WN *Columns*

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What do you think?

Geoffrey Cannon

Six of the spirals that set the theme of 'knowledge-policy-action' for the World Nutrition Rio 2012 conference: foods and home-made dishes flanked by a human touch and the symbol of partnership

Juiz de Fora, Cabo Frio, Rio de Janeiro. People say that spirals are mystic symbols too. Indeed: they relate to nutrition in its all its aspects, physical, mental, emotional – and spiritual. See page 269, following this one. Then, starting on page 270, Walter Yellowlees is my fifth hero. He is a retired Scottish general practitioner who throughout his life has cultivated his garden, literally, and by attending to and seeking to understand his experiences as a physician and a citizen. Appalled by the decline in the health of his patients and their families and communities, he became convinced that the chief cause was the parallel decline in the quality of their diets, as traditional meals became displaced by industrial products. He is now being proved right.

Action on world nutrition advanced as from two years ago next month, because of the planning for the *World Nutrition Rio2012 conference,* the event itself, and most important, its outcomes. There are lessons for the future too. Below, starting on page 273, I remind us all why the conference was a success. Above are six of the spirals devised as symbols for the conference, home-made (or posed!) by the teams masterminded by Inês Rugani.

Last issue I began a meditation on the *mangueira* (mango tree) in the garden of what was our Cabo Frio house – for now it has new owners. Starting on page 277, I continue, and this riff fills the rest of the column. Other items already intimated will come later. These will include the intriguing correlation between nutrition scientists associated with or funded by Big Sugar, and literature concluding that evidence does not support the conclusion that sugar is a cause of any disease. Apart that is from dental caries, sometimes explained as a fluoride deficiency disease. Just fancy that!

Box 1

The recovery of meaning

Jill Purce (left) and her book The Mystic Spiral (right); then in between, Jacob's Ladder by William Blake; a modern quest for the Jewel of Fire; the minaret of the mosque of Samarra

People who think Osama bin Laden was not responsible for '9-11' are called 'conspiracy theorists'. In response, they point out that the official story of what happened is a theory about a conspiracy masterminded by a man in a cave in Afghanistan. All stories offered as explanations of 9-11 are conspiracy theories.

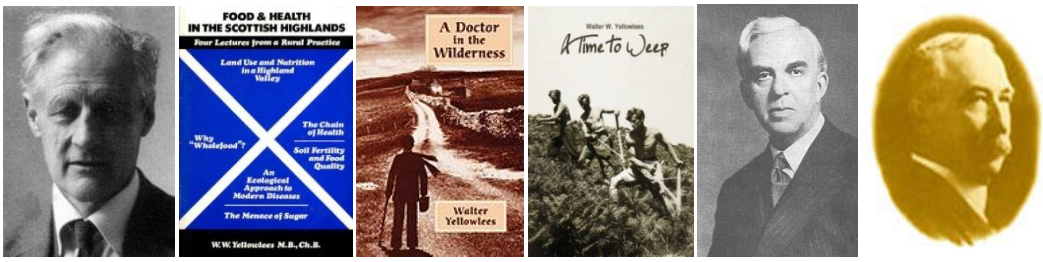
By analogy, those who see history, life, progress and so on as cyclical, and spiral or vortex in shape depending on whether things are going well or badly, are liable to be put down as irrational. But the idea that progress, life, history and so on are linear, such that development is growth in a straight line forward (as in 'US 2015 growth projected at 2.1 per cent') is by its nature also not rational. Both these ideas, cyclical and linear, with their very different implications, are metaphysical. Neither is scientific in the sense implying that one or the other can be proved 'objectively'. But both can be tested, in ways similar to the assessment of all sorts of evidence that leads to a verdict in a court of law, or to deciding what kind of society, guided by what type of principles, we want to live in and desire for those who come after us. Good ideas are informed by facts, but by their nature they are above and beyond data. And to repeat my own position, I am sure that the linear concept of reality is a mistake, is wrong – is a bad idea. Look where it has led us!

This was part of the conversation I was enjoying with the biologist *Rupert Sheldrake* and *Jill Purce* his wife, over dinner in their South Hampstead home some years ago. We shared the idea that life is richer if we think and act as if everything has meaning and purpose. Then, in the midst of my explaining that the spiral symbolises the New Nutrition, Jill excused herself, and came back a few minutes later with *The Mystic Spiral,* the book of which she is the author. It is beside me now, inscribed by her. Three illustrations from the book and shown above: a painting by William Blake, a pop art evocation of *Pilgrim's Progress*, and the 9th century CE minaret of the great mosque of Samarra. Rupert relished all this.

