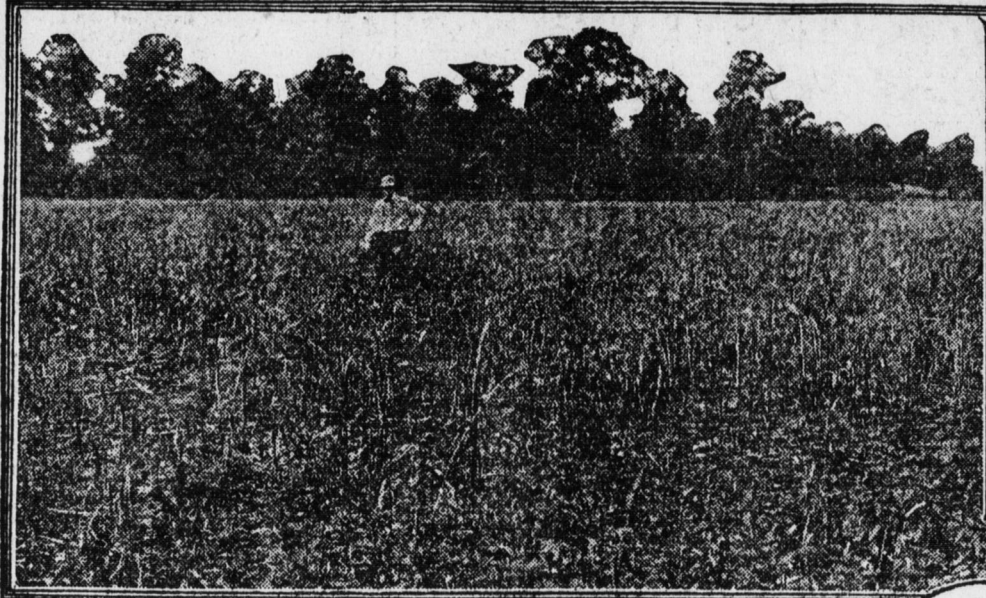
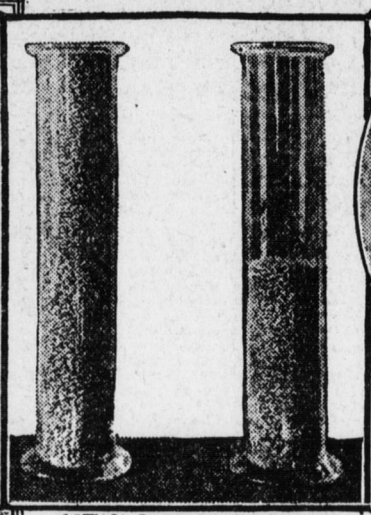


Bread and the European Conflict



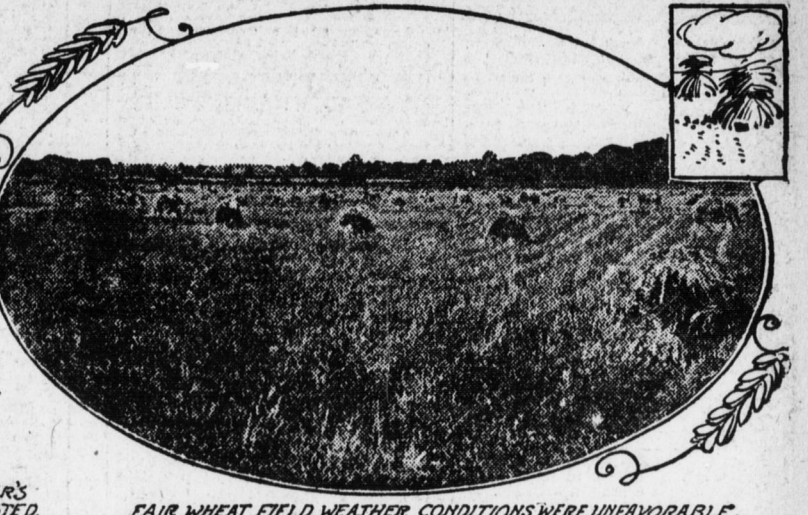
A WHEAT FIELD THAT DOESN'T PAY INTEREST OR EVEN COST OF PREPARING SEED BEDS. THE WAY MANY OF THE 1916 WHEAT FIELDS LOOKED



ACTUAL PROPORTIONS OF LAST YEAR'S WHEAT YIELD AND THIS AS DETERMINED BY AGRICULTURAL DEPARTMENT, O.S.U.



