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Editorial

Nutrition science: Time to start again

This editorial is about the significance of food processing, and in particular of ‘ultra-processed’ food and drink products. It is also about the nature, purpose, scope and value of nutrition science, which as conventionally taught and practiced, is now widely perceived to have run into the buffers or, to change metaphor, to have painted itself into a corner.

It introduces the commentary by Carlos Monteiro that follows in this issue of **World Nutrition** (1) He contrasts ultra-processed ‘type 3’ products, which are typically ‘fast’ or ‘convenience’ snacks and other items ready to eat or to heat, usually consumed by themselves, with ‘type 2’ processed ingredients. As he points out, these ingredients, like fats, sugars, starches and salt, are typically combined with ‘type 1’ fresh and minimally processed foods and drinks, and consumed as meals at or outside the home. What are most significant, he is saying, are not the chemical constituents of foods and drinks, but the products themselves – which are after all what we actually consume. If he is right, his thesis overturns conventional nutrition science, inasmuch as it is concerned with human health.

What if he is right?

To get a bearing on what Carlos Monteiro is proposing, it should be helpful to give an analogy. ‘What if he is right?’ was the resonant title of an essay written by Tom Wolfe in the mid 1960s about Marshall McLuhan, the Canadian sage, whose phrases ‘the medium is the message’ and ‘the global village’ are now part of the collective conscious. McLuhan’s thoughts flowed and flowered from one governing insight, which is that great developments in technology, and in particular in communications,

do not merely change the way we relate to our environment. They change the world as we perceive it, they change the way we are in the world – and so they change us (2). Thus as a result of printing, humans became different beings. His insight was a preview of the impact of the electronic revolution on what being human means, and on what humans now are.

His perception of ‘the global village’, which to most people seemed wacky in the 1960s, is now obvious to us all. His ideas remain disturbing to older people, because they trash concepts of reality that were taken for granted a generation ago. But parents need to sense that their kids, now using their cell-phones to be inside their world, are not merely using a speeded-up land-line telephone. The nature and capacity of the machine is so different, that they grow up changed. How we are determines what we are. The same applies to personal computers. These still look rather like typewriters, and older people may still use and experience them as typewriters with extra capacity, but they are actually as different from typewriters as printing is from manuscript. Electronic communications have reconfigured the circuitry of the brains of people who are young now.

Nutritionism

These thoughts relate to what has happened to global food systems and supplies, and thus to the food and drink in the shops that we purchase and consume. They also relate to our ideas of what is nutrition. What has happened to food systems in one human generation, an aspect of the linked transformations known as globalisation, is just as revolutionary as what has happened to communications. But one characteristic of revolutions, is that people who are in the midst of them do not see them as such, but continue to live their daily lives, becoming increasingly out of touch and maladapted.

Hold these thoughts. Now go to your shelves and take down a textbook on nutrition, and look at its list of contents – or look one up on the internet. One at hand (3) begins with a series of chapters on energy physiology. It continues with seven chapters on ‘macronutrients’, 14 chapters first on fat-soluble then water-soluble vitamins; and 11 chapters on minerals and trace elements. That’s the first 400 or so large-format pages. The second 350 or so pages include four chapters on nutrition at different stages of life, 12 mostly on nutrients and various diseases, and five mostly on the composition, measurement and monitoring of foods and diets. These are followed by three chapters two of which are about over- and under-nutrition, and a final four chapters overall labelled ‘emerging issues’ which include three on bioengineering, functional foods, and their potential. There is nothing unusual in a contents list like this. Other textbooks are likely to have chapters on foods and drinks, but in other respects it is fairly typical. Now think about this. The approach outlined here is surely very odd. Textbooks on architecture, say, are not almost

exclusively preoccupied with the physics of building materials. Why has biology been so much reduced to chemistry?

The US commentator Michael Pollan, admired by Carlos Monteiro (and by this editorial team) excoriates this approach as ‘nutritionism’, which is to say the identification of food with its chemical constituents. He says (4) ‘No idea could be more sympathetic to manufacturers of processed foods, which surely explains why they have been so happy to jump on the nutritionism bandwagon. Indeed, nutritionism supplies the ultimate justification for processing food, by implying that with a judicious application of food science, fake foods can be made even more nutritious than the real thing. This of course is the story of margarine...’ and an entertaining riff on margarine as the first fake food follows.

