

## Out of the Box

### On toast

In the middle of a brainy panel discussion on polycyclic aromatic hydrocarbons and heterocyclic amines, as the first World Cancer Research Fund report<sup>1</sup> was being prepared, Larry Kolonel had a thought. ‘What about toast?’ he asked.

The panel was moving to a view on barbecuing and indeed frying and grilling/broiling of meat and other animal foods. I was there, as head of the WCRF secretariat. As published, the report has some very brainy discussion on the relative carcinogenic potential of oak, hickory (good news) and mesquite (bad news) as barbecue substrate<sup>2</sup>, and, as you will know, recommends only occasional consumption of meat and fish cooked in flame or at very high temperatures.

But what about bread left too long in the toaster? What is the answer? Sling, scrape, trim or enjoy? I was interested in the answer to Larry’s question, because I like crispy toast.

Recommendation 13 of the report does begin ‘do not eat charred food’. But on toast, silence. Why, is because most research on heterocyclic and polycyclic nasties and other carcinogens and mutagens is carried out on animal models, usually meaning rats, that have not yet been systematically fed toast. Besides, as John Garrow has observed in his Confucian way, man is not a rat. Women and children, neither. An evidence-based answer based on research of the type now regarded as ticketyboo<sup>3,4</sup> requires a research programme on human consumption of toast.

A flick through Alan Davidson’s wonderful encyclopaedia of food<sup>5</sup> shows that the vistas are endless. First and second variables: quantiles of done-ness, from beige through brown to black, and bendiness, from floppy through firm to frangible. Next variable, type of grain: wheat, corn, rye, barley, millet. Next, of wheat, degree of extraction: whole wheat, brown, white. Then ashcakes, bagels, bannocks, crispbreads, grissini, manchetts, matzos, muffins, naan, panettone, pitta, pretzels, stotty cake and tortillas: the leavening factor. Salt as a confounder or risk modifier. Variants like porridges, gruels and mealie meals, made from oats, cassava and any other grain, tuber or root available. Breakfast cereals (a minefield, not just for nutritional reasons). Interventions at every stage in the cancer process.

Best of all, long-term Cochranic randomised controlled trials using cohorts of docile human volunteers. Where would the money come from? Lo! The USAID/Cargill/General Mills/Kelloggs Toast Institute, Ch’ung Ch’ing, also known as MicroStuff thanks to the benefaction of the

Bill and Melinda Gates Foundation, a veritable public–private–people partnership. Within its walls, a myriad of peasants from Szechwan fed plain toast, toast with butter, margarine or dripping (with or without salt), toast with marmite, marmalade (big peel, small peel, no peel, orange, lemon, grapefruit, ginger) or peanut butter (crunchy and smooth), all calibrated to seven degrees of done-ness according to the agreement of a global ‘On Toast’ consensus conference. Then, as above, with fried bread. Then again, with sandwiches, to include some rib-sticking effect modifiers (or do I mean confounders?) such as crispy bacon, blackened sausages, salt beef and smoked salmon. And then, all the variants of bread listed above, and then again, fortified with chalk, iron filings, fish oil, salt and sugar in every combination and permutation, in obeisance to the sponsor. More research will be needed until the crack of doom!

Next question: ‘What about biscuits?’

Meanwhile I offer this hypothesis. With cancer, and other chronic diseases, the main issue may not be food itself, but the methods of production, processing and preparation of food. If so, most current epidemiological research, using questionnaires that make little and often no distinction between different types of any given food or drink, can be tossed in the trash. An implication is that more reliance should be given to experimental work, including identification of plausible biological mechanisms.

### Don’t get burned

One lesson I learned from working on the first WCRF cancer report is that the accumulation and classification of data, while a necessary preliminary task, does not of itself generate answers. Thinking is required. Common sense also helps.

Thus I also offer a precautionary principle for prevention of cancer: don’t get burned. That is to say, avoid sunburn (we all know that); don’t eat or drink anything that burns the mouth and throat; and yes, avoid all burned and charred food. The principle comes first; the research can follow. Remember the epigraph to Karl Popper’s masterpiece: ‘Theories are nets; only he who casts will catch’<sup>6</sup>.

Conventional wisdom is that heavy consumption of alcoholic drinks is a cause of cancers of the oral cavity and oesophagus irrespective of the type of drink. While not exonerating wine and beer, I don’t buy this. I think Albert Tuyns was on to something in his studies of the calvados

drinkers of Brittany<sup>7</sup>, and likewise César Victora with his studies of cachaça drinkers in Brazil<sup>8</sup>.

As imprudent readers will know, raw spirits, especially when made illicitly or in artisanal conditions as hooches from anything fermentable in the vicinity like pears (calvados), plums (slivovitz) or cane sugar (cachaça), drunk neat not only pack a punch but also burn the throat. Occasionally drunk maybe OK and dead drunk on festive occasions also maybe OK, but regularly? Constant flow of rotgut down the hatch will cause open sores that never heal – which, I maintain, will predispose to cancer. In the same way, chronic atrophic gastritis increases the risk of stomach cancer; ulcerative colitis, of colon cancer<sup>1</sup>; and crummy dentures, of oral cancer<sup>9</sup>. Point made, I think.

