Men were Hunters and Women were Gatherers - of wild wheat

Men were hunters and women were gatherers[1]. This is the usual picture of the food scene more than 10,000 years ago during the Paleolithic era. Even in the Neolithic era following the end of the ice age 10,000 years ago, men were hunters and herders to a greater extent than women who were more likely to gather plants and tend gardens of food plants. During the Paleolithic, meat from large animals hunted by the men was eaten as a prolonged feast relatively occasionally. There surely was awareness of when to hunt so as not to deplete the source of their animal food. Fishing would similarly be governed by the season when favored fish were most abundant and least likely to deplete the source. The interim daily food requirements were likely satisfied by plant foods, small animals and shellfish gathered by women. Gathering would also vary according to the season and location to which they might have migrated to follow the animals. In the most hospitable lands, spring would yield plenty of greens. summer would be the time to gather roots and fruits. Somewhat later in the year, the tree nuts and annual plant seeds could be collected and stored for the winter. Since grasses are so plentiful in the temperate regions, grass seeds including wild wheat, would have been a prominent seed collected. The wild versions of most if not all our grains, must have been in existence for collection by the women gatherers in the Paleolithic. The exceptions to this omnivorous Paleolithic diet would have been where plant foods were really scarce; but where hunting and fishing were still possible, near the polar regions of the earth. Even now Eskimos are known for their high meat diet.

The assumption is made that Paleolithic people knew which plants were safe to eat, and which were toxic. Gathered plant foods: greens, roots, fruits, nuts and seeds can be eaten raw, but only if they are palatable in flavor and texture. Some bitter flavored plant compounds can be washed away with water, such as the tannins in acorns. Hard dry nuts, seeds and grains were often roasted, but more often than not after they had been allowed to imbibe water. Or they could be ground to a powder between two smooth rocks. The discovery was made that this powder could be mixed with water to make a paste. Leaving this paste out for several days, and stirring it every time it was inspected produced a change in aroma and in the case of grass seeds especially, a bubbliness, as fermentation progressed. Packaging the mass in large thick leaves and leaving it in the fire embers would have produced primitive bread. But even without this step of grinding the hardest seeds and nuts, they surely quickly realized that seeds and nuts all softened if left in water, and as the water evaporated or was poured away that sprouted seeds were produced, that were sweeter than the original seed or nut. Enough of our ancestors survived on these foods, and well enough that we are here on earth now. Wild grains must have been a part of the Paleolithic diet.

Actually some grass seeds, wheat in particular, are exceptional when eaten raw. Farmers walking in their ripening wheat fields eat raw wheat grain. It's irresistible, and in any case it tells the farmer about their wheat. Have you ever tried eating a teaspoon of clean wheat grain? This is a worthwhile

[1] E.S.Wing & A.B.Brown, *Paleo-Nutrition, method & theory in prehistoric nutrition.* Academic Press, 1979. Page 93.

experiment, because you'll be surprised to find yourself with a ball of chewing gum that just never dissolves, or disintegrates, in your mouth as most food would. This *chewing gum* is actually the *gluten protein* of the wheat. The bran and germ disintegrate enough on chewing that they are swallowed. Similarly the starch that accompanied the gluten in the endosperm is swallowed. You could of course eventually swallow the gluten, but instead you are more likely to inspect it as the farmer does, and then throw it away. Gluten is pale yellow in color and in some cases can be stretched paper thin or bubbled like bubblegum. When wheat is cooked we have no such ball of gluten forming in the mouth! That discovery must have been made eons ago.

When we entered the Neolithic age, nuts and seeds, especially grains were the basic foods that carried people through the winter and through the times when hunting or culling the herds and fishing were unseasonal.

Now in 2014 four generations have experienced the most profound change during our whole existence, from the Paleolithic through the Neolithic age and into Modern times, in the way that grass seeds, grains, are presented. For clarity it should be mentioned that grains, *wheat, rye, barley and oats*, have an outer *husk,* which is discarded and never eaten by humans. The whole grain is set free from the husk during or after harvest, and the whole grain has a thin edible seed coat, which is the *bran*. Grain bran is both edible, and essential in the diet. From prehistoric times until 1880, grains were stone milled and presented as a flour containing all parts of the whole grain: bran, germ and endosperm. A few bakers extravagantly sifted out the bran and germ, but the majority of all flour was presented in the whole grain form. For more than a century now, since 1880, grains have been milled free from the bran and germ, and we have been supplied with the endosperm alone as white flour, as the base ingredient for bread and pasta. In the case of white bread this white flour is often mixed with white sugar. Our suffering as a result, is manifest in the prevalence of constipation, obesity, diabetes, cardiovascular disease and colon cancer.

