On The Home Front;

The Production and Use of Ersatz Goods

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With the outbreak of WWI in August 1914, the press and government in the Entente countries were sure that Germany and Austro-Hungary could be reduced by hunger in some six months. It was a small wonder, then, that by September it was being asserted that the elephants of the Berlin Zoo had been butchered for their meat. It was also asserted that the Germans had brought all the food they had in the empire?s interior to their border towns so that agents and spies would be fooled into believing that there was plenty of food on hand. However, the famine theories were not progressing rapidly enough, for hunger was expected to do a great deal of fighting for the Allies. The German spirit was very strong and resented the assertion of their enemies that they would be defeated by their stomachs, as some famine-boosting university economics professor was insisting. There would, however, come a time when waists would shrink. As prices rapidly moved upward on meat, dairy products and delicacies, more people increased the consumption of food staples, especially bread; something would have to be done to meet these new demands. German scientists and researchers prepared to find solutions for not only the shortages of food but also of clothing--as well as strategic materials that were no longer available from overseas.

Ersatz Food

The area of food substitution was the most interesting. When stretching the food supply became necessary, the German pure-food laws were thrown on the scrap heap by the government . It really was remarkable what coal-tar would do for the Germans and their allies. It provided the base for their explosives, made their dyes, and from one period of the war by actual count provided 446 distinct and separate chemical products used in medicine, sanitation, and food substitution. Theoretically humans could be fed chemically by food in tablet form, but in practice, it would ruin the health of the populace. A diet of inorganic elements will not sustain organic life. The chemical food experts began to see that substitution would have to take the place of inventions and innovation.

Ersatz Bread

The first step was the appearance of ***Kriegsbrot*** (war bread). Despite its name it was very palatable. It consisted of 55% rye, 25% wheat, and 20% potato meal, sugar and shortening. The potato element was said to prevent its getting stale. Kriegsbrot?s flavor improved by the third day and loaves a week old showed no deterioration. Although this first war bread was superior, rye and wheat flour were not always plentiful. Oats, Indian corn, barley, beans, peas and buckwheat meal had to be added as time went on. A popular cake sold in the cafés was made mostly of ground clover meal, with flour of horse-chestnuts added, a little rice, glucose, sugar or honey and chopped raisins or prunes. Even at the price it sold

for--an ounce for three cents--the cake was a success, in nutrition, appearance and taste.

Ersatz Coffee, Tea and Cocoa

Coffee imports had became impossible by 1916. The scant stores on hand had been stretched and extenuated by the use of chicory and other supplements. A transition from coffee to coffee substitute began. The first substitute, **Kaffee-ersatz**, was not a bad one. It was mostly made of roasted barley and oats and the flavor was enhanced by chemicals from coal-tar. The brew had a good percentage of nutritive elements, no caffeine and was quite palatable when taken with milk and sugar--without sugar though, it was impossible. But the grain could be put to better purpose and so this led to the introduction of the substitute of a substitute. **Kaffee-ersatz-ersatz** was made of roasted acorns and beechnuts, with just enough roasted barley to build up a coffee flavor. It was said to be better than the first substitute but was also more expensive. Unfortunately, there weren?t enough acorns and beechnuts, much of which was being fed to pigs. Before long the excellent acorn-beechnut coffee disappeared to be replaced by a third substitute whose original ingredients were carrots and yellow turnips. A substitute for tea was not difficult. The bloom of the linden tree mixed with beech buds and a few tips of pine made an excellent "oolong." A cocoa substitute came from coal-tar and chemistry along with roasted peas and oats.

Meatless Meat

The advantage of the conversion of grains, nuts and vegetables that were used as substitutes was to placate the old eating habits of the public. The same food value would be found if consumed in some other form. This placation was no more evident than on every meatless, fatless, or wheatless day or period. The rice "lamb" chop would satisfy even an exacting taste. Rice was boiled and formed into a lump resembling a chop. A skewer of wood was stuck into the lump to serve as a bone. The illusion was made more complete with a little paper rosette to top off the "bone" and served with green peas and a sprig of watercress. Fried in real mutton tallow, it came to the table with the look and aroma of the real thing. The vegetable beefsteak was a composition of cornmeal, spinach, potatoes, and ground nuts with an egg to bind the mass together. It took becoming used to the thing?s interior, which was pale green, in order to achieve the satisfaction of using a knife in good earnest. The paucity of meat was a result of an economic decision made in 1914. It was easier and less wasteful to distribute cereals and vegetables directly than the more complex food products from animals, which required the same cereals and vegetables to keep alive. It was thought to be of more value to the state to eliminate the step of having animal stomachs convert home-raised cereal into meat and let the human stomach attend to the grain directly. The shortage of

meat, lard, suet, butter, and eggs actually helped to improve the health of the public, due to the elimination of three-quarters of the fat normally consumed. Since no animal fat could be produced without sacrificing a good share of the country?s cereal supply, the animal-product industry was kept down to its lowest possible level. However, this had the undesirable effect of raising the prices of what meats and fats that were available and encouraging illicit trading.