The pictures left and right above are of Jill, and her book cover showing the pilgrim Sudama, the childhood friend of Lord Krishna, in search of the pearl of wisdom. For me there are lots of such pearls. One is that coincidences are signs. Another is that beliefs held consistently by different cultures at different times, are likely to be valid and valuable. Another is that current conventional nutrition science has limited value. By its nature it cannot grasp the full meaning of nutrition in all its qualitative aspects, biological and also social, cultural, political, economic and environmental; physical and also mental, emotional and spiritual. Perhaps for clarity, nutrition in its full sense should be termed 'nourishment'. This circles back to the original concept of dietetics, as the philosophy of the good life well led. Nutrition as a biological science has a chamber in this mansion.

Food and nutrition, health and well-being

What they believe: 5. Walter Yellowlees
Whole earth and whole food



Walter Yellowlees (left), general practitioner, believer in the principle of the indivisibility of nature; (right), three of his publications; Robert McCarrison and Albert Howard, two of his inspirations.

'Country doctor discovers the secrets of health and disease, life and death' is an abiding rural legend. Walter Yellowlees (pictured above, left) comes fairly close. He qualified in medicine over 70 years ago, and was a general practitioner in Aberfeldy. This is a small town surrounded by fertile farm-land, streams, woods and hills in the middle of Perthshire, between the Scottish lowlands and highlands.

In his decades of general practice, visiting his patients and their families in their homes, he observed two great shifts, both of which had begun before his time. First, rates of chronic diseases affecting many bodily organs and systems had rapidly risen. Second, traditional dietary patterns based on freshly prepared meals often made with produce from the local farms, had been rapidly replaced by diets mostly made up from cheapened and degraded industrialised processed food products. He sensed and then became sure that deterioration of diet causes increase of disease, manifest in different forms.

As country doctors and priests often once were, he was a natural scholar. He studied the findings of big thinkers such as the nutritionist Robert McCarrison (1878-1960) and the agronomist Albert Howard (1873-1947), (next to right and right, above), who had already concluded that agriculture and food systems and supplies are the main forces that drive patterns of diet, disease, health and well-being.

While staying grounded in his own experience, he began to sense that the state of the natural environment, shown by the ways in which land is treated, shapes the rise and fall of societies. Like other natural philosophers whose big ideas are based on a set of general principles, he was ignored in the modern scientific literature typically preoccupied with technical details. But recent evidence and agreements on aspects of the big picture, such as *trans* fats, sugar, soft drinks, and industrial food processing, converge on various general conclusions, one of which is that all along, some details aside, Walter Yellowlees has been right.

Box 1

What happened to the good Scots diet

Edited from 'The taste of salvation' (New Internationalist,1990)

Walter Yellowlees shows that the dramatic deterioration in the nutrition and health of the Scoottish people began with the Clearances that destroyed the clan system, and with it the ties of Highlanders with their natural environment, way of life, and diet. Then all over Scotland people were driven to the cities, and were obliged to switch from home-grown food to imported processed products. In England too, industrialisation meant that peasants were turned into the first working classes, alienated from the earth and its fruits. In the cities they subsisted on crude versions of the diet that continues to wreck the health above all of the dispossessed and the urban poor all over the world today.

Drawing on his clinical experience as a physician, knowledge of his country, research and thought, Walter Yellowlees identifies a law of nature. When food and agriculture become business commodities, the health, the culture and the very identity of that nation will eventually be destroyed. Thinking and talking green means acting and therefore eating green. Saving the planet and saving yourself are indivisible. It is no accident that the words 'health', 'whole', 'healing' and even 'holy' all derive from the same root.

Walter did not publish much. His best-known pieces are some tracts, now freely downloadable thanks to his admirers, shown above: *Ill Fares the Land,* and *Food and Health in the Scottish Highlands.* He helped to organise a band of physicians, dentists and veterinarians dedicated to the propagation of whole food, as a founder in 1976 of *The McCarrison Society*, and as president of its Scottish branch.

At that time in Britain the flame of this cause burned low. In London in the 1970s there was just one substantial retail shop selling fresh food and with a book section, Wholefood at 24 Paddington Street. The Soil Association, representing the 'organic' movement including growers and farmers, was also on the fringe. The power and influence was with governments committed to industrialised agriculture and manufacture, and a nutrition profession preoccupied with adjustments of nutrients. Walter was indeed like a voice crying in the wilderness.