It is hardly surprising that there are people who are essentially afraid of whole grains. Whole grains have become an almost unknown ingredient in our basic food for the four generations since 1880. This is long enough for people to think there must be something wrong with whole grains. The fear now has a good foundation, since most people have become completely accustomed to white flour foods. When the basic food in our diet is changed back from white flour with refined sugar to whole grains, the first noticeable effect is due to the addition of grain bran. This bran is mostly (insoluble) dietary fiber, and is un-digestible both by our natural digestive enzymes and the microorganisms in the intestines, although a small amount of the bran (soluble fiber) is digestible by microorganisms in the intestines. However, the net result is a dramatic increase in the activity of the microorganisms in the intestines. Food begins to move through the digestive system faster and while the micro-organisms equilibrate, more gas than usual is produced. A person can have quite a dramatic reaction to whole grain foods: painful gas and bloating, or diarrhea. What's more it takes up to 2 weeks for the digestive system to settle down, after making the change to eating all grain foods whole, with their bran included. When the digestive system finally does settle down, most people are thrilled to find that they are no longer constipated and that their bowel movements are regular and daily.

Usually too, they are feeling more energetic. Most people who realize what has happened, never again return to a white flour and refined sugar based diet.

We do of course also have great need for all the nutrients to be found in the bran and germ of the whole grain: B-vitamins are necessary to accompany the starch so that we gain all the energy possible from the starch, without it turning to excess fat at the cellular level; anti-oxidant vitamin E and the germ oils provide the variety of oily substances needed for our nervous system; folic acid helps to protect us from Alzheimer's and unborn babies from spinal deformity. Also found in the bran is a valuable supply of minerals: calcium, magnesium, iron and zinc; trapped by a substance known as *phytic acid*, or inositol hexaphosphate, which is itself a source of phosphorus and a vitamin-like substance, inositol. This phytic acid has also been a source of fear among those accustomed to white bread. Scientists have observed that phytic acid binds minerals, and this has been interpreted as a dangerous characteristic. Whereas instead it is simply a protection of the seed's store of minerals: phosphorus, calcium, magnesium, iron and zinc, which are ready to be released as soon as the right moisturizing conditions appear for sprouting.

Phytic acid can also bind proteins, but it can bind only to the extent that it is present and it only binds the minerals that it contained in the original grain. However, release of those minerals stored in the grain is nutritionally very useful to humans. By now we know that bones are built primarily with the minerals phosphorus, calcium, and magnesium, and that we need iron for replenishing hemoglobin in blood, and zinc as a co-factor in the production of energy from carbohydrates, and in the working of many enzymes in all parts of the body. Whole grains as a basic food are a significant source of phosphorus, calcium, magnesium, iron and zinc. All these valuable minerals are almost completely absent from white flour; so much so that some white flours are supplemented with calcium and iron at least, as well as some of the B-vitamins that would have been provided with the bran and germ. This supplementation does not make up for all the minerals and other nutrients that could be supplied by the whole grains.

In the wheat grain, there is a generous supply of phytase, which is the enzyme capable of breaking down the phytic acid and so releasing any bound proteins or minerals. As soon as the grain is moistened this phytase springs into action. It has been discovered that the activity of phytase is considerably increased when the grains are simply moistened and allowed to imbibe water, and there is acid present. The action of soaking and flooding grains with an excess of water tends to slow the activity of the phytase, perhaps because oxygen is necessary for the degradation process. This seems comparable to the germination of seeds in general. Seeds planted in the garden do not germinate well if they are planted in waterlogged soil, whereas nicely aerated moist soil enhances germination.

People used to have such an instinct for making bread that few historians thought to write about it. We naturally and instinctively ground wheat grain to a whole grain flour, made it into a dough with water, and inoculated it with some of the previous fermented dough, so automatically creating acidity. In this way we had the basis for our daily bread. In these intervening 130 years since being deprived of whole wheat flour and natural sourdough leavening, we've been presented instead with white flour leavened with bakers yeast in the presence of

refined sugar. From 1880 onwards we have been presented with ingredients for bread-making that are totally different from anything we had previously in all our history on this planet.

