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The Colonisation of Europe and Our Western Diseases

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Abstract — Correspondence of fat intake with civilisatory diseases (coronary disease and cancer) is usually attributed to adverse effects of animal fat and cholesterol. The 'field studies' themselves, undertaken to support this theory, failed. As the last environmental changes in human history are agriculture and rise of carbohydrate intake (and concomitant reduction of fat and protein consumption), the author thinks that the carbohydrates rather than the animal fats cause our civilisatory diseases.

It can be shown that the spread of agriculture from the Near East to the West and North of Europe with the accompanying differences in time for the adaptation to the new food (the carbohydrates) easily explains the geographic differences in the frequency of civilisatory diseases which is highest where (in Northern Ireland, Scotland and Finland) carbohydrates came last. Highest, too, in those areas is the 'polymorphism' of genes which are related to cardiovascular diseases (ACE, apolipoprotein-B etc.) This 'adaptation theory' explains also the hitherto unexplained up and down of cardiovascular disease in the USA by immigration from regions with higher adaptation to carbohydrates.

Generally it is thought that animal fats and cholesterol are the causes of our civilisatory diseases. I am offering an alternative to this 'lipid theory' suggesting that the paleolithic hunter, adapted through millions of years to a low-carbohydrate, high-fat, high-protein diet, has not yet had the evolutionary time to adapt to the high-carbohydrate diet of the Neolithic farmer, and that this, not fat, largely explains the 'diseases of civilisation'. In our evolution, we had millions of years of scavenging with a high intake of animal fat (bone marrow and brain); the mammoths of the last ice age delivered animal fat in considerable amounts.

One of the first authors to suggest this was Vilhjalmur Stefansson, an Icelandic-born American who had lived for many years with the McKenzie river Eskimos of Northern Canada. Stefansson saw that as long as these people lived only on animal protein and fat they remained free from Western diseases. He observed that they began to suffer from our diseases with the introduction of our food high in carbohydrates (1).

Inspired by his work, I collected experimental and clinical evidence that supported his views. In an experiment with chickens – who in their natural environment eat little grain – I and my collegues showed that chickens fed a high-fat, high-protein diet developed much less arteriosclerosis than chickens fed a high-carbohydrate, low-fat diet (2). In over thirty years of clinical practice, I have found, as published in numerous papers and several books (3, 4), that the diet works very well against Crohn's disease, ulcerative colitis, multiple sclerosis, heart failure, acne and other problems. Surprising to many, this diet lowers blood cholesterol and triglyceride levels as

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well. As for Crohn's disease, a prospective randomized multicenter study (5) has shown a significant drop in relapse rates in hospitalized patients after discontinuation of cortisone.

But Ancel Keys' 'seven countries' study (6) found that a low ingestion of fat was associated with a low incidence of coronary disease against people who ingested more fat (Fig. 1). Other investigations revealed a similar pattern with cancer ((7), Fig. 2). How then can one square these data with the belief that excess carbohydrate is the villain of the dietary piece?

On closer inspection of the diagrams in Figures 1 and 2, you can see that populations to the left not only eat less fat but live more to the East and South of Europe and those on the right not only eat more fat but are located more to the North and West, at least regarding their origin in Europe (4). This corresponds with the spread of farming from the Near East to West and North of Europe.

Agriculture originated in different places at different times. It was firmly established in Central Anatolia, Mesopotamia and Syria about 10 000 years B.C. At the time, significantly, the Scandinavians and the British Isles raised no grain at all. The success in farming led to an increase in population pressure and, therefore, to migratory expansion. The path of farmers, elucidated by archeologists (8), linguists ((9, 10), Fig. 3) and population geneticists ((11, 12), Fig. 4) appears to have been from the Eastern to the Western Mediterranean, towards South East (Pakistan, India and Arabia) and to North Africa. From the Black and Caspian Sea, the farmers wandered in an 'advancing wave' to the West and North of Europe. In the course of 4–5 millenia, they mixed with and displaced the indigenous Europeans

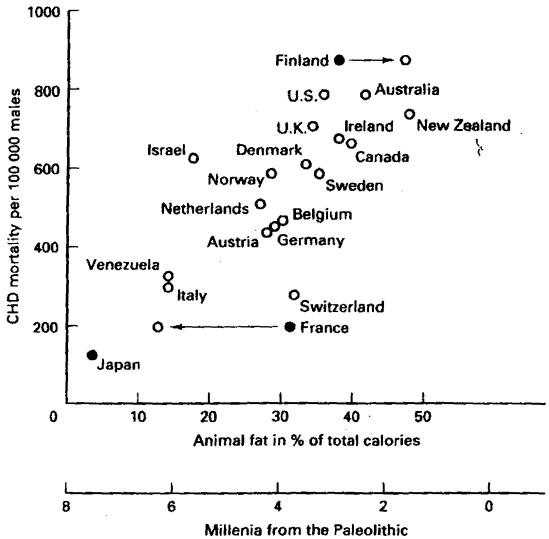

Fig. 1 The rate of myocardial infarctions in European populations (and some of European ancestry) coincides with the East–West, North–South gradient, i.e. with the distance from the Paleolithic (lower scale) better than with the fat content of the food (upper scale).

