Shanghai talk

Welcome to this Shanghai talk

Welcome to this Shanghai talk about wicking beds.

I guess many of you would have heard of wicking beds and may think they are just a way of saving a bit of time and trouble by not having to water plants so often.

This may be true but is missing the point of modern wicking bed technology. To my mind it is like thinking about a horse and cart as a means of transport.

Original wicking bed was simply a sheet of polythene buried in the ground to catch and store erratic rainfall or irrigation water to avoid loss of water and nutrients beyond the root zone. They were originally conceived as a way of providing sustenance food in periods of droughts in poor countries but the idea has caught on with many thousands of beds being made by enthusiastic gardeners.

But we should really be moving on from the horse and cart era to the era of high speed trains.

Wicking beds provide a solution to the problems of our modern diet which in countries like the US and Australia is leading to obesity causing diabetes, heart decease and strokes and some doctors think even cancer.

Diabetes is now the number 1 expenditure by Governments on health care.

I first came to mainland China when Deng Xiaoping opened up the country – one of the most far reaching events of the modern era. That was some thirty years ago but I have two distinct recollection of that time.

The first was the swarms of bicycles which were everywhere; the second was that people looked slim and fit.

Then as I revisited China over the years the electric scooter challenged the bicycle and now cars are everywhere.

For many China is prosperous country.

But there is a price on this prosperity, China has now surpassed the US and India to become the number one country for diabetes. Some 100 million Chinese now suffer from diabetes.

How diet affects health

In the next section of this talk I want to look at how diet affects health and what we can do about it.

There is an overwhelming amount of information about diet and health form qualified health professionals, people with their own pet remedies and companies trying to sell some magic solution, either diets or pills, which will make people thin and healthy. I have a google alert on diet and health so every day I read articles connecting diet and health.

The volume of information is almost overwhelming with so many different opinions it has been a challenge to make sense it.

How do we make sense of this?

The classic approach is to look for a consensus among the scientific community. At first there seemed to be no consensus with experts arguing there case with other experts, it made the debate on climate change look benign.

The aim of science is to come up with a general law which is universal. I was trained as an engineer and we can look to basic laws, often very simple laws like Newtons laws of motion, the laws of thermodynamics or strength of material. These laws can be applied in almost to design anything, simple or complex, from an aeroplane, car, washing making or toaster.

But medical science is different, people are different so what may work for one person may not work for another so we have to rely on a statistical approach to develop laws which are true in general but may not be true in a particular case. Eating hamburgers and hot dogs may make most people fat and liable to get diabetes but there are some people who could eat greasy fatty foods all the time and never get fat.

But a particular individual who is told they diabetic or more likely is not going to be happy to be told that there are some three billion people in the world who are diabetic. That is no comfort at all, what they want to know what do I have to do so I don't go blind (diabetes is the most common cause of blindness) or have my feet of hands chopped off.

A doctor monitoring a patient will look at specific results, such as blood sugar readings, for an individual and then decide what remedies may help based on general laws.

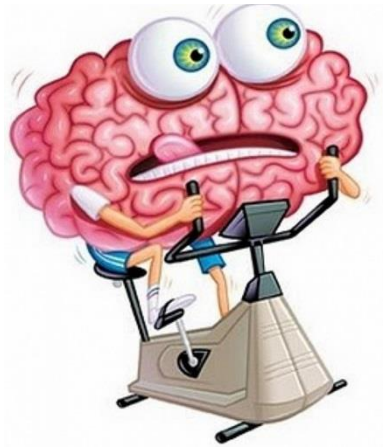
But laws based purely on statistics can be very misleading – for example there is a high degree of correlation between smart phone use and diabetes but that does not mean that an

individual that throws away their smart phone they will be cured of diabetes. We need an understanding of the mechanisms, how does this work.

For a long time I read about many trials, which I am sure are statistically correct, but I could see no mechanism. I am an engineer and since I was a small boy I have taken things to bits to find out how they worked.

Also I see the many diets that are being promoted, diets like the Atkinson, poleo, low fat vegan etc. and I see that often they are in conflicting, meat is healthy - meat is bad etc. I also see that many of these diets do not give lasting weight lost, they may work for a while then most people just give up and go back to eating in their old way.

There was an underlying assumption in the trials that our bodies are like some dumb machine, like an old steam train. You feed the boiler with fuel and the engine produces energy. You feed a person fuel like hamburgers and the body produces energy.



But then I came across some research that was done in the UK which explained many things. We are not some dumb machine, the body produces neurochemicals, chemical signals from our stomachs which report to our brains the current state of our food needs and the brain then signals us what and how much more to eat.