The trouble with chemistry

‘The contribution of nutrition science to the destruction of global health’. This is a theme for a PhD thesis, not yet (as far as we know) written. Unpacked, the concept could be the source for many more specialist theses. One of these could focus on the notion that if chemical compositional analysis of two edible items, one fresh, one processed, produces the same or much the same results, the two items are the same, or more or less so.

This notion is an exquisite combination of stupidity and arrogance, or else of intelligence and cunning. For a start, similar results can only be of those chemical constituents that are at the time known, and actually measured. For example, food composition tables began to include figures for folate only in the late 1970s, not so long after its function as a vitamin became first known. Before then folate was off the nutrition scientist’s map. Are all chemical constituents with biological activity, contained in edible substances, now mapped and included in composition tables? No, of course not. Could some of these bioactive compounds, some now fairly well-known although not in composition tables, some little known, and no doubt many now unknown, have special potency? Yes, of course. Obviously.

A second point is that substances that are chemically similar are very often different in their biochemical effects. This fact is now so well-known that it is almost embarrassing to point out that it saps the foundations of conventional nutrition science. An obvious example is sugar. Manufacturers claim that there is no difference between sugar as contained in a fruit, and sugar contained in a soft drink, assuming the percentages of energy supplied by sugar are much the same. But the ‘hit’ or ‘jolt’ given by sugared drinks – one reason they are popular – is because, freed from any watery, fibrous matrix, the sugar in the brain rushes into the bloodstream, whereas that contained in whole fruit is released slowly. Sorry, yes, we all know this.

Another example is *trans*-fatty acids, created by the process of hydrogenation. Chemically they are mirror images of polyunsaturated fats, and for this reason were assumed to be innocuous until the 1980s. It was only in the 1990s that consensus developed that they are probably more harmful to the circulation system than saturated fats. Has anybody calculated how many deaths from heart disease have been caused in part by hard margarines and biscuits and other baked goods? And how many of these had as a cause, consumption of margarines in the period when this product contained *trans*-fats yet was promoted as 'heart-healthy'? Such research has not been undertaken. No wonder. What a mess! It would expose a disaster with scandalous aspects. Research funders wouldn't want that.

What's in a word

'When I use a word, it means just what I choose it to mean'. This is what Humpty Dumpty said to Alice, in Wonderland. A point alluded to but not discussed in Carlos Monteiro's commentary, is the use of the same word to identify things that actually are very different. When is it appropriate to go on calling a food or product by the same name, when its nature has changed?

For example, in the 1980s the UK food manufacturers' trade organisation the Food and Drink Federation was infuriated by regulations proposed in Europe that would forbid the use of the word 'sausage' to refer to any product containing a relatively trivial amount of meat, and the use of the words 'ice-cream' and 'chocolate' to refer to any products containing little or no milk or cocoa butter. The 'blasted Brussels bureaucrats', as they became known to the public by public relations gurus paid eye-watering fees by the trade, had an important point. One patriotic tactic suggested was 'the British sausage' to refer to the 'banger', so-called because its content of grease and water, absorbed by starch 'filler' in the product when cold, caused it to burst explosively when fried or grilled.

The overall strategy, part of the general policy of politicians that still prevails, was a 'bonfire of regulations'. This was spurred on by the then UK prime minister Margaret Thatcher, who was trained as a food chemist. She was all for processed products. One of her closest advisors was Hector Laing, later Lord Laing of Dunphail, the biscuit manufacturer. She was also all for giving industrialists their head.

Any product that roughly looks and tastes like an ice-cream, or a sausage – or meat, or bread, or anything else – can be given that name. This now may be the biggest problem for any food classification. Should 'meat' have the same name, irrespective of whether it comes from a wild animal, a free-ranging animal, or an industrially produced animal? The fat content, the fatty acid composition and the ratio of fat to protein, is substantially different in these three cases

And what about products passed off as meat or meat products that are in part reconstituted from a slurry of skin, bone scrapings, and other refuse, and made to look and taste nice by sophisticated use of cosmetic additives? Examples include ‘economy’ versions of chicken nuggets or, better to say, ‘chicken’ nuggets or, better still, ‘imitation chicken nuggets’ or, better yet, ‘mechanically recovered chicken remnant nuggets’. Best of all would be no name, as a result of the technology used to extrude the substrate being banned as unfit for human consumption. Many other examples can be given – bread, for instance. Carlos Monteiro’s commentary elegantly and powerfully resolves some of these issues, simply by classifying all ready-to-heat and ready-to eat manufactured products as ‘ultra-processed’.