In France, about the same amount of fat is eaten as in Finland, but the rate of heart strokes is about one fifth ('French Paradox'). By the lower scale, the point for Finland moves to the right and the one for France to the left (arrows); the plot straightens. French population stems predominantly from the Mediterranean, where adaptation to carbohydrates had more time to develop. (See also Fig. 5). (Adapted from (15) with the kind permission of the author).

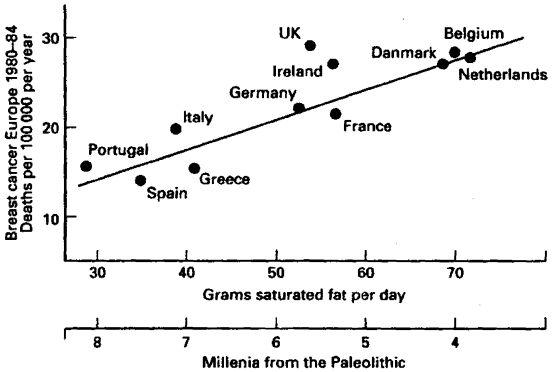

Fig. 2 Breast cancer mortality in Europe 1980 through 1984. Upper scale: saturated fat intake (g/day); lower scale: distance in time from the Paleolithic (time for adaptation to carbohydrates). Higher intake of fat today means fewer carbohydrates for a longer time (and of less intensity); it means, therefore, less adaptation to carbohydrates. (Combined from WHO Regional Publication Series #24, 1988, 85, and OM).

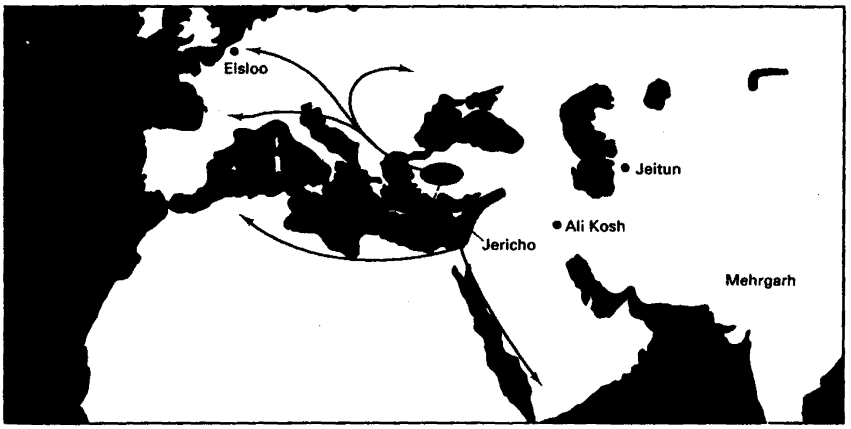

Fig. 3 Zone of origination of agriculture had three 'lobes', each of which may have given rise to a great family of languages by diffusion. The Anatolian lobe, containing Çatal Hüyük, may have been the cradle of the Indo-European languages. A second lobe, containing Jericho, may have been the homeland of the languages of Egypt and northern Africa. A third lobe, containing Ali Kosh, may have been the source of a group of langauages in India and Pakistan that were later replaced by languages of the Indo-European group. Elsloo, Jeitun and Mehrgarh are early farming sites in these three great diffusional pathways. The processes that are depicted on the map are hypothetical but are supported by recent findings in linguistics and genetics. The spread of agriculture from the Near East: a) from Iran and Iraq (Ali Kosh) to Pakistan and India; b) from Jericho towards Arabia and North Africa; c) from Central Anatolia (Catal Hüyük) to Europe, taking there agriculture and the Indo-European languages. The more to the West and North a population is situated today, the later came the Neolithic and the agriculture, and the lower the adaptation to carbohydrates. (Reproduced by the kind permission of the author (9) and of *Scientific American* Inc., New York, USA).

