Perhaps Cleave was right for the wrong reasons.

## Overnutrition

Cleave's last published statement was that overnutrition is now the most dangerous cause of disease in westernised countries.

I believe he was right, because like him I suspect that overnutrition is a major factor in the most important killing disease of our time, coronary heart disease. I also suspect that overnutrition is a major factor in several of our most common cancers—cancer of the colon, cancer of the breast, cancer of the uterus, cancer of the ovaries and cancer of the gallbladder. There is not space to present all the evidence and arguments. Suffice it



to say that cancer experts agree that, in laboratory animals, by far the most effective way of preventing cancer is to reduce calorie intake.

For example if rats are allowed to eat only 70 to 80 per cent of the chow which they would normally eat they become almost immune to cancer. In the wild, animals get very little cancer and, in the wild, they do not overeat. Cleave pointed this out in forthright and vivid language. 'No wild rabbit ever ate too much grass, no wood-pigeon ever ate too much wheat, and no herring ever ate too much plankton'. But caged rats given processed foods do overeat. Given doughnuts and biscuits they actually get fat. Standard laboratory chow is made from milled cereals (already chewed, as it were) and limiting the intake of chow is just a substitute for the natural limitations of having to search out and chew up the food.

Some people react to the calorie-restriction story by saying that human beings cannot be expected to under-eat all their lives in the distant hope of avoiding cancer. Of course they cannot. But people on a typically western diet do not need to under-eat to cut their calories by 20 per cent. All they need to do is to exclude refined sugar (fibre-depleted sugar, added sugar). ✕

Cleave argued that this must be so. In Bristol we have shown that it is so. In two separate sets of experiments involving 2,100 person-days of observation we found that, when people ate to satisfy their appetite on a diet which excluded refined sugar, they unconsciously reduced their calories by 20 per cent on average compared with when their diet contained about 100g sugar daily (which is about the national average)<sup>9, 10</sup>. Another way of interpreting these experiments is to say that when people use sugar in their diet to the extent that is commonly used in this country they unconsciously increase their calorie intake by 24 per cent on average. To judge from the animal data this must

increase their risk of cancer. Of course, it must also increase their risk of obesity and of the diseases which go with being overweight, like diabetes, gout and gallstones.

✕ Why does sugar make people take in more calories than they need? Cleave said—look at a sugar-beet, contrast the difficulty of eating two and a half pounds of sugar beet with that of consuming the five ounces of sugar which can be extracted from it (five ounces being the average daily consumption of sugar in Britain). He exaggerated a little here; average daily consumption of sugar is nearer the equivalent to one and a half pounds of sugar beet, but the point remains—who would eat one and a half pounds of sugar beet a day? Cleave also said—contrast eating an apple with drinking an equivalent amount of sugar in tea, that is, two teaspoonfuls. ✕

I like the last idea so much that, in 1977 with the help of three colleagues, I did an experiment comparing apples with apple juice made from the same batch of apples<sup>100</sup>. Volunteers were given sugar-equivalent breakfasts consisting of whole fruit or fruit juice and, on a third occasion, puréed fruit. They were asked to rate their feelings of fullness on a scale of 0 to 10 during the three hours after each test meal. As you would expect they felt much fuller after the apples than after the juice, with puréed fruit intermediate. We also found that the sugars in the meal were absorbed most rapidly from the juice and the blood insulin rose highest, while again the purée was intermediate. ✕

Cleave would have predicted these findings because he would have agreed that fruit juices are a very unnatural food and machine-homogenised purée is unnatural too. Sugars should be chewed or eschewed. Otherwise, said Cleave, they lead to 'deception of the taste-buds in the tongue and also to deception of the instinct of appetite (perhaps through lack of distension in the stomach) ... it is the unnaturalness that governs the deception

of the tongue and appetite, and therefore the danger of over-consumption'.

