WN *Columns*

World Nutrition **Volume 5, Number 12, December 2014**

Journal of the World Public Health Nutrition Association
Published monthly at www.wphna.org/worldnutrition/

What do you think?

Geoffrey Cannon



Spiral as measured by René Descartes and Jacob Bernoulli. The spiral of life. A sunflower and its seeds. Evolution mapped in the form of a spiral. Leaves, grass and stars as a spiral in the snow

São Paulo, Rio de Janeiro, Juiz de Fora. John Waterlow, the physician and physiologist, then an eminent professor of human nutrition, approved of the *New Nutrition Science*. This is mentioned here for three reasons. One, is that the icon of the *New Nutrition* is the spiral shape, to remind us that in making progress we are always passing where we have been, as have others before us, but with a wider understanding. The images of life and of evolution (second left and right above) show this.

Two, is that this month I celebrate John Waterlow (or 'Prof'), in an attempt to share some gifts he gave to me. Three, is John noted the environmental aspect of the *New Nutrition*. During and after my last evening with him, the year before he died, he let me know why. He had changed his mind on growth, health and human potential, a topic which was a large part of his life's work. John's home was not so much England, as the West Indies. Given a context of deprivation, food insecurity, and high rates of death of infants and children, he felt that more attention should be given to malnutrition caused by immiseration. He did not get very excited about diseases and disorders of over-consumption in populations with long life-spans, despite in the mid 1970s chairing a UK government enquiry of which Philip James was scientific secretary, whose report warned that obesity is a public health hazard.

Then in my next item this month I explain how *WN* covers are selected, which have revealed an error of mine, here confessed. Finally, the collective statement of social movements to last month's UN International Conference on Nutrition, and a reminder of the true nature of the original Thanksgiving, prompt me to think again that the term 'nutrition' could usefully be set aside in favour of 'nourishment'.

Box 1

The secrets of life



More spirals, all life-affirming. A spider's web. A bronze ear-ring. A woven decoration for the family holiday. Decoration, Emperor's Botanic Gardens, Rio de Janeiro. Stained glass

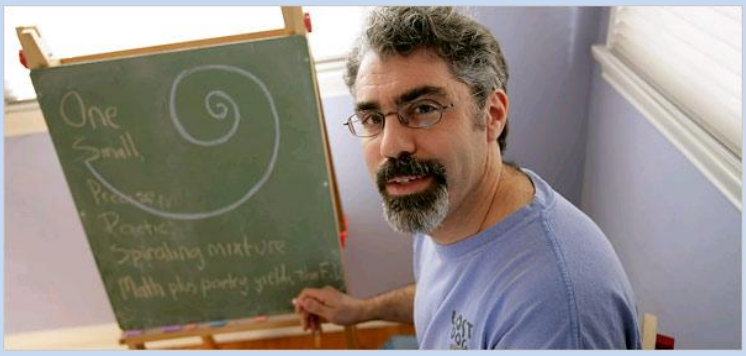
All this stuff you write about spirals is too serious, a colleague says. Worse is vortices, the shape of hurricanes, climate change, and doom and gloom. Cheer me up! OK, so I will. Here above are beautiful life-enhancing and uplifting spirals. Also here is a fun game to play at family occasions such as at the end of year holidays. Fibonacci poems, Fibs for short. The Fibonacci sequence (as explained in *The Da Vinci Code,* and Wikipedia) is the numerical expression of the spiral form: thus, 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, and so on. Thus (with thanks to *The New York Times)* expressed syllabically –

Blogs
spread
gossip
and rumour
but how about a
rare, geeky form of poetry? Blogs

Or, more ambitious, from a computer science engineer –

I
like
to blog
frequently.
Theory matters.
Computer science (theory)
is my home and geometric algorithms are
sublime. Let P be a set of points in general position in the plane. Amen.

These are wretched attempts – and 'theory' with three syllables? The best two submitted on the theme of public health, nutrition, and so on, get printed in my next column.