‘The question is, said Alice, whether you can make words mean many different things’. Then: ‘The question is, said Humpty Dumpty, which is to be master – that’s all’. Quite.

How many experts cook?

‘Here is the trouble with the experts who sit on committees that make conclusions and recommendations about nutrition and health. They are almost all middle-aged middle-class men, mostly rich from rich countries, who are very busy whizzing around the world. They don’t shop, they can’t cook, and their meals are prepared at home by their wives and when not at home in restaurants. They haven’t a clue! Variations on this provocative remark were often stated by campaigning nutritionist Caroline Walker, in her presentations and popular writing (5).

Twenty years after she died, it’s hard to fault the thought. It surely explains the recommendations made by many of the expert committees concerned to prevent heart disease and other chronic diseases, inasmuch as these mention food. Fingers were pointed (among other foods) at eggs and meat, on the grounds that these contain substantial amounts of saturated fat and cholesterol, which indeed they do. Foods like these are also familiar to anybody who eats breakfast and dinner. But the fact, obvious to anybody who prepares meals, that such foods are normally eaten as part of meals and dishes together with other foods, was not taken into account, and not much notice was paid to the fact that such fresh foods are in other respects highly nourishing.

What does make sense is to finger (cow’s) milk, as a drink consumed by itself. But the sensible targets, rather than fresh meat and eggs, include burgers, nuggets, and egg-bound ready-to-heat products also containing hydrogenated fats. Such products contain the saturated fats which, consumed in amounts typical in higher-income countries, are undoubtedly a cause of heart disease, and they are also bad news in other respects, such as energy density. But such ultra-processed products rarely feature in the recommendations of authoritative expert reports, because the distinguished experts had never heard of them. Or, if they had, they weren’t saying,

and if they had ever eaten such stuff, they weren't admitting it. Caroline had a point, and she stuck to it.

The case of Brazil

In his commentary he gives examples of the impact of ultra-processed products in his own country. Brazil has been a major sugar producer for almost half a millennium, whose food ways have been heavily influenced by traditional Portuguese cuisine. So consumption of sugar and salt has always been high, and remains so.

Rice and beans are still staples in the diets in most regions in Brazil. So is the Saturday traditional *feijoada*. This is a blow-out feast of fatty cuts of pork meat, offals and sausage, simmered with lard and beans, served in the earthenware pot in which it is cooked, and accompanied by rice, *farofa* (toasted manioc flour), and *couve* (a type of cabbage, thinly sliced). This is all washed down with ice-cold beer, some from factories founded by German immigrants in the mid 19th century. Many of the men at the feast also drink *cachaça*, the Brazilian type of rum invented by slaves working in the sugar factories. After all this, the traditional dessert is an intensely sweet combination of fruit compotes and condensed milk, and sometimes also soft cheese.

But few Brazilians got fat on the national sugary traditional diet, whose fat content was fairly high. Now however, as in many other lower-income countries, a high and growing proportion of adults in Brazil are now overweight by any standard. The most striking differences pointed out by Carlos Monteiro, is that over the years the fat, sugar, and salt, which until a generation or so ago were purchased often from sacks, as ingredients to be used in the preparation and cooking of meals at home, are now mostly found in packaged products.

In Brazil and other countries where undernutrition is or until recently has been common, another factor is the ambiguous nature of 'energy' contained in edible substances. Undernourished people are not just short of energy, but of many nutrients as well. Better to say that they are short of nourishing foods. But conventional nutrition science also separates out the energy content of foods, and manufacturers continue to claim or imply that foods high in calories are good for growth and health, whatever else they contain. This is a potent approach in countries whose populations commonly suffer from hunger, or remember such times.

The statesman who personally remembers this is, above all others, the outgoing president of Brazil, Luis Inácio 'Lula' da Silva, a charismatic and emotional person, who grew up in poverty and as a boy was often hungry. Here he is in the pictures on the next page, taken in 2009 and 2004, with executives from a supplier of empty calories. In the picture at left, he is being shown how Coca-Cola is dividing Brazil. In the picture at right, he is giving thanks as he knows how. He would do better to hug the country cooks who make his favourite dish of *feijoada*.

Carlos Monteiro's commentary is, in the view of the editorial team, an occasion to think through the value, scope, purpose and nature of nutrition science, all over again. The group best able to do this effectiveness and successfully are those less likely to be in thrall to chemistry – public health nutritionists.



The editors

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Acknowledgments and request

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