We are not some dumb machine but an intelligent creature.

Mankind has have been on this earth for almost 200,000 years most of the time as hunter gatherers collecting wild plants and catching and eating animals as best we could. All this time our bodies and particularly our brains were evolving to cope with these difficult conditions. We do not have strong claws or massive teeth or horns like other wild animals; we survived and prospered because of the evolution of our brains.

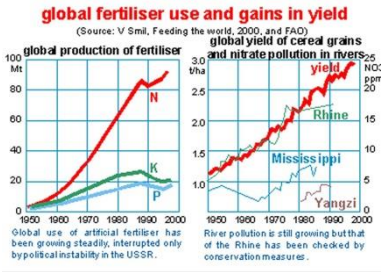
Agriculture barely goes back 10,000 years which in evolutionary terms is not very long, so essentially we have evolved as an intelligent creature as hunter gatherers.

The food supply was erratic predominantly from a wide variety of plants supplemented by a lucky animal kill. The wild plants growing in virgin soil would have provided plenty minerals and vitamins but limited energy. Our intelligent neurochemicals would have evolved to primarily to tell us that we needed more energy and it would be a good idea to go out and slay a passing mammoth.

The introduction of agriculture completely changed that picture which again was transformed in recent times by the green revolution. Our stable food now comes from a very limited range of plants such as rice, wheat, corn and soy which have been genetically selected for very high production supplying large amounts of energy.

The green revolution has given us the capacity to produce large amounts of energy; we are currently producing enough energy to supply double the current world's population. Of course there are still many people who are undernourished but this is largely due to political instability, war and poor distribution.

However the green revolution and the politics and economics of food production have fundamentally changed agriculture. It is now very dependent on both fertilisers and irrigation. In the west it is largely controlled by major corporations who operate the food processing industry but by their purchasing power essentially control the farms.



Fertiliser use has increased dramatically, particularly of nitrogen, which has led to a major increase in production.

Much of the fertilisers is produced synthetically base on oil. We now have a very good understanding of soil and plant chemistry. The process of photosynthesis on which all our lives depend require carbon, oxygen and hydrogen which plants get essentially from the atmosphere. They also need the primary nutrients such as
N, P, K, and the secondary elements Ca ,Mg, S which are required in moderate volumes. The micro nutrients Mn, Fe, B, Zn, Cu, Mo, Cl, Co are needed in smaller quantities essentially as catalysts.

However we humans require more elements such as selenium, iodine, vanadium, chromium etc. which the plants do not need themselves but will be absorbed by the plants if they are in the soil. And this is where the problem really starts. Smart farmers using soil tests know exactly how much of the primary nutrients to apply. We now have computer controlled fertiliser spreaders which will apply just the right amount to each section of the fields based on soil samples or even aerial surveys.

Most farmers also recognise the importance of the secondary elements and will supplement with calcium, magnesium and sulphur by adding gypsum and dolomite to the soil.

In much of our agricultural land there have been sufficient trace elements that famers have not needed to worry too much unless there is a serious deficiency, however this is becoming more common as each crop takes more of these elements from the soil.

However the farmer has little incentive to add the minerals which we need but the plants do not. Selenium is used by our cells for the reproduction of our DNA and there is a view in the medical profession that lack of selenium in our diet is an issue with cancer which is caused by rogue cells not reproducing correctly. Lack of iodine is well recognised as a cause of loss of brain function – a polite way of saying it makes people stupid or imbecilic.

The amount of meat we eat is steadily increasing with affluence. Many dieticians blame this increase in modern health deceases on this increase in meat consumption. This is a debatable issue and to me this is not so clear cut. There are many tribal people living on land which is too poor or with and adverse climate so they cannot grow crops and largely depend on meat – yet they appear to be perfectly healthy. But that is not the sort of meat we eat. Much of our meat comes from animals that are fed crops likes corn which are deficient in minerals and if the minerals are not in the feed they cannot be end up in the meat.

Wild animals and tribal cattle range overlarge distances often in hilly country which has never been farmed so eat nutrient rich plants with plenty of minerals. May be we are blaming meat when we should be looking at the way we produce meat.

When I was in Shenzhen I saw local people selling a wild pig in the street. Judging by the interest and rapid sales it seems they appreciated the improved quality of naturally grazed animals.

Our food system surplus of energy deficient in minerals

We have a food system which provides a surplus of energy and is deficient in trace elements, mineral vitamins and phytochemicals.

This is where our intelligent neurochemicals which have evolved over the centuries tries to protect us, as it has done for years. It senses that our food supply is not meeting the needs of our bodies and sends out signals 'go and eat more'.

