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# SOME OBSERVATIONS ON A LOW-SODIUM DIET<sup>1</sup>

By Max Gerson

The part played by sodium chloride in the human diet has been a controversial issue for many, many years. Some researchers view table salt only as a luxury or seasoning, which is harmless in small amounts and perhaps harmful in large amounts but which is not an indispensable part of the normal diet insofar as it occurs naturally in foodstuffs. Others believe that table salt is indispensable for the human diet – the amount of sodium chloride found naturally in human foodstuffs does *not* cover the need for sodium chloride of the average person.

Both sides provide arguments to support their point of view:

*Wolff-Eisner* maintains that sodium chloride behaves like a vitamin; its total absence from the diet cannot be borne over a very long period of time, as a withdrawal of food. (The point can be made here, on the other hand, that a “total” absence is in itself impossible as sodium chloride occurs naturally in food to varying degrees.)

However, *Wolff-Eisner* then adds (*Medizinische Welt* [Medical World], nr. 51/1930): “... table salt is also the only salt which is not available in sufficient amounts in a normal balanced diet and so needs to be added to food artificially”. There are, however, different opinions as to the amount of sodium chloride which, according to this view, must be added to food to satisfy the human need for sodium chloride.

The average person in Europe consumes 10-25g of sodium chloride daily; but in Asia and Africa the amounts are quite different. All physiologists agree that this amount far exceeds the need for sodium chloride. In other words, people consume sodium chloride largely to give taste to their food and not because their body needs it.

In 1901 *Bunge* conducted numerous experiments on the need for sodium chloride. He found that carnivores did not need so much sodium chloride whereas herbivores did. He believed that he might find a similar relationship in humans. He found that the consumption of table salt in urban areas with a generally meat-eating population was one-third of that of the mainly plant-eating rural population. Similarly, he found that meat-eating nomads need only comparatively little sodium chloride whereas Negro farmers have a much greater need, to the extent that in some tribes salt is used as money.

*Bunge* observed from his own experiments that the body eliminates a large amount of sodium chloride if a large amount of *potassium* is ingested, as is particularly the case with a vegetarian diet. (His classic experiment of 1931 is, however, theoretically not incontestable, even if his conclusions are correct.)

*Abderhalden* shares *Bunge's* view as regards the cause of the hunger for salt in ethnic groups with a vegetarian diet: excess of potassium in the diet leads to increased elimination of potassium, which in turn results in increased elimination of sodium chloride and consequently an increased hunger for it.

*Bunge* considered an addition of 4-5g of table salt a day essential for maintaining a “sodium chloride balance” (*von Voit*). *Hermannsdorfer* already disputed this in his doctoral dissertation. According to him, although it is true that people ingest up to 15g of sodium chloride a day, they can in fact make do with 1-2g. In his experiments on himself to determine the amount of sodium chloride eliminated, *H.* took as a rule 2g of table salt.

These views, even though they might have become well established, in a certain respect tell only one side of the story. The experiments *Gerson* has conducted on many patients, and particularly on himself, show that the need for salt is something that we condition our taste

<sup>1</sup> Extract from a book being prepared for publication

buds to from an early age. Just as one might say that all ethnic groups have a need for alcoholic beverages and that even animals, particularly the apes that so closely resemble man, can acquire a predilection for alcohol but without necessarily concluding that alcohol is a necessary part of the human diet, it is equally wrong to assume from the ubiquitous use of table salt that it is “indispensable”.

First of all, there are certain ethnic groups that do not use any sodium chloride. Such ethnic groups are already mentioned in *Homer* and in *Sallust*, who wrote that the Numidians did not use any salt. But that aside, even if it were true that all ethnic groups all over the world had used table salt since time immemorial, it is still not clear that this has been necessarily to their advantage. Finally, there have always been diseases, particularly chronic ones, where we are unable to determine the aetiology even today and where it is not clear to what extent they have been caused by an unhealthy life-style.

As a curiosity, it should also be noted here that even today there are ethnic groups that live without salt. Prof. *Vrgoc* (see *Deutsche Ärztezeitschrift* [German Medical Journal] 176/1929) reports that tuberculosis is extraordinarily common among the settled *Khirgiz* whereas it is rare among their nomadic brethren and that the nomads ate no salt whilst the *Khirgiz* farmers had adopted the Russian way of using the salt that is in plentiful supply on the Steppes as a food additive. (Note: the role of *Kump* - a strong form of alcohol – is not mentioned here.)

The *Khirgiz* had told him that they had observed a distinct deterioration in their sense of sight and smell since they had begun consuming table salt and bread. Nomads who ate table salt quickly lost their ability to sense the presence of wolves by smell.