In the mid-1980s the scene shifted. Experts agreed that the UK diet, and those of other industrialised countries too, had indeed gone wrong. But this remains expressed in terms of nutrients – too much fat, saturated fat, cholesterol and salt, not enough dietary fibre. Walter was unbending. He held fast to basic principles. He denounced the idea that fresh meat should be grouped with ultra-processed packaged snacks because both are fatty. He scorned preference for margarine over butter. He emphasised sugar as a cause of degeneration and disease. Walter would have been impossible as a member of learned committees charged with producing consensus positions agreeable to governments and acceptable by corporations. At that time I thought he went too far. Now I repent. Essentially Walter is right, and the principles that guide his thinking are right.

Box 2

Industrial diseases

Extracted from Walter Yellowlees, 'Land Use and nutrition in a Highland valley'

Our Perthshire valley of good farming land runs east and west and is enclosed by steep-sided hills which rise to heather-covered moors and forest. The landscape is a superb harmony of fields, rivers, mountains and lochs.

Visitors, sometimes medically qualified, are apt to exclaim as they gaze on this marvellous vista. 'But surely there is no need for a doctor in a place like this?' They echo the widely held belief that many diseases of our time are caused by the rush of urban living, by executive type stress. If urban stress was an important cause of diseases like duodenal ulcer, coronary thrombosis or high blood pressure, then their occurrence would be rare in Aberfeldy and its strath.

Alas, this is not so. These diseases are common in the modern Highlander. Here is no haven of health. The people are plagued by modern diseases no less than town dwellers. The 3,500 patients in our area require the services of three doctors. Dental decay, diabetes, obesity, varicose veins, disordered bowel function, peptic ulcer, coronary heart disease, high blood pressure and, above all, cancer are encountered daily in the surgery.

General practitioners have a unique opportunity of observing the daily lives of their patients and to a student of human nutrition this tale of woe comes as no surprise. When visiting patients at mealtimes I have been repeatedly appalled at what I saw on the family table: tinned meat, tinned vegetables, very seldom any salads; masses of white bread, scones, biscuits, cakes, sweet drinks, packeted milk puddings, margarine instead of butter, and, in place of porridge, the ubiquitous packeted, sweetened breakfast foods...

The people here a hundred years ago had a high infant mortality, and often in childhood they suffered from various infections. Infectious bowel diseases like typhoid were not uncommon because of defective sanitation and polluted water supplies. Tuberculosis, especially bovine tuberculosis, was a frequent cause of death and disability.

Susceptibility to infection especially among the poorer countrymen may well have been due to lowered resistance resulting from real hunger. Poor transport and primitive communications meant that the population was very dependent on local resources. In the early part of the 19th century poor harvests often meant hunger. Although romantic to us, for some of the inhabitants of these ruins, life was a hand to mouth existence.

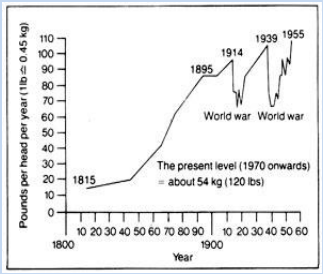
But we know from medical records that in those days the people did not suffer, as we do, from appendicitis, duodenal ulcer, coronary thrombosis and several other now common crippling diseases. Our conquest of infections has been accompanied by a rising tide of degenerations. These changes cannot be explained by changing age structure, or by improved diagnosis.

So here is a picture of massive rural depopulation, the disappearance of small rural industries, and a switch from home-grown food to imported processed food products. Such movement of food and people is now going on all over the world. In every continent, populations are trekking from the rural areas to swell the populations of the ever-expanding cities. Invariably and inevitably this is accompanied by a rising incidence of what are sometimes, but wrongly, called 'diseases of civilisation'.

Box 3

Sugar

Extracted from Walter Yellowlees, 'Land Use and nutrition in a Highland valley'



Sugar: rise in its consumption in Britain, from an average of 20 pounds a year in 1840 to 80 pounds a year in 1900, with more increases since, interrupted by the two world wars

Eaten in its natural setting of cane, root or fruit, sugar is relatively slowly absorbed in the human gut. But taken in pure form, particularly as a between-meals snack, the natural check to its quick absorption is removed, [causing] excessively high blood sugar levels [found] in those consuming the quantities of refined sugar normal in advanced countries.