Supporting evidence is provided by erva maté drinking<sup>8,10</sup>. The WCRF report<sup>1</sup> puts this down as a possible cause of oral and oesophageal cancer, but with a footnote indicating that the cause may be regular consumption of any very hot drinks. Indeed. To my mind there is no good evidence against erva maté as a herb. But in the southern cone of Latin America it is drunk with metal straws, liable to cause permanent abrasion of the soft tissues of the mouth, and delivers the liquid super-hot to the throat.

Replace metal with paper or plastic straws, and cancer rates would drop. Hard to control though, because the gauchos if deprived of metal straws would turn to cola drinks, which, as every schoolboy knows, in time dissolve metal coins. Impresario Cochratrics with truckloads of dollar Bills to burn could try a collaborative study with the Toast Institute: ‘Maté drunk through metal, paper and plastic straws, as a confounder of the carcinogenic effects of consumption of burned marmite soldiers’. A library of extremely brainy journals could be founded on these ideas!

### Reasons to be cheerful

The WHO global strategy on diet, physical activity and health<sup>11</sup> is now in the consultation stage. Now, there is general agreement that regular physical activity is vital protection against most common chronic diseases, and also is good for mental and emotional health. Hooray.

My own personal enthusiasm goes back to the early 1980s, when I tottered around marathon courses in Paris, London, Birmingham and New York, and began to advocate regular physical activity, such as jogging, cycling, swimming and dancing, that every able-bodied person can build into their lives<sup>12,13</sup>.

Here is an area where private and public interests coincide. Thus, in the summer of 1986, Caroline Walker and I went to see the big bosses of the UK Food and Drink Federation in London. Caroline wrote to them afterwards: ‘...a fit nation will eat more food, which can only be good for business. Could industry help to provide playgrounds in inner city areas?’<sup>14</sup> Alas, what we have seen instead is the Mars Bar London Marathon, the Coca-Cola and McDonalds

Olympic Games and Football World Cup, and, as I found in India this year, the Pepsi-Cola Cricket World Cup<sup>15</sup>.

My best deed in those days was to found the Serpentine Running Club, which celebrated its first 20 years with 700 members in May last year, whose details are on info@serpentine.org.uk; its members include world champions, but the club remains dedicated to the absolute beginner.

Every time I come to London and stagger round Kensington Gardens and Hyde Park, I look at the unofficial paths parallel to the tarmac, made by the incessant tread of countless thousands of runners. Those paths did not exist before the days of the Serpies, and I feel proud. However, jogging goes back to the 1960s, long before anybody dreamed that most able-bodied citizens could run a marathon. My own inspiration was Norman Harris, founder of the *Sunday Times* National Fun Run in the late 1970s. Here is the story of the first-ever jogging club, and the invention of the word ‘jogger’.

Norman’s inspiration was his fellow New Zealander Arthur Lydiard, the fabled coach of Murray Halberg and Peter Snell<sup>16</sup>, who, as Norman explained to me (Harris N, personal communication) in 1962, “decided to start an informal club of former runners, who would amble a few miles on a Sunday morning and then maybe have a picnic. As the then *New Zealand Herald* athletics writer, I was asked to put a piece in the paper. They said the guys would just be jogging, and I remember saying: ‘So what will you call it – the Auckland Joggers Club?’ There was a bit of a giggle. But the name stuck. So I think I invented not the verb ‘to jog’, but the noun ‘jogger!’”

Bear Arthur Lydiard and Norman Harris in mind next time you go for a jog. Remember too, with due deference to Gunnar Blix<sup>17</sup>, Per-Olof Astrand<sup>18</sup> and the other Nordic pioneers, that it was the citizens’ running movement of the 1970s and 1980s that supplied the cohorts of tens of thousands of enthusiastic volunteers for the experiments of exercise physiologists that have now proved beyond reasonable doubt that regular physical activity prevents chronic diseases. With no funding from USAID, too! Before jogging there were two separated populations, of elite athletes and the sedentary masses; so researchers could not be sure of the meaning of moving from being fat to being fit. Now we all know.

Arthur Lydiard and Norman Harris began the movement that led to the launch of Agita Mundo on World Health Day in São Paulo in April 2002 and the new WHO global strategy. They are the founders of a global grassroots movement that has improved the quality of life of millions of people. Salutations to them. Raise your glasses, please, filled neither with Coca-Cola, nor cachaça nor calvados. Saúde! Good health!

### The hot and the cold

Claude Levi-Strauss seized one of the all-time good book titles with his *The Raw and The Cooked*. I now offer my

general theory of the hot and the cold, from field studies of feeding times at international nutrition conferences, most recently at the Park Sheraton, Chennai at the 30th UN Standing Committee on Nutrition meeting. This squib here may turn out to be the Ur-reference for another whole new field of research.