Gregory Pincus from Los Angeles with one of his Fibonacci poems, or Fibs, whose syllabic sequence is 0+1 = 1, 1, 2, 3, 5, 8, 13, 21... and so on – as he shows here, a verbal spiral

Food and nutrition, health and well-being

What they believe: 13 . John Waterlow Human potential and limits









Photograph of some of the participants who attended the symposium to honour John Waterlow organized on 5 July 1996 at the London School of Hygiene & Tropical Medicine. Photograph taken in the London University Senate House garden with the London School in the background. *Top row (left to right):* Katherine Garrow, Jo Hautvast, Andre Briend, Rainer Gross, Kim Michaelson, Roger Shrimpton, Roger Neale, Jeya Henry, Ken Fletcher, Beat Schurch, Eddy Fern, Robert Montgomery, Sally McGregor, Andrew Tomkins. *Middle row (left to right):* Norma Anderson, Prakash Shetty, Philip James, David Thurnham, Lars Garby, Dave Halliday, Peter Reeds, Joe Millward, Ann Hill, Vernon Young, Peter Garlick, Virginia Pain, Mike Golden, Barbara Golden, Jackie Landman, Jane Earland, Susan Walker, Peter Williams, Henry Bunje, Kennedy Cruickshank, Terrence Forrester. *Front row (left to right):* Joan Stephen, Buford Nichols, David Picou, John Waterlow, George Alleyne, John Garrow, Alan Jackson.

John Waterlow at 80 with some of his pupils and colleagues assembled in his honour. He is centre, front, flanked by Joan Stephen, Buford Nichols and David Picou (left) and (right), George Alleyne, John Garrow and Alan Jackson. Keen eyes can spot (top) Jo Hautvast, Rainer Gross, Roger Shrimpton, Sally McGregor, Andrew Tomkins, and (middle row) Prakash Shetty, Philip James, David Thurnham, Joe Millward, Ann Hill, Vernon Young, Mike Golden, Terrence Forrester

'Half my family was killed in the war' John Waterlow told me, referring to the First World War, 'and I wanted to do something useful. Whether it has been useful, remains to be seen'. We were sitting in the front room of his small house, 15 Hillgate Street, off Notting Hill Gate in inner west London, the year before John died. With Joan Stephen, we had crossed the street to Costa's Grill, for Greek salad, dolmades, baklava and retsina. On return I asked if he would speak for the record. He agreed, in his grave

way. After a couple of hours I sensed that there was something he wanted to tell me.

John Waterlow died age 94 in 2010. He is one of the most eminent and influential modern nutrition scientists, as witness the picture above of the human version of 'the houses that John built', taken to celebrate his 80th birthday in 1996. The first time I met him was in 1988. He came to our home to say goodbye to his former student my wife Caroline Walker, who lay dying. He told me she had 'obtained, as I recollect, the highest marks ever achieved' in her 1977 MSc examination at the London School of Hygiene and Tropical Medicine, where he was 'Prof'. After they talked and laughed he left, and by the front door quietly said 'very sad'. Caroline later said to me that it was so kind of him to come. But he was like that – thoughtful.

Emissary of Empire

'If you're going to make any progress, you've got to go all out for it' John said during what was our last evening at Hillgate Street, referring to his research on protein metabolism and physical potential. That is what he did, with pupils and assistants many of whom remained devoted to him and became distinguished. Three – David Picou, Joe Millward and Prakash Shetty – have advised me.

He was one of a breed of British public servant that has vanished, with other aspects of British life. Tributes sent to me *by David Picou* and *others including by George Alleyne,* indicate his achievements. His father Sir Sydney, a friend of the Bloomsbury Set, was Ambassador to Siam (Thailand), then Abyssinia (Ethiopia), Bulgaria and Greece. His grandfather Sir William had been Lord Mayor of London. Captain of School at Eton, John's scholarship to Cambridge was in Greek and Latin – thus his command of language and use of exact, strong, clear words and terms. With a choice of the church, the bar, politics or academia as careers, he chose physiology. He too was an emissary of Empire. In the 1939-1945 war he was in Iraq with the British army – 'we were the first to distinguish between heatstroke and heat exhaustion' he told me. Assigned by the Colonial Office, from 1945 to 1970 he was mostly in the Caribbean, with a base in Jamaica, 'to investigate why so many children were dying'.