*Vrgoc* reports that the fishermen and hunters etc. of Siberia also have a pronounced distaste for table salt - *Nansen* on his Arctic expedition would exploit the distaste of the Eskimos for table salt by offering heavily salted food to unwelcome guests to get rid of them. *Stanley* and *Livingstone* also reported that they had found Negro tribes to whom table salt was unknown and who reacted physically with signs similar to those normally associated with poisoning when they consumed table salt for the first time.

We ourselves observed that otherwise healthy nurses who had eaten unsalted food for some months initially reacted to normally prepared food with diarrhoea and nausea. This illustrates to what extent the habit of using salt can affect the body in much the same way as the habit of drinking alcohol and using tobacco. A nurse who thought half a year ago that she would not be able to live without table salt reacted to it after some months of not using salt much as a schoolboy would smoking his first cigarette. In relation to the question whether *table salt* is a foodstuff, one might mention as an example that even a German party in government during the parliamentary crisis in April 1930 put forward as an argument against the increase in tax on beer that *beer in Bavaria* was not a luxury but an essential foodstuff of the people!

The assessment of alcohol and salt as essential parts of the human diet is, therefore, strongly linked with national and even religious and political motives, which do not necessarily have anything to do with medical considerations.

It would, therefore, be better not to consider the ethnographic aspect in examining the significance of table salt in the diet. Similarly, it would be a mistake to refer to examples from the animal world to prove that the ingestion of table salt as a dietary supplement is “natural” or necessary. From the very outset, the use of the argument that the Gerson diet is a “natural” diet has been rejected. The use of this term must also be rejected if it - apparently - can be used to speak against the diet. Whether a form of diet is “natural” or not “natural” has nothing to do with the debate as to whether it is effective in curing illness or not. This is the only consideration that matters as regards the use of our form of diet.

However, for the sake of completeness, some observations shall be briefly made about the appetite for sodium chloride in animals. The zoos in *Hagenbeck* and *Berlin* have confirmed to the author that

sodium chloride is administered to all herbivorous mammals. But it is not only in captivity but also when at large in their own habitats that animals seek out salt ponds or salty herbs or any places where the sodium chloride has been washed out of the earth by the rain and so can be found by them. There are certain animal species that migrate en masse for long distances to have access to sodium chloride. Here in our forests the fact that gamekeepers put out salt for the game in their care is as equally well-known as the use of cattle lick for cattle, small livestock and horses.

According to *Waldmann* (Gruene Blaetter - Green Leaves, issue 4), salt lick stimulates digestion, encourages a better appetite and as a pleasant delicacy (!) puts game at their ease in the hunting area. The maintenance of salt licks in most big game hunting areas and deer hunting areas has proved to be economically rewarding (*Stroese*, Hunting Handbook).

But not too much weight should be attached to this aspect of hunting practice. The principal advantages of the salt lick are that the game (see above) feels at ease in the hunting area, is less likely to move to other areas and, finally, can be more easily watched when salt licks are positioned near hides. From the hunter's point of view, it is also important that salt licking apparently improves log formation. It is claimed that the antlers become more beautiful and the stags strip less bark from trees in winter when they have salt. On the other hand, it is quite clear that even in our native forests salt is not absolutely essential for game to survive. There are very many hunting areas where no salt licks have been created and in those areas where the game has no previous knowledge of salt, as *Waldmann* (Gruene Blaetter, nr. 5, 1930) points out, it needs to be first led close to the salt lick by tempting it there with good and wholesome food and it is only when it has had several tastes of the salt lick - and this may not be the case for several months - that getting the game accustomed to salt can be considered a success.

What is true on a small scale for game cared for in native forests also applies on a larger scale to game in the freedom of the jungle. Salt is a luxury, not an essential foodstuff - even for herbivores, even for animals which, despite every effort, often need months to be attracted to this new form of seasoning.

In areas of great expanse, such as in Central India and on the Deccan plateau, a huge variety of game can be found but no natural salt whatsoever. It can be assumed that similar circumstances prevail everywhere in smaller areas. It is especially significant, however, that the *apes* in particular do not have an appetite for salt in the wild. It is only in captivity that they are fed the mixed diet of humans which contains salt - which they accept just as readily as they learn to drink alcohol, smoke tobacco and eat roast meat.

According to Dr *Gustav Riedlin* MD in *Table Salt*, 1924, Paul Lorenz publishing house, Freiburg im Breisgau, *Hahnemann*, the founder of homeopathy, and his pupils thoroughly tested table salt. These tests involved the researchers consuming daily considerably larger amounts of salt over weeks and months than they would normally consume with their meals. The harmful effects are described in detail on pages 9 to 15.