At any meeting of food and nutrition experts that lasts two or more days, their general beliefs can be deduced by observing their feeding habits, starting with breakfast. There are two main groups. The cold group selects fresh fruit, yoghurt, nuts, seeds, whole-grain cereals and bread, and fruit juice, and refuses offers of eggs. The hot group tucks into eggs, bacon, tomatoes, mushrooms and, yes, toast; and a red-hot subgroup, the nutritional equivalent of the Marlboro cowboy, adds sausages.

Much can be deduced from the choice of one food item: no eggs (cold group) or boiled eggs (hungry cold group), or scrambled or fried eggs (hot group), or fried eggs and fried bread (red-hot subgroup). An 'organic' sub-set of the cold group will insist on butter and may choose eggs: such people can be detected by their tendency to ask irritating questions during conference discussions. A potential confounder is that a hot person will tend to make cold choices for breakfast when suffering from a hangover: in these cases it is advisable also to observe dinner habits.

Thus, within any conference, there is a strong relationship between what people say and what they eat, but – and here the theory becomes challenging – this is either assonant or dissonant.

Dissonance is more commonly a hot inversion. Thus, the cold assonant Walt Willett uses olive oil so often at mealtimes that I think he must carry an extra virgin hip flask. Whereas, a number of hot dissonants I won't name – you know I know who you are! – advocate prudent dietary guidelines for the great unwashed at the podium, but can be observed at lunch shaking the salt cellar like a one-handed maraca, drizzling cream on their chocolate pudding and washing down toasty nibblebits with octuple bourbons in the happy hour. This paradoxical behaviour can be compared with the gorging habits of the Bororo and Bacairi peoples of Mato Grosso, which, as interpreted by Levi-Strauss<sup>19</sup>, amounts to large-scale gathering [in the case of the Park Sheraton, from the groaning buffet boards and drinks trolleys] followed by immediate consumption, 'as though the need had suddenly arisen to compensate for the disappearance of a differently balanced diet'. Emphasis mine.

'Putting their hypothesis where their mouth is? A study of assonant and dissonant behaviour in nutritional scientists' will be a fun topic for a sociology journal.

Watch out! The person behind you in the breakfast line may be the author!

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## References

- 1 World Cancer Research Fund (WCRF)/American Institute for Cancer Research (AICR). *Food, Nutrition and the Prevention of Cancer: A Global Perspective*. Washington, DC: WCRF/AICR, 1997.
- 2 Nagao M, Honda M, Seino Y, Yahagi T, Sugimura T. Mutagenicities of smoke condensates and the charred surface of meat and fish. *Cancer Letters* 1977; **2**: 221–6.
- 3 Mann J. Discrepancies in nutritional recommendations: the need for evidence-based nutrition. *Asia Pacific Journal of Clinical Nutrition* 2002; **11**(Suppl.): S510–5.
- 4 World Health Organization (WHO). *Diet, Nutrition and the Prevention of Chronic Diseases*. Technical Report Series No. 916. Geneva: WHO, 2003.
- 5 Davidson A. *The Penguin Companion to Food*. London: Penguin, 2002.
- 6 Popper K. *The Logic of Scientific Discovery*. London: Hutchinson, 1959.
- 7 Tuyns A, Riboli E, Doornbos G, Pequignot G. Diet and esophageal cancer in Calvados (France). *Nutrition and Cancer* 1987; **9**: 81–92.
- 8 Victora C, Munoz N, Day N, Barcelos L, Peccin D, Braga N. Hot beverages and oesophageal cancer in southern Brazil: a case-control study. *International Journal of Cancer* 1987; **39**: 701–16.
- 9 Merck. *The Merck Manual of Medical Information*, Home edition. Whitehouse Station, NJ: Merck, 1997.
- 10 International Agency for Research on Cancer (IARC). *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Vol. 51. Coffee, Tea, Mate, Methylxanthines, and Methylglyoxal*. Lyon: IARC, 1991.
- 11 World Health Organization (WHO). *Process for a Global Strategy on Diet, Physical Activity and Health*. Geneva: WHO, 2002.
- 12 Cannon G, Einzig H. *Dieting Makes You Fat*. London: Century, 1983.
- 13 Cannon G. *Fat to Fit*. London: Pan, 1986.
- 14 Cannon G. *The Good Fight. The Life and Work of Caroline Walker*. London: Ebury Press, 1989.
- 15 Hawkes C. Marketing activities of global soft drink and fast food companies in emerging markets: a review. In: World Health Organization (WHO) ed. *Globalization, Diets and Noncommunicable Diseases*. Geneva: WHO, 2002.
- 16 Reader's Digest. *New Zealand Yesterdays*. Auckland: David Bateman, 2001.
- 17 Blix G, ed. *Nutrition and Physical Activity. Symposia of the Swedish Nutrition Foundation 5*. Uppsala: Almqvist and Wiksells, 1967.
- 18 Astrand P-O, Rodahl K. *Textbook of Work Physiology. Physiological Bases of Exercise*. New York: McGraw-Hill, 1970.
- 19 Levi-Strauss C. *Structural Anthropology*. London: Allen Lane/The Penguin Press, 1968.