Excess glucose (the form in which sugar is ultimately absorbed) is converted to body fat. Over-consumption is thus the main cause of the widespread obesity which inevitably occurs in populations eating refined carbohydrates. And with obesity goes diabetes, sometimes in the same individual, always in the same population. ...The frequent occurrence of late onset diabetes is exhaustion of the human body's cellular mechanism for dealing with absorbed sugar. Repeated peaks of blood glucose absorbed at unnatural speed overwhelms and wears out the pancreatic insulin-producing cells.

The repeated appearance of diabetes among racial groups as they change from traditional to modern foods is explained with understanding of the latent period between sugar consumption approaching a certain level, and the 'explosion' of the disease.

Walter abominated sugar, or to be precise, sugared industrialised processed food and drink, and also products made from degraded white flour. In this he drew from the work of TL Cleave, whose graph of increase in sugar consumption from 1800 to the 1960s is shown above; from the 'outlier' nutrition scientist John Yudkin, whose warnings on sugar have also prove to be prophetic; and from younger researchers, notably Kenneth Heaton. The explanation of the physiological mechanism whereby added 'free' sugars cause what is now known as the metabolic system, summarised above, is now basically repeated, with more detailed evidence, by current adversaries of sugar such as Robert Lustig. The basic concept is not new, but its time may well now have come.

Walter Yellowlees is a religious man, and the words of the prophet speak of him. 'Let us now praise famous men and their fathers that begat them. Leaders of the people by their counsels and by their knowledge of learning… The people will tell of their wisdom'. Next month, April, Walter will be 97. This is a good time to remember and celebrate his witness and testimony.

Conferences

From *Rio2012*, with love

World Nutrition Rio2012. Above left and right, plenary speakers; young investigator winners. Below left and right, team members that made it all happen; colleagues on the favela FabTour

WN carries criticism about nutrition conferences, organisations and professions, and in this respect the journal itself can be criticised for being too negative too often. So here goes with some celebration. Next month is the second anniversary of *World Nutrition Rio2012*, the conference with around 1,500 participants from 50 countries put on jointly by the World Public Health Nutrition Association and Abrasco, the Brazilian national public health organisation. The symbol of the conference was the spiral, or rather many spirals, as shown on the first page of this column.

Rio2012 was for sure wonderful, but that's not really the right word. Its success, as the first ever international nutrition conference I know of to be planned and achieved in the right and proper ways, was not by chance. It was guided by a set of explicit principles. Its creation involved scores of people, including lots of keen student volunteers, kept informed and working together as teams beginning over a year before the event. Its viability came from the commitment of the Brazilian government at all levels from federal to municipal, to support public health with public funds and facilities.

Life and soul

Its vivacity sprang from its careful organisation as an event in which all the people present were able to think, speak and act as participants. Its quality was made

possible by two week-long meetings in Rio in 2011 of the combined executive, programme and operational committees, in which all aspects of the conference were reasoned out. The structure of the programme prevented pontification. The average age of participants, a majority of whom were women, was I guess around 30, and my sense was of people wanting not just to learn and to get academic credits, but to increase their ability to consolidate Brazil as a participatory democracy.

Everybody involved with making the conference happen will I think be pleased that four people are mentioned here by name. These are joint programme committee chairs Harriet Kuhnlein and Catherine Geissler, the operational maestro Sabrina Ionata, and overall mastermind Inês Rugani. To be forever remembered.

The pictures above give a flavour of the focus, fun and flexibility of the conference. Above left are Walter Willett from the US, Philip James from the UK, and Carlos Monteiro from Brazil, being friends after a tough plenary session with Philip as interlocutor. Right is the line-up of some of the young investigators whose posters won prizes. Below left is some of the teams of student and other volunteers who were the life and soul of the conference organisation, after lunch in the *per quilo* restaurant with super salads opposite the State University of Rio, the conference venue. Right are Malden Nesheim and Marion Nestle from the US during the tour of Rio's Rocinha *favela* organised by Fabio Gomes (hence FabTours).

Now I adapt what is already recorded on the conferences section of the Association's home page.

The conference as a whole affirmed the principles and purposes set out in the 2005 *Giessen Declaration*. Thus: 'The purpose of nutrition science is to contribute to a world in which present and future generations fulfil their human potential, live in the best of health, and develop, sustain and enjoy an increasingly diverse human, living and physical environment'. Further: 'Nutrition science should be the basis for food and nutrition policies. These should be designed to identify, create, conserve and protect rational, sustainable and equitable communal, national and global food systems, in order to sustain the health, well-being and integrity of humankind and also that of the living and physical worlds'. Stirring stuff.