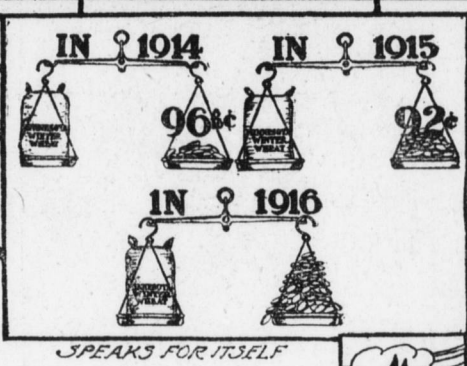
IT ISN'T ONLY THE HEIGHT OF THE STRAW OR THE NUMBER OF GRAINS THAT COUNTS BUT ALSO THE SIZE AND PLUMPNESS. LAST YEAR'S AND THIS YEAR'S AVERAGE WHEAT CONTRASTED.



FAIR WHEAT FIELD, WEATHER CONDITIONS WERE UNFAVORABLE. AVERAGE WHEAT FIELD OF 1916, CONTRAST WITH ONE OF 1915 YIELD



DR. H. E. BARNARD, STATE FOOD AND DRUG COMMISSIONER OF INDIANA



PROF. WILMER G. STOVER, O.S.U.



SAM F. McDONALD, MEMPHIS, PRES. NAT. ASSN. MASTER BAKERS



MISS ANNE MACGREGOR PAYNE, HOME ECONOMICS EXPERT



1915 WHEAT FIELD

Baking An Ancient Craft

By T. T. F.

BREAD! The commonplace of every-day life, coeval with the pyramids, fellow with wars and dynasties in the history of the world, older than the oldest tradition, honored in Holy Writ, bread today disputes with the political activities and the European conflict for first page position in the newspapers of the land.

Why this reawakened interest in bread? Why are so many questions concerning it, supposed to be answered for good and all, and so many other questions, never before propounded, being brought to the front?

There are two reasons, both very simple. In the first place practically everyone in America eats bread and therefore is interested, and in the second place after a period of an average life time at a stationary price, that price suddenly has changed.

Man has been laying bricks since before the days when the Pharaohs bulid themselves monuments by the banks of the Nile, but it remained for Frank B. Gilbreth, an efficiency engineer of Providence, to find that for all these centuries much of the energy and time had been wasted. So the present agitation about bread has revealed facts never before suspected. Big minds in all lines have applied themselves to the subject. What some of them have to say is set forth here in a general survey of the bread problem from all angles.

In thinking of bread the dweller in the city considers at once the baker, while in a large measure the rural inhabitant considers the housewife. Obviously the baker is the person most intimately interested in the whole bread proposition. In the last 25 years the baking industry has undergone radical changes. S. F. McDonald, of Memphis, president of the National Association of Master Bakers, says more talent is required to be a successful baker than to be a successful banker or a successful doctor. Mr. McDonald defends this view by saying that the average baker has no professional training. He has grown up in his business, and his trade is the trade of dollars and cents, of debits and credits, and there is not what fairly might be called a technical training.

The physician must give years of time and study to preparing himself for his calling,

but aside from these he seldom has any business acumen.

The baker, on the other hand, according to Mr. McDonald, must have a high degree of technical training, including chemistry and physics, coupled with years of apprenticeship in the shop, and to this he must add a proportionate degree of skill in the managing of his business. He has a big investment at stake and he must not only know how to sell, but when and where to buy, what prices are right, and he must have executive ability into the bargain, as the baking industry today is conducted on a large scale. Like all other big business men, bakers have installed cost accounting systems, so that the leaders in the industry saw the approaching necessity for price readjustment and set themselves to work to prepare for it.