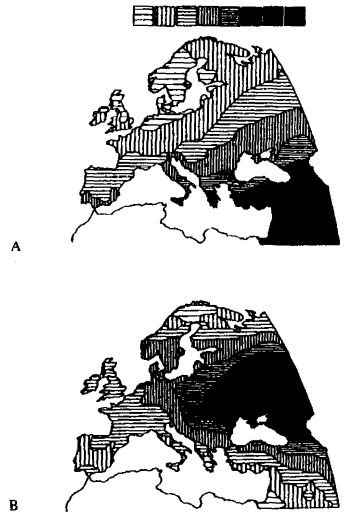

Fig. 4 The spread of agriculture and the Kurgan invasions according to genetic investigations of recent populations. Shades from black to light mean more or less genetically similar. **A** shows the migrations of the first farmers, **B** the migrations of the Kurgans ('horsemen'). (Reproduced by kind permission of the authors (12) and of *Science*).

(descendents of the Crô Magnon people) which lived as Paleolithics and therefore lacked adaptation to carbohydrates. As for Europe, Neolithic settlements with residues of farming existed in Greece, Italy, Southern and central France and the Iberic peninsula around 6500 years B.C., in Germany at 5500, and around the Baltic at 3500 B.C. (8).

Thus, as agriculture spread to the West and North of Europe, the people of the East and South had more evolutionary time, in Darwinian terms, to adapt to the new food. Those who did not have the genes to tolerate larger amounts of carbohydrates from the newly invented farming suffered from carbohydrate-induced diseases such as obesity, diabetes, infertility, lactating difficulties, high infant mortality, muscular weakness and so on. In the course of millenia, genes not suited to cope with carbohydrates would diminish in their genome. It is of great interest that early farmers in Greece and Turkey were five inches shorter than their athletic paleolithic ancestors (13).

There are two factors which must have modified the South East–North West trend of adaptation.

1. *The three invasions of the Kurgans (8) from the Wolga district to Central Europe (Fig. 4B).* Though they had some agriculture, they were herdsman and lived predominantly on meat. They, therefore, brought back some genomes less well adapted to carbohydrates to Central Europe (together with the tamed horse, the wheel and advanced weapons).
2. *The Roman empire played a major role in spreading agriculture around* so that those within the empire developed more tolerance. By contrast, in countries outside the empire, i.e. Northern Ireland, Scotland and the Scandinavian countries (especially Karelia), the rates of myocardial infarctions are the highest ((14), Fig. 5).
3. *The sheer existence of Neolithic settlements does not represent exactly the food eaten by those peoples.* The further-North-living populations probably ate fewer carbohydrates and derived more calories from animal sources because agriculture was more difficult and less abundant. Therefore, the difference in adaptation to carbohydrates must be more intense today than expressed solely by the geographic gradient. In my view, the influences of these three factors on the original adaptive trend from SE to NW produce the spotted picture of proneness to our civilisatory diseases in Europe and from there in all 'Western' people in the world.

If one replaces the original scale of fat ingestion in Figures 1 and 2 with the number of millenia a people had to adapt to farming (so that they now have a high intake of carbohydrates and a low intake of fat), the results of Keys (6) can easily be explained by the degree the of adaptation to carbohydrates, even better than by the intake of fat. You will note that the points for France and Finland which did not correspond previously, in spite of the same amount and quality of fat ingested ('French Paradox' (15)), now fall in place.

Where are, then, the genes that enable a person to tolerate carbohydrates and not to succumb to coronary disease and cancer? In 1992, François Cambien, a French researcher, and his group found an incomplete gene for the angiotensin-converting enzyme (ACE) in patients with myocardial infarctions otherwise thought at low risk (16). ACE profoundly influences circulation because it promotes the output of angiotensin II and the breakdown of bradykinin, factors that enhance the production of smooth muscle cells in arteries and may promote coronary sclerosis and thrombosis as well as heart failure. This 'deletion polymorphism', i.e. the incompleteness of this gene, occurs predominantly in areas such as Northern Ireland (Belfast) for instance, where carbohydrates arrived later. The gene for apolipoprotein B, which