Theme

The theme of the conference, *World Nutrition: Knowledge, Policy, Action,* affirmed that different types of knowledge, including evidence derived from conventional scientific investigations and also from traditional and other sources, are needed to ensure rational policies and effective actions. Further, knowledge in itself is not enough to face the challenges that now confront public health nutrition. Policy strategies need to be implemented, evaluated, and thus continually strengthened. This cyclical process explains the spiral symbol.

Principles

The conference was governed and guided by explicit principles, discussed, revised, agreed, and published for all to read, mark and digest. It was completed with the *Rio Declaration,* which affirms these principles and calls for action.

- *Scope*. Public health nutrition is an integral part of public health, as well as being a biochemical discipline. It needs to be based on ethical and also evolutionary, ecological, and equitable principles, and to take history and tradition into account. Its dimensions are social (including political and cultural), economic, and environmental, as well as biological and behavioural.

- *Collaboration*. All relevant actors need to work together, and agree rational policies in the public interest, as the basis for effective actions.*Rio2012* was an occasion for debate and discussion, and also for agreements to be carried forward, rather than a meeting at which experts spoke at audiences. This was reflected throughout in the structure and nature of the programme.

- *Interaction*. There was a place for podiums and lecterns. But all formal presentations included and protected substantial time reserved for interactive contributions and discussion. Many sessions were interactive throughout. The conference included simultaneous translations, and also the facility for interactive remote access to the plenary sessions.

- *Independence*. The conference was funded by registration fees, government and other public bodies, and private companies with no commercial interest in food and nutrition. It was supported by the Brazilian federal government and government agencies, the city of Rio de Janeiro and its agencies, and by the State University of Rio de Janeiro, the host of the congress.

- *Empowerment*. The conference was committed to empower future leaders in the profession of public health nutrition, and also to recognise and promote community and other grass-roots workers. Students and young professionals, and also community workers, were fully involved in its programme, as they were in its planning – as shown above.

Onwards!

All future conferences concerned with nutrition as part of public health will, I believe, be well guided by the principles above. *Rio2012* was designed to be a new beginning for public health nutrition, to make it fit to face the challenges of this century. These include the linked finance, fuel and food crises, economic globalisation, population increases, climate change, and worsening inequity. The conference will guide work to be progressed until success is achieved.

Nourishment

Meditation on a *mangueira: 2*

A mango from our garden in Cabo Frio (centre) just fallen in the early morning from its tree (left). It is easy to see why in India (right) the mango fruit is the symbol of female ripeness and fertility

This is written in our house in Ogiva, a suburb of Cabo Frio, on the coast of the state of Rio de Janeiro. In my last column I began to meditate on the *mangueira*, the mango tree in the garden. These first thoughts *are linked here.* Cabo Frio is where Amerigo Vespucci landed in 1503. Here is where the *brasil* tree from which this country gets its name was first exploited. I mentioned previously that *mangueiras* may bear fruit for 250 years and more. This makes me feel reverent. The tree was never 'ours'. One of our duties in selling the house, which we have now done, was to find new owners who will cherish the *mangueira,* and who in due course will want to ensure that the owners after them will also do so. We have I think succeeded.

Nourishment is more than nutrients

Sustained attention to any living thing that is a source of food for us humans, or that is eaten by any other living thing, shows what nourishment really means, and is a reminder of the limitations of a nutrition science that undervalues, overlooks, or even ignores life itself. To judge the quality of food in terms of its nutrients, which is to say its chemical composition, is to treat food as if it is a corpse, or in the case of minerals and trace elements, a stone.

What is life? 'Hard' scientists may complain that life itself cannot be measured or even defined. True, but this is not a reason to act as if life does not matter or does not exist. Even if we cannot define or measure what our being alive is, here we are. Besides, there are ways to take life into account, when making recommendations on what to eat. Two of my favourite sayings are 'long shelf life causes short human life', and 'good food goes bad'. It would be fun to build a new food pyramid whose only criterion of quality was degree of perishability at ambient temperature. Sugar would

have a place of its own: it is the only edible substance that kept dry remains edible forever, one reason why it is the most profitable legal cash crop after tobacco.

In our garden

These were some of my thoughts, as just after dawn the day before I write this, I picked up the mango above, fallen from the tree in our garden. The stump of its stalk, which you can see, was still oozing nourishment from one of the tree's many hundred botanical versions of umbilical cords. I held the big mango in my hand, went inside, peeled and sliced it, and ate it for my breakfast – mindfully, as my colleague and friend Carlos Monteiro recommends.