Fortunately more recent scientific research has given us evidence to return happily to our former instinctive bread-making days[2], and also to our good sense when cooking with grains[3]. Wheat has a naturally high content of the enzyme phytase that can degrade phytic acid and so release the minerals, but only when there is sufficient moisture and acidity. During simple whole wheat sourdough bread-making there is development of just enough acidity during 6-12 hours of fermentation to almost completely degrade the phytic acid. Such bread can be mildly flavored and the texture also seems to benefit from the fermentation; the phytase likely releases gluten protein that might otherwise be bound by the phytic acid. Whole wheat dough for pasta and tortillas, can also be treated with a small amount of sourdough starter and a similar rest time before rolling the dough.

Wheat grain is usually milled into flour and prepared as bread or other baked products; but there are several exceptions. Wheat grain can be variously cooked and dried, as a means of increasing its shelf life in storage and reducing the cooking time needed for the intact grain as a side dish or ingredient.

Bulgur wheat is now made with all kinds of wheat, as well as durum wheat, but the process may have been developed originally, as a way to de-husk the closely related emmer wheat, and rice, which is also harvested in the husk, and known as paddy rice. The grain in the husk, or free, is moistened and hydrated before being boiled for long enough to thoroughly cook the grains. During the process, as carried out with emmer or rice still in the husk, the cooking causes the grains to swell and burst open the husk. When the cooked grains are thoroughly dried, the husk from emmer or rice is easily removed. All grains treated in this way retain practically all their bran. Soluble nutrients from the husk and bran are drawn into the center of the grain, during the boiling process, rather than being lost into the boiling water. I speculate that just enough water is used for boiling the wheat or rice, so that it is either absorbed or evaporated by the end of the cooking, which would allow complete absorption of soluble nutrients such as antioxidant polyphenolics and B-vitamins. For rice the process is known as parboiling. Bulgur and parboiled brown rice can be prepared for a meal in a relatively short time, making them time saving and healthful dinner grains.

Some people nevertheless prepare their dinner and porridge grains, from a supply of the grain. They first moisturize the grains with just enough water to be absorbed completely by the grain. This allows some enzyme activity, whereas completely submerging the grain likely suppresses any enzyme activity that requires the presence of oxygen. Also if grains are flooded with water, the excess is usually poured off and soluble nutrients will be lost. Moisturization is usually

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[2] B. Fretzdorf & J.M. Brümmer, *Reduction of phytic acid during breadmaking of whole-meal breads.* Cereal Chemistry, 1992, 69(3):266-270.

[3] I. Egli, et al., *The influence of soaking and germination on the phytase activity and pytic acid content of grains and seeds potentially useful for complementary feeding.* Journal of Food Science, 2002, 67(9): 3484-3488.

an overnight, or all day process. The grain is then cooked, preferably in just enough water that all is absorbed by the end of the cooking time.

While they are still green, grains are quite large, very sweet, and succulent, before fully maturing and drying out in the field. The temptation to harvest at this stage is considerable and is actually an ancient custom. The chaff is burned or roasted off the grains and in the process the grains are cooked. The product is known for its sweet smoky flavor. It is evident that this process can be applied to all the grains. Examples are spelt in the form of *grünkorn* and durum wheat as *freekeh*, which are currently produced and are available in some stores. They are prepared as a dinner grain, by boiling in a minimal amount of water so that all is absorbed by the end of the cooking time, approximately 45 minutes.

When I sprout wheat I initially simply moisten the clean grain with half its weight of water, by tossing the grains in the water by hand. In reality I make my wheat into sourdough bread, and so practically never cook wheat grain as an accompaniment, but I now know that I would treat it as I would my sprouting wheat: toss it with half its weight of water, cover the bowl and toss again some hours later, until all the added water has been absorbed, and then perhaps cook these moistened grains at the end of the day. However the effect of such a treatment likely only degrades a small portion of the phytic acid.

Making porridge might benefit, in terms of phytic acid degradation and minerals release, from a small inoculation of sourdough into the mix of water and cracked grain left to soak overnight. I've made porridge from fully fermented wheat sourdough and found it unbelievably delicious and warming.

So I would say be fearless in your treatment of whole wheat, and whole grains in general, and realize that the processes are all simple common sense, that is if you allow your instincts and common sense to reign. According to current knowledge, old-fashioned simple sourdough whole wheat bread provides wheat in its most nutritious form.