But what do we tend to eat, food with more of the same, food with an excess of energy and lacking in these critical minerals etc.

This is why diets generally fail. We start off with good intentions and our will power overcomes the signals from our body. But our body signals have been developed over centuries to protect our bodies and keep on telling us to eat; eventually we develop an overwhelming craving for more food.

To ensure we get a full complement of micronutrients, evolution wired us with a drive, powered by neurochemical rewards, to seek out those micronutrients and the variety that supplies them.

But we eat more of the wrong food so the deceases of obesity spread like wild fire and diabetes, heart decease and strokes spiral out of control.

The world's worst health problems are, in short, diseases of civilization.

The United Nations Food and Agriculture Organization (FAO) tells us that a third of humanity suffers from what the organization calls "hidden hunger," which is defined as a diet ample in calories but insufficient in nutrients and micronutrients. Anemia from iron deficiency, goiter from iodine deficiency, and blindness from severe vitamin A deficiency lead the list as the worst problems.

Vitamin B12, iodine, magnesium, cholesterol (yes, cholesterol is a vital nutrient), vitamin D, calcium, fiber, folate, vitamin A, omega-3s, vitamin E and iron — each is plentiful in the same foods we have eliminated from the modern industrial diet and each is vital to brain function and physical well-being. Furthermore, scientists are in the early stages of understanding the phenomenon of "bioavailability" — that the lack of a given vitamin or micronutrient is not simply remedied by adding a given amount back through a supplement. The body's ability to absorb those nutrients is greatly influenced by the presence or absence of other nutrients. For instance, people eating a full complement of healthy meats tend to not need added vitamin C at all. Eating spinach with lemon helps the body absorb much more of the iron in the green's leaves. Eating eggs and cheese together delivers a better uptake of vitamin D and calcium. Variety supports our internal complexity.

Yet making this all an issue of omega-3s or carbohydrates misses the point. There is no single focus or magic bullet or wonder micronutrient, no matter what the marketers might tell you. There is only diversity.

The search for the Holy Grail (if it exists).

On my current trip to China, which is really the home of medical plants, I thought I should at least look for that magic plant which would solve these health problems. I was deeply suspicious that I would find such a plant – it seemed to me unlikely that there would be any pill or plant you could eat which would mean you could eat as much as you liked including the proverbial hamburgers and hot dogs.

I was therefore surprised when I came across not one but a bunch of plants and pills that made this claim. Being a suspicious engineer who is into underlying mechanisms I wanted to see if there was any explanation on how they worked.

Again I was surprised when I found an explanation. This was that the plants produced sugar like substances which were chemically very close to sugar but not quite so they fooled our intelligent neurochemicals into thinking that we had plenty of sugars on our bodies when in fact we did not have real sugar. We felt full and stopped eating.

Fooling our intelligence system

In essence they are fooling our intelligence system but is this good. Our intelligence has been developed over thousands of years to protect us, which it has done admirably. These plants (and some drugs) are treating the symptoms of overeating and obesity without looking at the real cause which is a lack of the essential minerals in our diet.

We need to attack the real cause which is a lack of balance between energy and minerals in our diet.

Possible solutions

Many people have realised this fundamental problem and have tried various solutions. Taking dietary supplements e.g. pills is widely used, but this is may not be such a good approach. We need a whole range of minerals and vitamins which would need proper medical supervision to get the balance right. It is also an expensive approach which is really only available for the rich.

Farmers markets and organic shops have been springing up all over western countries. These are no doubt help but the emphasis has been more on avoiding chemical sprays which can make affect the appearance of the produce. Just because produce is organic is no guarantee that it contains the needed minerals, vitamins and phytochemicals.

This will only be incorporated into the plant if the grower makes sure the mineral are in the soil, which is not a legal

requirement for organic certification.

The permaculture and alternative life style movement has caught on in countries like Australia but the reality is that this in only available to a limited number of highly dedicated people. Trying to grow all your own food means a severely restricted range of foods depending of the season. Most people like to have grapes in winter as well as for a few months each year.

Such movement are highly commendable but are unlikely to develop into a mass movement which will provide nutritional food to the majority of the population. We must also recognise the reality that the food industry is dominated by large transnational corporations who have major political power and can restrict competition. It is a sad fact but in many countries the days of the traditional family farm are over.

So we need to look for practical solutions which will work.

Finding practical solutions

I may be critical of our modern food system but we must recognise that it has bought great benefits. It provides us with an abundant supply of food at low prices with a whole range of foods available throughout the year.

