

HEALTHY SOIL MEANS HEALTHY MEN

*Extracts from an address by SIR STANTON HICKS
given to the recent Science Congress in Wellington*

IT is my intention to deal with the mis-application of scientific thinking as it affects only one aspect of modern life. I refer to food production in relation to basic health. Obviously there is need for clear thinking and plain speaking in other departments of human affairs, but this is one that affects us all, and most fundamentally.

Before leaving Otago University I was occupied in association with Professor Drennan, upon an investigation into the causes of endemic goitre in that part of the Dominion, and we had already been forced to retrace our steps to the very soil from which food in goitrous areas was grown. Here it was found that a much lower iodine content of both foodstuffs and soil seemed to be related to the distribution of the disease—a full elucidation of which was made by Professor (now Sir Charles) Hercus, who with his wife followed on with the research in succeeding years, during which I was prosecuting my investigations in America and Europe.

I mention this firstly because it has local significance, and secondly because it illustrates my present thesis by proving how the outlook of the period directed the nature of the research.

In the case of endemic goitre, our outlook was based upon the pathology of disease. We were interested in the iodine because it was a remarkable essential constituent of the thyroid secretion, and was moreover, very readily estimated by chemical analysis, and also an inorganic element coming only from foodstuffs and therefore the soil.

Definitions of Health

At no time during that period, or for that matter until recently, did I ever look upon the soil from the standpoint of its significance to health. For one thing health, as such, from a medical standpoint, is purely a state of absence of disease, and the dictionary definition I am sure would never occur to any medical practitioner suddenly asked to define it in, shall we say, a radio quiz competition.

The same outlook dominates the approach to plant or animal diseases (in so far as they are not reducible to bac-

terial, virus, or parasitic causes). So we get the ever-growing list of so-called trace elements, essential, it is said, to plant life and growth.

Again, finding that food requirements can be assessed in terms of quantities of protein, fat and carbohydrate, we were quite content to base the whole of our medical, and even sociological estimates upon these, and the total energy value expressed as calories, until Hopkins introduced the conception of accessory food factors, notwithstanding the fact that Lind had fully established the importance of this aspect of foodstuffs in the 18th Century by following up an earlier practical observation of Admiral Sir Richard Hawkins in the 16th Century.

In those times diseases were visitations of God, and elixirs and prayers were the fashion, but note the ease with which we pass in our thinking from the pre-vitamin to the vitamin stage, and yet remain just as dogmatic and self-satisfied. For if the discovery of the vitamins and their tangible demonstration, chemical isolation, and synthesis proves anything important, it most certainly is not that absence of one or other of them causes this or that disease, but on the contrary, that the desirable condition called health requires something essentially complex and vital in the foodstuffs upon which we subsist.

At the present moment the medical profession, as well as the bio-chemists, are interested in vitamins only in this fragmentary way. So much is this the case that I am sure that 99 medical students out of 100 if asked what foodstuff to recommend to provide vitamin C would prescribe citrus fruit, whether such were available or no. The potato would most certainly never receive a mention.

Iodine Deficiency

Although iodine deficiency in soil and food is undoubtedly a factor in the causation of endemic goitre it is by no means the only one, for this disease can occur independently of such a deficiency, and appears to result as much from the intake of other materials in food and drink, such for example as fluorine, which in some cases adversely influence the absorption or utilisation of the iodine by the body.

Nevertheless, it is still a matter of soil and food that is in question, and Sir Robert McCarrison has shown how micro-organisms in the drinking water can influence the absorption of iodine from the intestine. That the organisms in the intestinal tract are involved in the absorption of iodine is demonstrated by the fact that sulpha guanidine, which is a recently introduced preparation for destroying dysentery organisms, effectively stops the formation of Vitamin K by intestinal flora, and thus indirectly influences the absorption of iodine and causes hyperplasia of thyroid

gland in animals otherwise not receiving this vitamin in the diet.