Any mango may seem the same to city eyes, but not to people who live as we do with *mangueiras*. A *manga Rosa*, the variety we have, picked from the ground and eaten warm, is different from a *manga Tommy* selected from a supermarket. The Tommy (short for Tommy Atkins), the commercial leader, looks lovely, keeps well, resists diseases, and is pulpy and tastes blah. *The manga Rosa* can be rosy like the one above, and also comes in other colours, some not attractive, has a short shelf-life (who wants to keep them on a shelf!), may be devoured by birds and ants unless you get there first, and is smooth in the mouth and tastes divine.

Our 9 year-old Gabriel taught me a lesson. A few days ago we gathered mangoes, including some pecked by the birds the tree also nourishes. No supermarket 'perfection' in our household! Share and share alike, is what we believe. Gabriel pointed out the wreck of an over-ripe mango, which seemed to be alive and moving, because covered with thousands of tiny ants, almost pin-head size, the type that in centuries gone by were thought to generate spontaneously. Where had they come from, where would they go? Next day there was the same mystery, in the kitchen. Overnight I had left a plate with some mango in the sink, unwashed. In the morning it was also swarming with tiny ants. How did they get there? How did they climb in? Washing up the plate, I felt bad, for they had a right to live too. Sorry, ants.

With Gabriel I acted the parent. There is a book by a South African writer Eugène Marais called *The Soul of the White Ant*, I said. He spent many years observing termites and thinking about them, and realised that their identity is not individual, as we think of ourselves, but is the whole community, the entire nest or mound and everywhere they go. Everybody knows that, said Gabriel. Well, I said, Eugène Marais understood this first and best, he is why your teachers know it from what they have been taught, and that is how come they taught you. Gabriel also knew from watching files of leaf-cutters scurrying plants to nest and back again, and again. He tells his mother to avoid running over leaf-cutters when she backs the car out of our drive.

Soon it would be time to plant seeds from the *mangueira* in our garden in Juiz de Fora in the state of Minas Gerais. Life continues, from generation to generation.

The origin of mangueiras

Mangueiras are not native to Brazil. Those in Brazil originally came from India, where they are the national fruit. Half of the world's 25 million tonnes of mangoes come from India. They were brought to Brazil by seafarers and settlers from the Portuguese colonies in India including Goa and Macau. Pedro Álvares Cabral, who is (wrongly) credited with the European discovery of Brazil, landed in what is now Porto Seguro in the state of Bahia, not far north from where I am in Cabo Frio, having been blown off course on his way to India. Mangoes need heat, and trees grown in the southern uplands of Brazil bear no fruit.

When I lived in the UK I thought there was one type of mango. There are many hundreds. As well as *Rosa* and *Tommy,* in Brazil there are *Alfa, Bourbon Vermelha, Chana, Carlota, Comum, Espada Stahl, Haden, Keitt, Kent, Malika, Ourinho, Palmer, Surpresa, Ubá;* many others. Thirteen years ago at Christmas time, I swear I was offered *manga Jasmim* by Dona Silveirinha the family matriarch, fresh from the central market in Fortaleza in the north-eastern state of Ceará. Yes, I savour the perfume of jasmine even now. But I cannot find this variety listed. Perhaps it is a secret.

Reverence for trees

In many cultures trees are venerated, as is the mango tree in India, as a symbol of life, as a provider of shade and shelter for insects, plants, birds, animals, crops and people, and as the community centre

It is not by chance or whim that the *mangueira* is the national tree of India. Nor is this a mere symbol in the sense that most Europeans or North Americans understand. In the countries where it originated, the tree is a source of life. Religions based on nature venerate trees that are home and nourishment for insects, birds and animals, and whose cool shade shelters crops. But there is more. *Mangueiras* are big bushy trees. In Indian villages they are the place where, in the evenings in the shade, the community meets to share experiences, report news, and make decisions. It is natural for villagers to feel that the *mangueira* under which they and their ancestors have gathered, embodies the spirit of the place. They are garlanded, as shown above, right; and the Jain goddess Ambika (left) is usually depicted sitting under a *mangueira.*

The mangueira in our garden in Cabo Frio bears enough fruit for the whole neighbourhood (left), and nourishes insects and birds as well right). Its abundance is a reminder of the nature of life

Another aspect of *mangueiras* is abundance. At a guess, I daresay the tree in our garden drops 500 fruits each weighing over half a kilogram, every year. Right now after a couple of hours writing this piece, I walk out in the late afternoon and five more have fallen, two pecked (one of these is above, right), one and one only mysteriously attractive to the tiny ants, and two that could be sold to a supermarket. All ripe and luscious and aromatic. Inside I cut off the part of the mangoes that the birds ate and slice these for the family first. A *mangueira* makes people sociable. Even a large family could never eat all the mangoes from one tree. Giving mangoes away is part of the process of having a *mangueira* in your garden. Giving and accepting gifts of mangoes, creates a sense of community with neighbours, and even with passers-by.