It would be stupid to try and overthrow this system rather we should look at how we can overcome the limitations of the system by supplementing our diet. It is providing us with all the energy we need we just need to supplement this with food containing the essential mineral, vitamins and phytochemicals.

To a significant degree this has already happened in Australia where a significant proportion of the people are growing food, particularly vegetables. The wicking bed technology has played a significant role, overcoming one of the big problems in Australia of limited water.

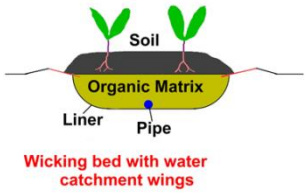
However the bulk of the population live in suburban houses with an adequate garden so growing your own food is relatively easy. Even in the city centres where an increasing number of people live in apartments the local council has often set aside an area for communal gardens with local residents having their own small area of allotment. This has proved quite a social boon as they form an unofficial social club where local residents can meet and talk.

Gardening is the most popular hobby in Australia with most localities having an organic growers club.

However to apply this technology to China required some serious rethinking of both the technology and the social aspects. The population density is much higher in China; Shanghai has the population of the entire Australian continent. Most people live in apartments but most of these have a veranda or Yangtai which is still capable of growing food, also roof tops and some communal gardens are available.

I will now describe the basic wicking bed technology and how this can be modified to suit conditions in China.

Wicking bed technology



Wicking bed with water catchment wings

The principles of the wicking bed system are simple. The base, which is water proof is typically filled with organic material and with a pipe to distribute water along the length of the bed. A top layer is home for the plants which is maintained moist by water wicking up from the base.

The operation resembles the classic flood and drain system in which a pot is flooded, expelling all the air, then pulled up to let the water drain out sucking fresh air back into the soil.

This creates a breathing action. The water level must drop to get this air movement e.g. a deep cycle system

Wicking boxes can be as simple and cheap as an old vegetable box, with a hole poked in the side and a pipe to flow the water to the bottom of the box

Note the drain holes about 1/3 from the base

This is the size of a typical garden wicking box made from a plastic sheet draped over a frame; rigid boxes are now more popular

.

Typical sunken bed with the plastic lining to soil level

Typical back garden with multiple beds

Beds are often built in shade houses to protect the plants from sun and insects.

Larger beds can be built into the ground. Simply dig a trench line with plastic, lay in the distribution pipe, fill with organic material then back fill.

The final soil level must be above the natural soil level to allow drainage.

Soils

Soils are a critical part of wicking bed technology. They must have a high porosity, be hydroscopic and have a full range of nutrients particularly the trace elements.

Worms are an integral part of the system as they help release nutrients. Poweful worms like the Amyanthus variety will bore through the soil leaving large holes which act as a water reservoir.

Minerals are added to the bed and soil biology such as mycorrhizal fungi used to break down the minerals and make them available to the plants which in turn will produce the vitamins and phytochemicals needed for health.

Some people use stones or sand covered with a porous film. If you use the right soil it will hold plenty of water and the roots can grow into the entire box. Using a highly porous hydroscopic soil is a superior system.

The ‘YingYang He’ (fertility box) system for China

The wicking bed system is mature and well established in Australia but needs adapting for China, this is the current development project.

The objective is to enable a typical Chinese family living in an apartment to grow enough nutrient rich food with the needed mineral, vitamins and phytochemicals to balance the energy rich food commercially available.

It is envisaged that many families will want to grow their supplementary food in their Yangtai or veranda although some may have access to a roof top or local allotment.

One challenge is to get enough production to be useful in the limited space of a typical Yangtai where only a couple of square metres may be available.

This can be achieved in a number of ways.

Careful selection of plants is important. Fast growing vegetables like KangKong provide a great deal of bulk while other green vegetables like the cresses and Red Amaranth are good sources of nutrients. Tomatoes and the climbing bean make good use of height.

Another technique is the use of the so called ‘chop and chew’ method. With many plants you can simply chop of the outer leaves to eat now and the plant will quickly put out new shoots.

The ‘Swap and go’ system works well with the chop and chew method and is particularly suited to food distribution in China. Many vegetables may take two or three months before they are ready to eat and then produce fresh food for another month or so. With the basket system it is just not necessary for the family to grew all their plants from seed. A professional grower can mature a basket where the plant is producing food.

The basket full of almost mature plants can then be delivered to either the apartment or to one of the many vegetables stalls which abound in China. The customer returns the used basket to the store on a replacement basis.

From my limited observations it appears that the Chinese are fanatical about having their vegetables fresh. Each day they seem to buy a complete plant with the roots