This observation, like the discovery made during the recent war, emphasises the complexity of our symbiosis with our intestinal flora. Dysentery patients receiving sulpha guanidine treatment, and at the same time on a low dietary intake of the Vitamin B complex, often quite rapidly developed beriberi—a disease allegedly due to deficiency in Vitamin B. This it appears is, like the previously mentioned thyroid disease, due to suppression of all the bacterial flora by the sulpha drug, and thus we discover that these humble occupants of our intestine can and do often supply adequate Vitamin B to maintain health on a diet otherwise deficient in that food factor.

Experience with Troops

Our investigations into the feeding of prisoners-of-war have established without a doubt that beriberi has been fatally rife among troops receiving what is officially recognised as adequate Vitamin B, but inadequate riboflavin, and you doubtless are aware of the crucial experiment conducted upon a Boston medical man who went on a diet free from Vitamin C for six months, whose blood and tissues in the first 10 days and thereafter were shown to contain none of this essential food factor, and who nevertheless developed absolutely no signs of scurvy. His dietary did however contain large amounts of all the other known vitamins.

All these, and many similar observations made in recent times, serve to demonstrate that researches based upon pathology of disease, can lead to oversimplification.

Thus endemic goitre has a simple explanation in iodine deficiency in soil and food; scurvy and beriberi in foods deficient in Vitamins C and B respectively. In actual fact, the matter is immensely more complex than this, as I have indicated, and the time is come when a whole view, rather than a partial one, is necessary.

What is the essential weakness in the approach to the problems mentioned? It is the firm belief that a simple chemical explanation will prove to be correct and complete.

Medical bacteriology, too, has exerted a powerful influence. Engrossed in the germ theory of disease, we have failed to grasp the idea of an ecological balance between all living organisms, high and low. So it comes about that we could naively suppose that the teeming life of our intestinal contents could be little else than an aesthetic embarrassment. Sulpha guanidine has banished



SIR STANTON HICKS

"There is need for clear thinking and plain speaking"

that view, and it required a war, and large numbers of successive observations of cases, to provide adequate and convincing evidence.

Soil—Food—Health

So, too, it comes about that we can ignore the teeming bacterial and fungal life of our productive soil and imagine that a simple chemical explanation of plant growth is the true one. The pity of it was that the immediate results of application of the chemical explanation to practical agriculture proved so lucrative to all concerned. It is to this basic aspect of our health and being, therefore, that I wish to draw attention in the light of the criticism of our scientific outlook which I have endeavoured to justify, by quoting some of the more outstanding and relevant examples.

If, as in the case of simple goitre, we are dealing with a disease the origin of which is traceable to the soil and foodstuffs derived therefrom, is it at all unlikely that robust health is largely dependent upon the food we eat, and therefore upon the soil in which it grows?

You are all acquainted with the cobalt deficiency which causes failure in the maturation of the red blood corpuscles of sheep—a widespread condition in South Australia, and I believe not unknown in this country. In Western Australia, however, a much more complex stock feeding problem has arisen, and it is one which has particular significance for this thesis that soil and food and health are interlocked.

Effect on Fecundity

A population of some one and a-half million merino sheep, including many valuable stud flocks, is involved. It is pastured on a variety of subterranean clover which was found to grow luxuriantly in this area where the stock carrying power of the native fodder plants was lower, and therefore less remunerative.

This clover has spread until it comprises some 80 per cent. of the fodder plant available to the sheep. At first, results measured by the usual financial yardstick were excellent. Then as time progressed—the period involved is some

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*IT'S a very odd thing
As odd as can be
That whatever Miss T. eats
Turns into Miss T.
Porridge and apples,
Mince, muffins, and mutton,
Jam, junket, jumbles
Not a rap, not a button
It matters, the moment
They're out of her plate,
(Though shared by Miss Butcher
and sour Mr. Bate).
Tiny and cheerful
And neat as can be.
Whatever Miss T. eats
Turns into Miss T.
—Walter de la Mare.*