This brings me to a touching story. A few mornings ago our housekeeper heard somebody on the sidewalk outside our house throwing bricks up into the tree, as happens. Mangoes ripen suspended on long thin stalks and are fairly easy to dislodge. Anyway, Aparecida went outside and gave him a hard look and he said sorry, but could he call next day for some mangoes, and she allowed this, and the next day also, and today he telephoned and they are going out for a date. 'He thinks you are a mango' I said to her. Well, who knows. If one thing leads to another and then some more, we may supply the mangoes at their wedding.

All this and nutrition too

Do I sense you the reader thinking 'nice thoughts and stories, but what does this have to do with nutrition?' Well, all this does relate to conventional nutrition. Mangoes, as we all know, are good sources of carotenoids, vitamin A precursors.

In the tropics this is a Good Thing, because deficiency in vitamin A, including that with clinical signs such as damage to eyes and even blindness, especially in children, is endemic in various tropical regions. Estimates of prevalence of genuine deficiency, including as issued by UNICEF and WHO, are gross exaggerations, but that's another story. What the UN Food and Agriculture Organization says, and I agree, is that the most reconomical, equitable and sustainable protection against shortage or deficiency of vitamin A, is consuming lots of foods that are good sources of retinol, and of carotenoids. Such as mangoes. Now please study the table on the next page.

Table 1

Brazilian fruits that are good or excellent sources of carotenoids

Food	Type	Cheap or free (1)	Source of mics (2)	RE/mcg 100g (3)	100%+ 100 g (4)
Abóbora (pumpkin)	Vegetable	YES	YES	350	
Abóbora (leaves)	Leaf	YES	YES	600	YES
Alfalfa	Leaf	YES	YES	1,140	YES
Babaçu	Fruit, nut	YES	YES	?	LIKELY
Babaçu	Oil	YES	YES	?	LIKELY
Batata doce (sweet potato)	Root	YES	YES	300	
Batata doce (leaves)	Leaf	YES	YES	975	YES
Bertalha	Leaf	YES	YES	582	YES
Bettaraba (beetroot)	Root	YES	YES	-	
Bettaraba (leaves)	Leaf	YES	YES	525	YES
Buriti (palm) (pulp)	Fruit, nut	YES	YES	6,000	**YES**
Buriti (oil)	Oil	YES	YES	50,000	**YES**
Caruru	Leaf	YES	YES	530	YES
Cenoura (carrots)	Root	YES	YES	1,100	YES
Coentro	Leaf	YES	YES	533	YES
Couve (like cabbage)	Leaf	YES	YES	600	YES
Dendê (red palm) (pulp)	Fruit, nut	YES	YES	10,166	**YES**
Dendê (oil)	Oil	YES	YES	45,920	**YES**
Espinafre (spinach)	Leaf	YES	YES	585	YES
Macaúba (palm)	Fruit, nut	YES	YES	?	LIKELY
Macaúba (oil)	Oil	YES	YES	?	LIKELY
Mandioca (cassava)	Root	YES	YES	-	
Mandioca (leaves)	Leaf	YES	YES	1,960	YES
Manga (mango)	Fruit	YES	YES	750	YES
Mostarda (mustard)	Leaf	YES	YES	700	YES
Paprika	Vegetable	YES	YES	470	
Pequi	Fruit, nut	YES	YES	20,000	**YES**
Pequi	Oil	YES	YES	28,196	**YES**
Pimenta (pepper)	Vegetable	YES	YES	1,356	YES
Pupunha	Fruit	YES	YES	1,500	YES
Tucumã	Fruit, nut	YES	YES	6,000	**YES**
Tucumã	Oil	YES	YES	31,300	**YES**
Urucum	Fruit, nut	YES	YES	?	LIKELY
Urucum	Oil	YES	YES	?	LIKELY
Vinagreira	Leaf	YES	YES	689	YES

1. Cheap or free, meaning low price in shops or readily grown, picked, or retrieved
2. Source of mics - a good source of other micronutrients and bioactive compounds
3. RE/mcg/100 grams - retinol equivalents measured in micrograms contained in 100 grams. But most of these values vary greatly depending on climate, species and other factors
4. 100% + 100g. YES means that 100 grams (or in the case of fats, 15 grams) contains more than 100% of the estimated average daily requirement of vitamin A (500 RE mcgs)

YES in bold means that a portion contains more than the requirement for a week. Recommended amounts of vitamin A are higher in the US, as are the reference nutrient intakes (RNIs) in the UK.