### **Nature, naturalness and whole foods**

Scientists tend to scoff at words like 'nature' and 'naturalness' because they are so vague and hard to define. But Cleave put his faith unashamedly in nature. He liked to quote from classical writers and his favourite quotation was from the Roman poet Horace 'You may drive out Nature with a pitchfork, but she will ever hurry back, to triumph in stealth over your foolish contempt' (Epistles, Book I, X, 24). Cleave's basic argument was that to preserve health you must eat foods which, apart from being cooked, are as near their natural state as possible. There is now abundant experimental work (some of which I have reviewed) to show that the more our sugar-containing and starch-containing foods are processed the faster we eat them, the faster we digest them and the less we leave for our intestines to work on. The bypassed teeth rot, the over-nourished body swells and the under-used intestine stops work or turns malignantly on its owner. Is this the last laugh of the pitchforked Nature?

## References

1. Eaton SB, Konner M. Paleolithic nutrition—a consideration of its nature and current implications. *N Engl J Med* 1985; 312: 283-9.
2. Trowell H, Burkitt D, Heaton K, eds. *Dietary Fibre, Fibre-depleted Foods and Disease*. London: Academic Press, 1985.
3. Glinsmann WH, Irausquin H, Park YK. Evaluation of Health Aspects of Sugars Contained in Carbohydrate Sweeteners. Report from FDA's Sugars Task Force. *J Nutr* 1986, 116: Suppl 11S, S1-S216.
4. BNF Task Force on Sugars and Syrups. *Sugars and Syrups*. London: British Nutrition Foundation, 1987.
5. Heaton K W, Marcus SN, Emmett PM, Bolton CH. Particle size of wheat, maize and oats test meals: effects on plasma glucose and insulin responses and on the rate of starch digestion in vitro. *Am J Clin Nutr* 1988; 47: 675-82.
6. Heaton K W. Are we getting too much out of food? *Nutrition (London)* 1973; 27: 170-83.
7. Tovey F. Duodenal ulcer. In: Trowell H, Burkitt D, Heaton K, eds. *Dietary Fibre, Fibre-depleted Foods and Disease*. London Academic Press, 1985: 229-40.
8. Rydning A, Berstad A, Aadland E, Odegaard B. Prophylactic effect of dietary fibres in duodenal ulcer disease. *Lancet* 1982; 2: 736-9.
9. Thornton J R, Emmett P M, Heaton K W. Diet and gall stones: effects of refined and unrefined carbohydrate diets on bile cholesterol saturation and bile acid metabolism. *Gut* 1983; 24: 2-6.
10. Werner D, Emmett P M, Heaton K W. The effects of dietary sucrose on factors influencing cholesterol gallstone formation. *Gut* 1984; 25: 269-274.
11. Haber G B, Heaton K W, Murphy D, Burroughs L. Depletion and disruption of dietary fibre. Effects on satiety, plasma-glucose, and serum-insulin. *Lancet* 1977; 2: 679-82.