John's family story had aspects as found in Graham Greene novels. Waterlow Park in Highgate (picture right above, next to John in his prime) was donated in 1889 by an earlier Sir Sydney to the people of London. The family was master printers. In the 1970s I went to Waterlow's Park Royal weekly to work on the journal I then edited. The name was known all over the world, for Waterlow's had the licence to print money and postage stamps for many countries, often with 'Waterlow & Sons Limited, London' printed on the product. I later learned (picture left above) that in 1922 Sir William was duped into printing 200,000 Portuguese 500 escudo banknotes ordered by and delivered to a confidence trickster. The notes were dumped in Portugal, swamped its economy, and maybe accelerated the rise to power of the dictator António Salazar. After all was discovered, a court ruling fined and almost broke Waterlow's.

Box 1

Physiology and beyond

Extract from the obituary by Joe Millward in The Guardian, 15 November 2010. See also tributes from David Picou and from George Alleyne and others

John Waterlow was born in 1916 into a well-known London printing family. His great-grandfather bequeathed Waterlow Park in Highgate, to London in 1889. John's father, Sir Sydney Waterlow, was a member of the Bloomsbury set, so John grew up in an intellectual and literary environment, with occasional visits by authors such as EM Forster and Virginia Woolf and others to the family country home in Wiltshire. As a teenager he was an intrepid traveller, especially to Greece, where his father was British ambassador. One trek from Athens to Castoria in north-western Greece in 1935, mainly on foot, ended with a bout of malaria. Twenty years later, he almost died of altitude sickness in the Colombian Andes while researching the condition.

He studied natural sciences at Trinity College, Cambridge, as a prelude for medicine, gaining a first-class degree in physiology in 1939. He qualified at the London Hospital in 1942. After working for the army, researching heat stroke in Basra during the Second World War, he joined the scientific staff of a new Medical Research Council nutrition unit headed by Ben Platt, who also became professor of human nutrition at the London School of Hygiene – the post John assumed on Platt's death in 1970, continuing to 1982. Platt told John: 'Nutrition will be the problem of the future.' He sent him to the Caribbean to find out why so many young children were dying there.

Diagnosis and treatment of kwashiorkor

Studying malnourished children in the Caribbean in the early 1950s, John found the same symptoms he had previously found in African children suffering from kwashiorkor. He persuaded the Medical Research Council to let him establish his own Unit in Jamaica, with beds for sick children and research laboratories. The challenge was to understand the cause of the children's condition, which involved fatty liver, oedema, flaky skin and hair loss, loss of potassium from muscles and blood cells, and reduced protein synthesis.

Kwashiorkor was eventually shown to be the catastrophic influence of diarrhoeal or other common infection in children who lacked the protective antioxidant vitamins and minerals in their diet, and not a simple consequence of protein deficiency, as had been believed. This discovery led to a phased treatment programme beginning with antibiotics, electrolytes, vitamins and minerals, then stabilisation with modest feeding to allow repair, and only then intensive feeding to allow complete and rapid recovery. John then was able to establish the Tropical Metabolism Research Unit at the University of the West Indies in Jamaica in 1956.

John later moved into the mainstream of international public health, chairing, in 1976, the first UK government committee to report on obesity. He contributed to reports for the UN's Food and Agriculture Organization and the World Health Organization on nutritional requirements for protein, chairing the 1985 report. His books *Protein Turnover in Mammalian Tissues and in the Whole Body* (1978), and *Protein-Energy Malnutrition* (1992), are standard works.

He became a fellow of the Royal Society in 1982 and was president of the UK Nutrition Society from 1983 to 1986.

John founded and directed the MRC Tropical Metabolism Research Unit (TMRU) in Jamaica. In his time there, between 1954 and 1970, the rate of infant deaths from malnutrition dropped from 35 to 5 per cent. In 1969 he became CMG (Commander of the Order of St Michael and St George, an Honour awarded to distinguished public servants. CMG is said jokingly to stand for 'Call Me God'). The Unit then became part of the University of the West Indies, and was headed by David Picou, then Alan Jackson, and as an Institute (TMRI) by Terence Forrester. George ('Champ') Alleyne, a Barbadian who also worked with John, later became director of the Pan American Health Organization. They flank John in the picture above at his 80th birthday celebrations. He was elected a Fellow of the Royal Society in 1982.