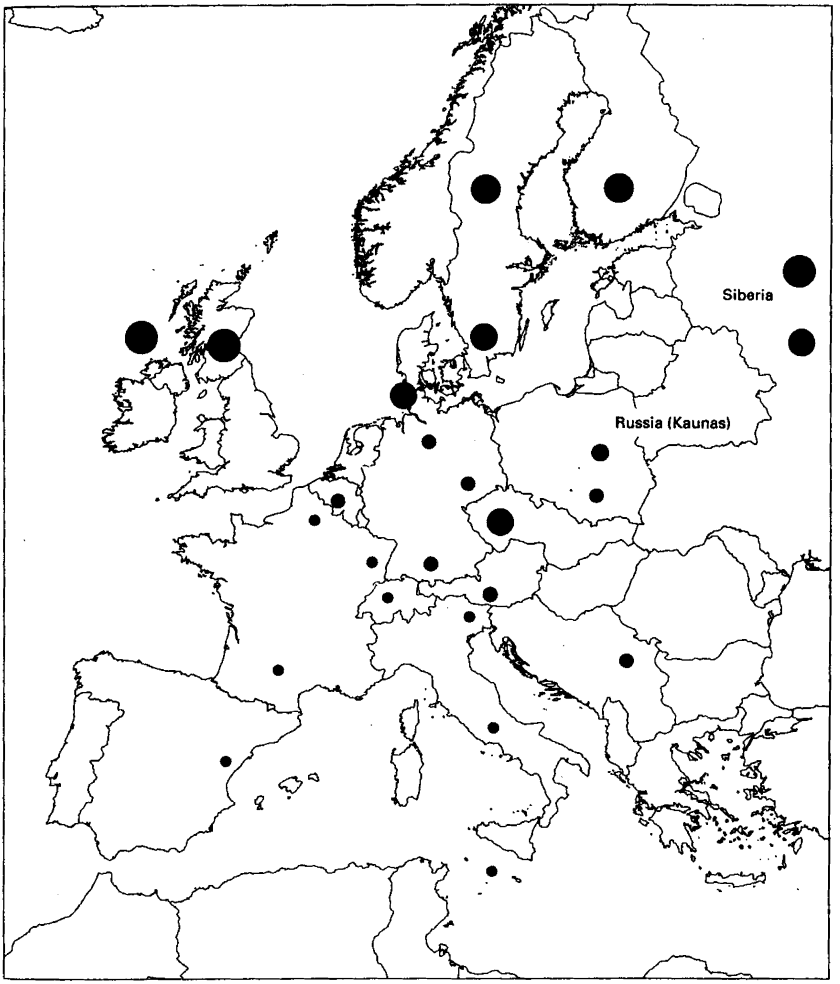

Fig. 5 The MONICA projects (14) results transferred to a European map. 2 mm diameter of the circular areas correspond to 100 deaths from myocardial infarctions per 100 000 male inhabitants in the age group 45–65 in 1984. Aside from Novi Sad, which is made questionable by the low number of participants and the widely differring result of nearby Belgrade, the mortality comes in three grades: a) lowest mortality in the Mediterranean where agriculture invented in the Near East about 10 000 years ago came first, strongly distributed in the Roman empire. b) highest in Northern Ireland, Scotland and Finland (also in Siberia), where carbohydrates came last and were not spread by the Romans. c) a median tendency to heart attacks where the 'advancing wave' of farming from South East to North West came between 5000 and 6000 years ago, and where adaptation to carbohydrates was weakened by the Kurgans (herdsmen rather than farmers), and the Roman influence was absent North of Roman lines.

regulates the docking of LDL at the cell membrane and therefore its entrance into the cell, shows the same polymorphism (17). In its incomplete form, it is more frequent in Northern Ireland than in Strasbourg and Toulouse. One may speculate that the incomplete genes, were the genes of the Paleolithic hunter and gatherer which are on the way to be completed in a carbohydrate-eating population. Probably there are other incomplete (for cancer, hyperinsulinism, adiposity, diabetes etc). As for cancer, there are plenty of possibilities to think of incomplete oncogenes left over from the time of primordial agriculture. Not all of them must have been deleted by viruses.

But how can one reconcile the recent drop in heart disease in the United States with this 'adaptation theory' (4)? This drop does not stem from a reduction of amount of fat ingested; very likely it results, in part at least, from immigration of people from the Mediterranean or other areas who had already acquired a higher tolerance to carbohydrates. Thus, when these people reached the coronary age, the incidence fell.

What has been said about Europe and the Western world seems to hold for the Far East as well. The cultivation of rice is older than that of grain, and therefore the adaptation to carbohydrates is even better. But since it is by far not complete, even the Japanese show a significant rise in longevity under American dietary influence, that is the ingestion of more animal protein and fat (18).

Clearly there are still many open questions in our view of a healthy human nutrition, open to studies by a multitude of researchers, but I think it is time to consider the transition from the Paleolithic, i.e. our high intake of carbohydrates, as one of the causes of our diseases.

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