## Bibliography

- Burkitt, D, Trowell H (eds). Refined Carbohydrate Foods and Disease: Some Implications of Dietary Fibre. London: Academic Press. 1975.
- Burkitt D. Don't Forget Fibre in Your Diet. London: Martin Dunitz. 1979.
- Cleave T. A Molecular Conception of Organisms and Neoplasms. Bristol: John Wright, 1932.
- Cleave T. The neglect of natural principles in current medical practice. *J Roy Nav Med Serv* 1956; 42/2: 55-63.
- Cleave T. Fat Consumption and Coronary Heart Disease. Bristol: John Wright, 1957.
- Cleave T. On the Causation of Varicose Veins. Bristol: John Wright, 1960.
- Cleave T. Peptic Ulcer. Bristol: John Wright, 1962.
- Cleave T, Campbell G. Diabetes, Coronary Thrombosis and the Saccharine Disease. Bristol: John Wright, 1966.
- Cleave T. The Saccharine Disease. Bristol: John Wright, 1974.
- Cleave T. Over-consumption. Now the most dangerous cause of disease in Westernised countries. *Publ Hlth, Lond*, 1977; 91: 127-131.
- Department of Health and Social Security. Nutritional aspects of bread and flour. Committee on Medical Aspects of Food Policy. London: HMSO, 1981.
- Heaton K (ed). Dietary Fibre. Current Developments of Importance to Health. London: John Libbey, 1979.
- Heaton K. T L Cleave and the fibre story. *J Roy Nav Med Serv* 1980; 66: 5-10.
- Heaton K, Emmett P, Henry C et al. Not just fibre—the nutritional consequences of refined carbohydrate foods. *Hum Nutr: Clin Nutr* 1983; 37C: 31-35.
- Hutt M, Burkitt D. The Geography of Non-Infectious Diseases. Oxford: University Press, 1986.
- Royal College of Physicians of London. Medical Aspects of Dietary Fibre. Tunbridge Wells: Pitman Medical, 1980.
- Spiller G, Kay R (eds). Medical Aspects of Dietary Fibre. New York: Plenum, 1980.
- Trowell H, Burkitt D (eds). Western Diseases: Their Emergence and Prevention. London: Edward Arnold, 1981.
- Trowell H, Burkitt D, Heaton K, Dietary Fibre. Fibre-Depleted Foods and Disease. London: Academic Press. 1985.

## **Kenneth Heaton**

**Dr Kenneth Heaton is Reader in Medicine at the University of Bristol, and Consultant at the Bristol Royal Infirmary.**

**He was Secretary of the Royal College of Physicians' working party that produced the report on 'Medical Aspects of Dietary Fibre' in 1980. In 1986 he was appointed a member of the Department of Health Committee on Medical Aspects of Food Policy's panel on the effects of sugar on human health.**

**He is Chairman of the Royal Society of Medicine Forum on Food and Health. He has edited a number of textbooks on Western food and Western diseases. His special interest is the health of the gastrointestinal tract.**

## **The McCarrison Society for Nutrition and Health**

The McCarrison Society was founded in 1966 by a group of doctors and dentists who were convinced of the supreme importance of good, whole fresh food for the promotion of health and the prevention of disease. The Society is named after Sir Robert McCarrison, one of the great nutritional scientists of the twentieth century who identified good food as vital for personal and public health.

The President of the McCarrison Society is Dr Hugh Sinclair; its Chairman is Professor Michael Crawford; and its committee and membership in Britain and throughout the world includes many leaders in the biological sciences who are united in their belief, based on science, that whole fresh food is vital for good health, and that Western food, with its excessive processed fats and sugars, salt, and chemical additives and contaminants, is a major cause of Western diseases.

The Society mounts regular conferences. Proceedings of the Society are presented in the scientific journal 'Nutrition and Health' and in the Society's newsletter, both published quarterly. Members of the Society enjoy special rates for conferences and the journal, receive the newsletter free, and join in the Society's work for the promotion of good food and health. Enquiries to the McCarrison Society, 24 Paddington Street, London W1M 4DR.

## **Surgeon Captain T L Cleave FRCP**

'Long before the year 2000, time will have amply confirmed the Cleave hypothesis, and over-refinement of food will have become part of our history. His name will be added to the roll of the great men who opened up new fields of discovery in medicine.'

**Sir Francis Avery Jones**

'Like William Harvey, he was a born naturalist; his observations on the reaction of the human gut and metabolism to the onslaught of industrially refined carbohydrate food was part of his understanding of nature's processes.'

**Dr Walter Yellowlees**

'Cleave was one of the most revolutionary and far-sighted medical thinkers of the twentieth century, seeing far beyond the small vision of intricate details of individual diseases.'

**Dr Denis Burkitt**

'Cleave saw that many of the diseases of civilisation could be explained as the consequences of eating refined carbohydrate, pointing out the crucial fact that refined foods are an artefact of technological civilisation.'

**Dr Kenneth Heaton**