Social responsibility

The 80th birthday celebrations for John were followed by a *festschrift* edited by Prakash Shetty. This includes a tribute by George Alleyne, also *separately published,* which takes from the final conclusion of John's book *Protein-Energy Metabolism* a quote from the Colombian clinical nutritionist Leonardo Sinisterra:

> It is not the function of scientists to change the economic and political structure of a society, but it is our responsibility to understand its inequalities and limitations, because it is within this context that we must exercise our knowledge.

John's rejoinder in his book should also be quoted:

> If… politicians and administrators choose not to apply the knowledge put at their disposal, then the training, experience and activities of professionals in health and nutrition may seem to be rather irrelevant. Professionals are also citizens, and perhaps a more productive way ahead [is] promotion of political will. Some even hold that technical progress is counter-productive because it weakens drive for more radical reorganisation.

For all his working life, he thought about the limits of social responsibility of scientists and the scientific profession, which is to say, the philosophy and politics of science. He did not attempt to impose answers. He was Socratic. He asked questions, for readers and his colleagues in UN agencies, government, academia, industry, and learned professions to consider.

Box 3

Publications by and about John Waterlow

Waterlow JC (editor). *Protein Malnutrition. Proceedings of a Conference in Jamaica* (1953). Waterlow JC (chair) *Research on Obesity* (DHSS-MRC report, 1976). Waterlow JC (co-author). *Protein Turnover in Mammalian Tissues and in the Whole Body* (1978). Waterlow JC (consultation chair, chief contributor). *Energy and Protein Requirements* (FAO-WHO-UNU report, 1985). Waterlow JC. *Protein-Energy Malnutrition* (1992, updated 2006). Waterlow JC (co-ed). *Feeding a World Population of More than Eight Billion People. A Challenge to Science* (1998). Shetty P (ed). *Nutritional Metabolism and Malnutrition. Festschrift for John Conrad Waterlow* (2000).

Serious thinking

John is famed as a rigorous laboratory scientist and an inspiring teacher. He was proud of the achievements of his students and staff, as eloquently set out by David Picou. He quoted himself as saying to a young colleague in Jamaica, not entirely as a joke, 'I never took you seriously until I saw you walking across the road carrying a bottle of urine'. His own work on protein turnover, and on protein and human growth and health, remain as Joe Millward says (Box 1 above), standard work.

He thought holistically. He bitterly regretted that after his retirement, the 'three legs' of nutrition he had created at the London School between 1970 and 1982, of clinical and medical diagnosis and intervention, biochemical and metabolic research, and public health initiatives and advocacy, had been split up. Priority was given to molecular biology, then and now a money magnet

During our conversation I asked him about his views on breastfeeding. He said he still was inclined to believe that a goal of 4-6 months of exclusive breastfeeding is better than what is now the UN goal of 6 months. A range is more flexible, and the time to change from exclusive breastfeeding, which can be felt by both mother and child, is better not imposed. On his work as a consultant for Nestlé, he said 'we ought as scientists to collaborate with industry, and I wanted to be able to influence them in some way'. He had been a governor of the industry-funded British Nutrition Foundation from 1967 to 1997, and chair of its scientific council 1975-1976.