Ersatz Cloth and Fibers

Times being hard, there was a reemergence of the nettle plant as a textile. Prior to the war it was looked upon as a noxious weed fit only for goose fodder. To convert nettles into a useful fiber, the plant is cut, packed tightly under water so that the vegetable pulp will decay and then dried and prepared for spinning in a process similar to the production of flax fiber (into linen). It was brought into the market with the imposing name of "natural silk." Germany, Austro-Hungary, Turkey and Bulgaria produced considerable quantities of cotton, wool, flax and silk. But there continued to be a shortage of textiles and raw materials to go around. The wear and tear on uniforms was severe, and the men at the front were wearing out their uniforms at an alarming rate. The military authorities realized that nothing would be gained by making uniforms of poor cloth, so only the best materials available were used It was the civilian who was forced to wear shoddy--fabric made from reclaimed wool fibers. Shoddy gives ample satisfaction as long as enough new material is added. An old wool suit could be "combed" for fibers and combined with some new wool, cotton or silk, and then re-dyed. Enough material could be made this way to make two "new" suits. First-class shoddy was produced under a formula of 65% new fiber and 35% old. To prevent the spread of disease all shoddy was thoroughly sterilized.

Paper-cloth

The shortage of textiles gave rise to the paper-cloth industry. It was not a question of inventing something entirely new because paper twine had been in use for many years. For many purposes for which textiles were being used, paper-cloth was well suited, especially for all the articles that used imported manila and jute. But from paper-twine to paper-cloth it was quite a step, since the yarn or threads that are used to make fabric are finer than paper twine. These threads had to be made reasonably strong in order to make a relatively durable fabric. Paper cloth?s manufacture used machines originally designed to make newsprint. First, rolls of unbleached paper passed through an arrangement of rotary blades which cut the sheet into strips. The strips were gathered on spools that revolved about their axis but also about themselves giving the paper strip the necessary twist. Fabric made entirely from these threads could be used for bagging and similar uses. But even when hardened by a chemical treatment, paper-cloth yarn still did not have the

strength to form a garment-strength fabric. When reinforced by a tougher fiber--cotton, flax or silk--as the weft, a fabric suitable for garments that would not see rough use was made. For example, sweater coats for ladies and children or for hats. For military overcoats, a wool weft was used and a waterproof treatment applied. This produced a warm garment that was watertight without the result of being airtight.

Shoes

The endeavor to find a substitute for shoe sole leather was not so successful. Horned cattle in Central Europe are stabled throughout the year. Protected from inclement weather, these animals have thin, tender hides. Thus, there was enough leather for the finest uppers, however, this leather was next to useless for soles. The solution was found in the use of wooden soles. Wooden soles worked well enough for the rural population, but on city pavement it was unacceptable. The question was how to make that wooden sole bend a little at the instep. The first design was a sole whose two halves were held together by a hinge under the instep. However, the hinged sole left the arches unsupported at the very point where the support was needed. Experiments produced a flexible bit of steel plate to replace the hinge. The best wooden soled shoe was the one that gave the foot lots of ankle room, held the instep snug and made up for the flexibility of the leather sole by a rounding off of the wooden sole under the toes. A good and serviceable wooden sole shoe with leather uppers had been created.

A New Source of Explosives

Much was done in the field of inventing substitutes for hard to get war materiél. German scientists perfected the system of a Norwegian chemist, who had made commercially possible the process of condensing the practically inexhaustible store of nitrogen in the air into niter crystals. This eliminated the need to import minerals to make explosives. The fact that almost anything could be converted into explosives by nitration resulted in substitutes for more valuable raw materials. Before the war, cotton fiber and fat were the materials used to make nitroglycerin. But the fats that go into glycerin and the cotton that becomes trinitrocellulose could be put to better use. After a new process was developed, which substituted coal-tar in place of fat and birch and willow pulp in place of cotton, a savings in both food and clothing was achieved. Thrift, Conservation and Recycling The campaign against waste was the embodiment of thrift and conservation. All household offal had to be separated into food remains and rubbish. Food leavings, potato peels, fruit skins, the unused parts of vegetables, and the like were used as animal food. Much of the copper and brass complement of households was turned in and most copper roofs were replaced by tin. Church bells were being smelted, while in coinage, iron took place of nickel. Sweepings

from the streets were being used as fertilizer and dead leaves were gathered for stable bedding. Women and children were sent out to gather nuts, mushrooms and berries in the woods and villagers were permitted to cut dead wood in state forests.

"Summer-Time"

The introduction of "summer time" moved the clocks ahead an hour, so that people rose shortly before dawn, worked their customary ten hours in the shops and factories and then still had enough daylight to work in their gardens. When dusk came they went to bed! The early closings of shops, cafés and restaurants greatly effected savings in light and eatables. And thus while the German soldier endured at the frontline, the civilians served the cause on the home front.

- Source: ***The Iron Ration: Three Years in Warring Central Europe***, George Abel Schreiner, Harper & Bros. Publishers, New York, 1918.