The arguments against a diet "free of table salt" (free of table salt means here free of table salt added to the food) are more or less as follows with reference to *Wolff-Eisner*:

a) On a diet rich in vegetables the body needs the addition of table salt as this is "the only salt" that does not occur in sufficient amounts in food. Since the potassium carbonate<sup>2</sup> in vegetables combines with chlorine and sodium to form potassium chloride and sodium chloride, the effect is the elimination of chlorine and sodium. This means that both sodium and chlorine must be given to the body to compensate for this loss - hence the need for the addition of table salt!

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2 It should be noted here that it is not just the potash salts that play a role but it is also the fruit acids that are contributing factors in such metabolic changes as well as other factors)

At this point, W.E. refers to the well-known experiments of *Bunge*, who claims that the continuous consumption of potatoes, which contain 31-42 times more potassium than sodium, is only possible if sodium chloride is added to them.

At the same point, curiously, it is mentioned that apples contain even a hundred times more potassium than sodium but that large quantities of apple can be enjoyed without table salt and that days when exclusively apples are eaten can be tolerated without sodium chloride.<sup>3</sup>

b) *Hydrochloric acid in the stomach*, it is generally claimed, is dependent on the body's intake of salt. If there is no intake of table salt, this would necessarily have an adverse effect on hydrochloric acid production, with all the concomitant consequences for the appetite, digestion etc. "Lack of table salt has an inhibiting effect on hydrochloric acid production" (see above).

c) Finally, *Wolff-Eisner* notes that up to 1% table salt may be found in the *sweat* of patients with tuberculosis with the result that the body *is deprived* of table salt... (Medizinische Welt {Medical World}, pages 1921/1929)

d) Furthermore, he claims that the kidneys regulate the ion balance of the body. In cases of fever and in the majority of infectious diseases, the table salt content of the urine is decreased, even if the sufferers are given table salt.

(So, if the kidneys in any case regulate the *elimination* of table salt, there is no need to regulate table salt intake [in healthy kidneys]. As even diseased kidneys, according to *Roth-Koevesi*, are able to eliminate 5g of table salt in a litre of urine, an intake of 5g at least would be harmless in the case of such diseased kidneys.)

As some of these objections are sometimes also voiced by our patients, who see table salt as an especially important foodstuff and appreciate highly the appetite- and thirst-increasing effect of table salt in the diet of the ill, the doctor is sometimes obliged to go along with them.

Table salt, however, plays such an important role in folklore and even in connection with religious customs and superstitions that the doctor prescribing a low-sodium diet not only knows only too well all the loudly expressed arguments taken from popular books or newspaper articles but is also supposed to know what memories may be evoked in his patients, and in particular in their advisors.

Table salt, for example, plays a significant role in Jewish ritual. Ritually prepared meat must be sprinkled with table salt to "draw the blood out of the meat" and is then drained to remove any remaining blood out of the food with the salt. A blessing is said over *bread* while dipping it in salt. The Oriental Churches also consider salt and bread as holy. Guests of honour are received at the entrance of Oriental Christian communities with bread and water. Finally, the saying "Salt and bread makes the cheeks red" is not only a hygienic folk wisdom but also has a basis in religion and superstition. Salt is an object of hate for the Devil and in the satanic rituals of the Middle Ages it was not just pronouncing the name of God that was forbidden but also mentioning the word "salt" - salt has anti-satanic force!

a) The first of *Wolff-Eisner's* arguments can be countered by simply pointing out that what seems to him to be a disadvantage is what I am seeking - increased elimination of sodium chloride. If *Wolff-Eisner's* notion based on *Bunge* is correct and a diet rich in vegetables induces the elimination of sodium chloride out of the body's sodium chloride reserves, then that is precisely what the diet I have put together wishes to *achieve*. The more sodium chloride is eliminated in the process, the more effective the diet. To compensate to some

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<sup>3</sup> The authors quoted by W.E. are not individually listed, see Medizinische Welt (Medical World), 1929, nr. 51.

extent for this decrease in sodium and chloride which we are trying to achieve by the addition of table salt to the diet seems to us just as pointless as a doctor in a case of diabetes seeking to compensate for the loss of sugar resulting from the increased elimination of sugar in the urine by increasing sugar intake.

It has already been mentioned above that the consumption of potatoes requires the addition of table salt and that apples, which contain 100 times more potassium than sodium, are not salted, except by gourmets with a specially developed taste for it.

(This shows to what extent custom and taste play a role here. The farmer would laugh out loud at someone putting salt on apples but seasons himself potatoes with salt. In fact, using a lot of butter on potatoes, especially jacket potatoes, compensates for the lack of table salt.)

b) It is known that hydrochloric acid is linked to the sodium chloride intake of the body. However, that it is dependent on this intake has not been proven, and runs counter to the experiences of *Gerson* among others (see *Eimer*, *Deutsche Medizinische Welt* [German Medical World] 1930, nr. 24).