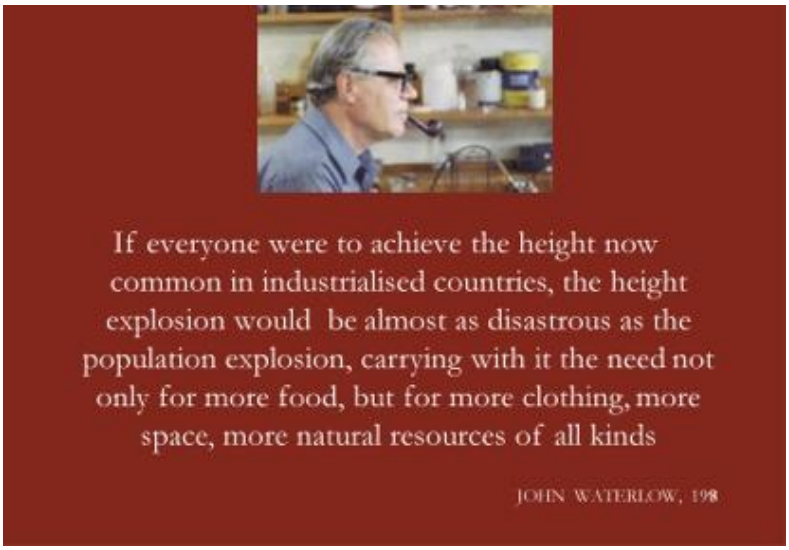
Human potential

What I most hoped he would talk about, was human potential. He was chair of the FAO-WHO expert consultation resulting in *Energy and Protein Requirements* (Technical report #724, published in 1985). A couple of decades later this report had not been superseded, yet was not available. UN recommendations on protein seemed to be in limbo. (The current report, #935, was published in 2007). So I was intrigued. In 2004 I photocopied the copy in the WHO library in Geneva. It is beautifully written, and also is a work of philosophy. Thus, at its beginning:

> Throughout the process of determining protein and energy requirements, the question 'requirements for what?' has to be borne in mind. Acceptance of this view demands a closer liaison between biologists, who are concerned with the physiological basis for estimating requirements, and social scientists, who are concerned with the practical application of these requirements.

And at its ending, the final words of the report's conclusions:

> If the present judgements are thought to be inappropriate, then it is up to the user, or the community of users, to offer more appropriate judgements. No longer can we bypass the question 'Requirements for what?'



The environmental dimension of population development. One of John Waterlow's observations in the final book for which he has a lead responsibility, on future global food needs, published in 1998

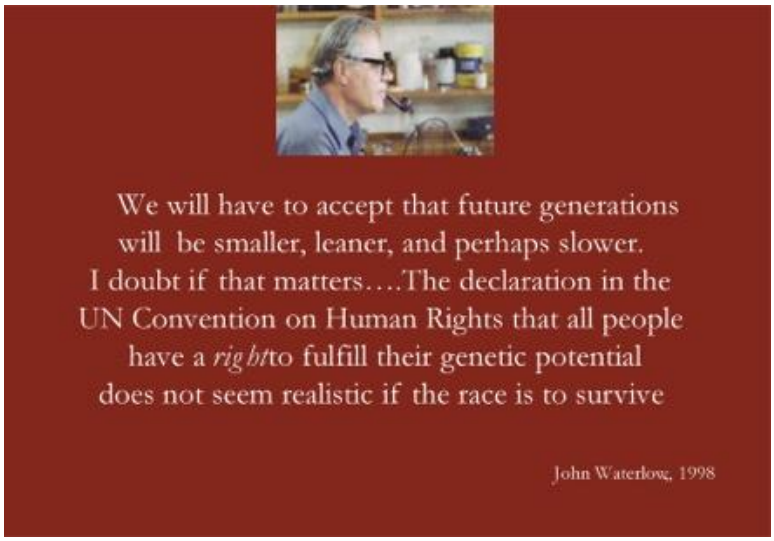
The scale of malnutrition

This was John's style, for sure. He was unacknowledged chief author of the report. He was also personally responsible for the powerful plain language terms 'stunting' and 'wasting', to refer to people – children, especially – who are much smaller or thinner than agreed norms. These are almost invariably seen as reliable proxy measurements of malnutrition, and are the basis for estimates of how many children in any population, whether local, national, or global, are malnourished. But *in his Boyd Orr lecture* to the UK Nutrition Society in 1980, John wonders if very short children who show no clinical sign of disease are suitable cases for nutritional intervention:

> If stunting were regarded as an adaptation, or a kind of healed scar, and therefore unimportant, and the definition of malnutrition was based only on the deficit of weight for height, our estimates of the numbers of malnourished children in the world would be cut at a stroke by something like 80%.

The view that malnutrition in the world is over-estimated, is held only by a small minority of knowledgeable people. The full expression of human genetic potential by dietary methods that promote growth, resulting in children and adults taller and so on average heavier than their parents and grandparents, is agreed as a prime aim of nutrition science. From long experience, John's colleague in Jamaica *Sally Grantham-McGregor* is sure that sustained physical growth is crucial for mental, emotional and social health and development. John's persistent point was that short people may have impressive physical abilities. This is stated in the 1985 UN report. As one of the examples given:

> Italian children from poor families performed better in physical fitness tests than their counterparts from more prosperous families, in spite of their smaller size and lower habitual energy intakes.