Compiled not long after I began to live in Brazil for a small book (1), the purpose of the table, and an accompanying one on animal sources, was to prove that plant foods are the best sources of vitamin A. The conventional theory that children in particular need to eat animal foods to gain adequate amounts, is just plain wrong. Or to be more precise, in parts of the world where animal liver, fortified milk, butter, cheese and eggs are available and affordable, such animal foods are good and adequate sources. But in the tropics, where all sorts of leaves, fruits, nuts, seeds and oils are abundant, there is no need for animal foods as sources of vitamin A, at all.

One of the various reasons for the mistake, is that many of the richest sources of vitamin A in the tropics are plant foods whose analyses do not appear in tables of chemical composition prepared in temperate countries. Take the items listed in the table. You may have heard of *dendê*, which is a type of palm fruit and oil from Africa, brought to Brazil by slaves. But *buriti*, *pequi* and *tucumã* , with staggering amounts of retinol equivalents, are native to Brazil, and I found most of the results in a Brazilian food composition table published in 1981 (2) on a shelf in the federal government Ministry of Health in Brasília, where I was working between 2000 and 2002.

Now for mangoes. You will see from the table that mangoes are a good source of vitamin A. One mango a week would be adequate – easy in many parts of India, and Brazil for that matter, where vitamin A deficiency is also still endemic. But there is more to the mango story. As you may know from the UK official tables of the chemical composition of foods, the amount of carotenoids in mangoes varies vastly. A footnote in the edition I have (3) says that levels vary by a factor of 10. Furthermore, it is a fair bet that the type analysed was *Tommy Atkins*, bred in Florida in the 1930s as a great commercial product, which for this very reason is the worst source of carotenoids. Mango Board analyses show that the *Keitt* type has twice the amount of carotenoids as *Tommy*, and the Mexican *Ataulfo* five times as much (4).

That is to say, the official food composition tables on which so much food and nutrition policy and practice is based, stack the cards against mangoes as a source of vitamin A. It is a fair guess also, that the same bias will underestimate the vitamin A content of all relevant plant foods, most of all those that are imported, because the commercial varieties that are sold and available in high-income temperate countries where vitamin A deficiency is practically non-existent will always be inferior sources of carotenoids. The relevant analyses need to be made in tropical countries, in areas where deficiency is still fairly common, and of varieties that grow wild or in small farms for local consumption, not cultivated for export or for distribution to national supermarkets, and which like the mangoes in our Cabo Frio garden, are eaten fresh off the tree. As far as I know such analyses have never been made. The policy of the dominant UN agencies and US-based international organisations is to supply vitamin A in the form of very high-dose capsules to children in countries reckoned to be at risk of deficiency. The comparative ignorance, disinterest and neglect of local plant sources of carotenoids, mangoes as an example, is an outrage.

The story gets worse. Again, please see the table above. The richest plant sources of vitamin A in Brazil are the fruits of trees that often grow in those parts of the country where vitamin A deficiency remains a public health issue. These natural sources are fairly well known, but ignored. Instead, the *cerrado,* the savannah region of Brazil where *pequi* grows, is being destroyed to grow soya, which is for export to other countries and also to the Amazon region, where the forests are being destroyed to breed cows fed on soya. The fate of these vast cattle herds after slaughter, is to become meat, and remnants that are raw material for cheeseburgers.

The moral of this meditation on the *mangueira*, is that nourishment of humans, and of other creatures too, depends on the protection of trees and their fruits, and on understanding that locally sourced foods from trees – seeds and nuts as well as fruits – are those that are most nourishing.

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1 Cannon G. *The Fate of Nations. Food and Nutrition Policy in the New World.* London: The Caroline Walker Trust, 2003. Obtainable at www.cwt.org.uk

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3 Holland B, Unwin I, Buss D. *Fruit and Nuts.* First supplement to McCance and Widdowson's *The Composition of Foods*, fifth edition. London: Royal Society of Chemistry – Ministry of Agriculture, Fisheries and Food, 1993.

4 National Mango Board. http://www.mango.org/media/47771/ phytochemicals% 20in%20imported%20mangos%20exec%20summary.pdf

Status

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