According to *Rosemann*, the gastric juice of the average person contains 400-500mg% hydrochloric acid. Its pH is between 0.97 and 0.80. If one considers the regulatory mechanisms involved in the secretion of hydrochloric acid, it becomes clear that the whole body plays a part in its formation, just as is the case with all other vital processes no matter in which organ the particular process takes place.

Experiments by *Kremer* (*Medizinische Welt* [Medical World], nr.11/1930) have shown quite clearly that the levels of gastric hydrochloric acid in patients on the diet remained *normal* over several months despite the sodium chloride intake being limited to the quantities present in the food given them. The appetite of *Gerson* patients does not suffer as a result of the lack of table salt and, in the severely ill, it in fact generally improves once they are on the diet.

c) The elimination of some sodium chloride in the sweat of patients with tuberculosis plays no role whatsoever in the treatment. The diet treatment in fact results in tuberculosis sufferers soon sweating less and ceasing to sweat at all at night after a short period of time. *Strauß* (*Medizinische Welt* [Medical World] nr. 6, 1930) correctly attributes this and the reduced secretion of mucus to the dehydrating effect of the low sodium diet and draws the conclusion that the reduction in the intake of sodium chloride should also be part of the treatment for other illnesses (such as bronchial blennorrhoea).

d) The last argument that healthy kidneys in any case regulate the ion balance of the body - and that for this reason limiting the amount of sodium chloride in the diet is unnecessary - is much too generally expressed and does not take into account other essential factors that play a part in the elimination of sodium chloride apart from the kidneys (hormones, tonus in the visceral nervous system, circulation and others besides).

The fact that diseased kidneys are still able to eliminate 5g sodium chloride in a litre of urine has no special significance as regards the issue of sodium chloride intake. Nevertheless, chlorine is unique in terms of the degree of concentration in which it can be found in the kidneys. Whereas concentrations of urea can be found in the kidneys 40 to 80 times greater than those found in the blood plasma, of uric acid 25 to 50 times greater and of sugar (in diabetes mellitus) 30 to 50 times greater, the increase in the concentration of chlorine is just 2 to 5 times greater than can be found in the blood plasma (*Lichtwitz*: *Klinische Chemie* [Clinical Chemistry], 1930, p. 501).

There has been practical experience with reduced sodium chloride in kidney disease over the last quarter of a century. It is this experience which has shown that a *more radical* reduction in sodium chloride intake as adopted in a “strict form” by *Strauß* (less than 2.5g NaCl daily) or in the “third stage” (by *Noorden*, 1.5 - 3g NaCl daily, which corresponds more or less to the usual “Gerson diet”) provides relief for the diseased kidneys.

“As soon as the diseased kidneys are no longer over-stimulated and overburdened by excessive amounts of chloride in food, they recover astonishingly quickly .... and eliminate much *more* sodium chloride on a *low sodium diet* than before on a high-sodium diet!” (from *Noorden-Salomon*, see above, p. 915).

*Noorden* also already then made the point that such a low sodium diet is not in itself a *cure for kidney disease* but helps to create the necessary conditions for healing to take place by removing a harmful source of continuous irritation (see above, p. 916). Something similar also applies for the effect of the *Gerson diet*: the elimination of sodium chloride is not a cure for various diseases but only one of its various aspects. A harmful irritation is removed with increased elimination of sodium chloride.

If, moreover, in normal kidneys the elimination of sodium chloride is temporarily restricted in fever as *Wolff-Eisner* mentions - and remains restricted despite further administration of table salt - , then it should not be necessarily concluded that the body can regulate the distribution of sodium chloride sufficiently well for the doctor to leave it to the body to sort itself out but it is more an indication that the body is unable to cope with the additional amounts of sodium chloride in such circumstances and that therefore even in acute illnesses (infectious diseases) a temporary radical reduction in the amount of sodium chloride in food is the correct approach to follow (starvation diet - refusal of food intake etc.). And if - a comment that has already been considered above - a diseased kidney can eliminate 5g sodium chloride, then that is not a reason for believing that 5g sodium chloride needs to be administered. Quite the contrary, it would be more logical to strive for similar results in all cases of illness to give relief to the kidneys and the other organs as is the case in the treatment of kidney disease.

In conclusion, however, it must be stressed here that there is a complete lack of proper research into the whole mineral metabolism of animals. There is nothing, therefore, that we can say for certain about the role of chlorine and of sodium - each one separately but also in combination in NaCl and in other compounds. We can only determine certain connections and conditions.