The environmental dimension of population development. Another one of John Waterlow's observations in the 1998 book for which he has a lead responsibility, on future global food needs

The 1985 UN report seemed to signal dissonance between requirements for growth and requirements for health – or at least for physical performance. During my evening with John I felt this might be my last chance to quiz him about this. So I did. He responded in a way that impressed me, for he did indeed have something to tell me. This was not about human size and physical or mental ability, but global ecological and environmental dimensions and trends – the future of the human race.

He walked me slowly into his library. He had already signed my copy of *Protein Malnutrition*, the hardback verbatim record edited by him of a 1953 conference held in Jamaica convened by FAO and WHO. Participants had included Marcel Autret, Wallace Aykroyd, Rex Dean, Colothur Gopalan, Nevin Scrimshaw, Cicely Williams. Claus Leitzmann had rescued the book for me just before it would have been thrown out with many other 'old books' from the Giessen university department library.

Perhaps you would like these' John said, and gave me two books. One was the updated edition of *Protein-Energy Malnutrition*. The other was *Feeding a World Population of More Than Eight Billion People*, published in 1998. In it he addresses the environmental implications of human size, integrating this with the thinking of *Limits to Growth*, the 1972 report commissioned by the Club of Rome. Two of the statements John made in his chapter on future world population projections, are shown in the two slides on this and the previous page. In particular:

> We will have to accept that future generations will be smaller, leaner, and perhaps slower. I doubt if that matters… The declaration in the UN Convention on Human Rights that all people have a *right* to fulfil their genetic potential does not seem realistic if the race is to survive.

This, I feel, is what he wanted to tell me, to share with others. So I do.

Vitamin A. Mangoes
Trial and error

Access October 2014 Geoffrey Cannon on visuals here
Access November 2014 John Mason, Ted Greiner et al on Vitamin A
Access this issue cover here



Four of the options for the cover of last month's WN on the universal vitamin A supplementation programme, for all young children in countries where deficiency is judged to be a public health issue

At *World Nutrition* we spend quite a lot of time choosing pictures to use in important positions, especially the cover. In common with other publications, we search the internet for options. The best choice for a cover picture is accurate, vivid, appropriate, and simple. Few available pictures are all of these. Last month's cover projected *the commentary by John Mason*, Ted Greiner, Roger Shrimpton, David Sanders and Joshua Yukich, on the universal vitamin A supplementation programme. Their commentary is critical of current practice, and for this reason it felt right to choose a picture that has been used to promote the programme. Here are four of the half-dozen options. That at top left was used for the cover of the May 2010, whose commentary by Michael Latham was also critical of current practice.

What we then do is ask for a vote among a dozen or so members of the *WN* editorial family. In this case everybody thought it was inappropriate to repeat a previous cover. All disliked the 'upside down' picture. Voting was otherwise even. The dark picture (top right) is visually stronger. But it is not clear what is happening, the child's eyes are closed – and that ring! So as readers will know, we chose the 'white gloves' picture, which is rather cluttered and far from perfect, but does clearly convey a para-medical procedure.



Four of the options for the cover of this month's WN marking the UN International Conference on Nutrition, and its theme of reducing malnutrition by means of protecting healthy food systems

Which mango?

Now for this month's cover. The main event of November was of course the UN International Conference on Nutrition, magnificently recorded on the UN Food and Agriculture Organization website. We wanted a cover on healthy food, clearly coming from the global South. As a bonus, it also seemed a good idea again to refer to food-based approaches to prevent vitamin A deficiency. Plus the mood should be positive. So the answer was a mango. So far so good…

Here I confess my error – or what would have been an error, had it not been for our polling system, and wise colleagues. I liked the picture of the mango in hand, top left, because it is simple and luscious. Everybody who voted was against this picture, and quite right too. The hand is white, for a start. But also, the food is shown as an external object. Wrong! It has to be shown as being eaten!

Votes were more or less evenly distributed among the other pictures. Of the three I rather liked the one of the wistful Indian boy, his face nicely lit, with a mango hanging right by him, but its 'mystical' mood is a distraction. Several people liked the one of lots of Indian girls, but earlier *WN* covers have featured lots of smiling children and it is not instantly obvious that what they are eating are mangoes and not popsicles. As you can see, the picture chosen for the cover is of the African boy. A couple of worried comments were that he looked very hungry and rather anxious, and also that he was making a mess. Thiago Hérick de Sá's comment was similar, but enthusiastic. Sure he is hungry! And mangoes do make a mess and the juice does dribble down your face, when you eat them not politely peeled and sliced, but whole! Thank you, Thiago!

Nourishment
Food for the body, mind, heart and soul



A dance of the Baganda, the people of the ancient central province of Uganda that includes Entebbe and Kampala. Throughout traditional societies, dancing and feasting come together in celebrations

Food as a centre of life

'Nutrition cannot be separated from food'. These are the first words in the statement made at the UN International Conference on Nutrition, by *the social movements of the world.* They go on to make a true and beautiful declaration:

> Nutrition encompasses identity, love, caring, spirituality and health. Nutrition is more than simply eating. It is part of the transmission of methods, knowledge, language, ceremonies, dances, prayers, oral histories, stories and songs related to food, subsistence practices. It is also essential to the continued use of traditional foods in our daily diets.

Exactly. The term 'nourishment', rather than 'nutrition', well expresses the unity of all personal, social, cultural, economic, political and environmental aspects, and of the physical, mental, emotional and spiritual dimensions, centred on and implied by the whole process centred on enjoying freshly prepared meals in company, every day and on special occasions. This is all in the originally ancient natural philosophy of dietetics, developed independently in Asia, Europe and America, as the teaching and practice of the good life well lived, in harmony with the living and natural world. The social movements have a clear vision and definition of what is needed to gain and maintain security:

> Food sovereignty is a prerequisite for food and nutrition security. Food sovereignty is the right of peoples to define their own policies and strategies for sustainable production, distribution and consumption of food that respect their own identities and systems of managing natural resources.

We are the Indians now

This resonates with a reminder by Anne Guerry Hodderson of the truths behind Thanksgiving, the feast held every year in the US at the end of November. She says

> At the time of the conquest, the indigenous people cultivated over 300 food crops which today are the basis of three-fifths of what is eaten on our planet. When Columbus arrived here, the rest of the world was plagued by regular famines because the crops they depended on – grains in Europe, rice in Asia, and sorghum and millet in Africa – were vulnerable to bad weather, birds, and insects.
>
> Luckily for the poor and underfed peasants of the rest of the world, the Incas had developed 3,000 varieties of potatoes over 4,000 years. They had a variety for every growing condition in Europe, Africa and Asia. This is a personal piece of information, since most of us are probably descended from peasants and wouldn't be sitting here without the Inca's humble, homely potato which ended famines caused by crop failures.

It is now commonly known that the popular story of Thanksgiving as told to children, shared in families and amplified in the media, which portrays the Pilgrim Fathers and earlier European settlers of what is now the USA, as hardy and resourceful farmers and hunters in an uncultivated land, is a travesty. In truth, these first arrivals had little idea of how to survive, and were rescued from famine, starvation and even cannibalism by the native peoples, whose cultures were centred on sharing, and who took pity on them and fed them, then taught them how to sustain their food supplies. Throughout what are now the Americas:

> The indigenous people of this hemisphere… invented countless herbal medicines, domesticated animals and cultivated thousands of varieties of plants….Potatoes, corn and beans were miracle crops. They could be grown in any soil, required no milling, and on a regular basis provided more food, more nutrition and with less labor than any grain… Crops and spices grown in our hemisphere were spread around the globe.
>
> Native Americans didn't just create new varieties of food, they developed the technology for processing plants and animals by drying, grinding, adding lime or ashes, using acid to soften and preserve meat, tapping maple trees for syrup. Plains tribes figured out how to extract oil from sunflower seeds. Mayans learned to produce chocolate from the cacao bean, and Aztecs discovered vanilla in an orchid fruit that required months of heat and humidity to produce a wonderful aroma.

Learning the true histories of the original peoples of the Americas, and of the civilisations and cultures of pre-literate societies throughout the world (1,2) enables a deeper and fuller understanding of what goes on in the world now. From the vantage point of corporations, we are the Indians now.

References

1 Zinn H. *A People's History of the United States* (chapters 1-3). New York: Harper, 1999.

2 Conner C. *A People's History of Science* (chapters 1, 2) New York: Nation, 2005.