As a result of their analysis of the situation, the campaign in favor of ten-cent loaves, which has been going on for the last several weeks, was inaugurated. This is because in baking approximately 45 per cent of all costs are in the nature of overhead charges and these are proportionately less in the larger loaf than in the small one.

The immediate cause for a readjustment in bread prices is the woeful insufficiency of the 1916 wheat crop coupled with the extraordinary export demand for that cereal growing out of the war in Europe. According to government authorities this year's acreage was only 80 per cent of that of 1915, and this acreage has yielded as low as 50 per cent of the crop in a great deal of the United States wheat lands.

Bad Winter and Dry Summer, Then Rust. Many things combine to reduce the yield, among them a bad winter and a dry summer, but most damaging of all was the black rust, which made its appearance in the Dakota, Minnesota and Montana wheat fields. Black rust is a great many people is only a name, but to the farmer who has staked his all in a crop of wheat it is a very real and very evil. Prof. W. G. Stover, of the Ohio State University, one of the grain experts of the Middle West, says rust is a fungus growth which attacks the leaves and stems most. At first there are numerous pustules or reddish brown spots. Later black and brownish spore masses are formed on the same parts and these give the name black rust to the disease.

In many wheat growing sections black rust is by far the most serious disease of the wheat. The disease is spread from plant to plant and from farm to farm by means of these spores, which are of the same use to the rust fungus as seed is to other plants. Rust annually causes loss to wheat in the United States ranging from \$15,000,000 to \$80,000,000.

Another cause that is added to the high cost of wheat, according to other experts,

is the failure of American farmers to properly fertilize their fields. C. E. Thorne, head of the Ohio Experiment Station at Wooster, Ohio, in an official bulletin, says: "Less labor with more seed, more manure and more fertilizer would enable Ohio farmers to grow as much wheat on 1,500,000 acres as they are now growing on 2,000,000 acres."

Each official monthly report of the Department of Agriculture since the first of June has decreased the estimate of the United States wheat yield until it is now approximately 600,000,000 bushels and more than 400,000,000 under the 1915 yield. As the annual consumption is very close to 600,000,000 bushels, this would mean that there should not be a single bushel exported if prices were to remain at the 1915 level.

But already millions of bushels have been exported and millions of other bushels have been booked for export, so that the price of wheat, and as a consequence the price of flour, has continued to soar until they are now at a level unknown since the days of the Civil War.

No Good to Bake at Home.

This has resulted in some well intended, but misdirected, effort to induce the housewife to bake her own bread. It was a mistaken idea that such a change might result in economy to the family. Official investigation along this line comes far from bearing out this supposition. A miller who appeared recently to Miss Anne Macgregor Payne, director of the Home Economics Department of one of the leading papers in Ohio, was given the benefit of exhaustive research and experimentation which show that only by turning out an inferior loaf could the housewife do as well as by buying baker's bread, while if she attempted to produce a loaf as good as the best baker's bread it would cost her more to make it at home than to buy it.

On a basis of New York prices, Miss Payne found that in buying the bread baked from a barrel of flour, the housewife was paying only 27 cents for the labor involved, if she bought 10-cent loaves and 75 cents if she bought 5-cent loaves. Allowing three-fourths of an hour for each four loaf batch, Miss Payne found that the 74 bakings in a barrel of flour would require 52 hours of time and that this labor at a minimum rate would have a market value of \$11.40.

Miss Payne's deductions are further substantiated by the Journal of Home Economics of July issue, which made a survey of the same subject. Taking up the claim that the saving of money is not necessarily the only point to be considered in comparing domestic baked and commercially baked bread, Miss Payne says:

"It is necessary to know and understand the modern bakery methods and machinery as compared with the old basement type of

bakery. And in the further discussion I am speaking of the large bakery which is able to give the most of the best bread for the least money because of quantities of material handled, and who is reliable and dependable and honest, and many such exist. I am taking it for granted that the housekeeper who will consider the question at all will be ambitious enough to see that her bread is coming from a clean, reliable bakery. In the old, small bakery the baker was forced to use "red dog" flour and inferior materials in order to come out with a profit. The modern bakery sends the flour which is the best to the top of the building and there it is rebolted and sifted through fine silk cloth. This the baker has another purpose in doing, but it results in the flour being cleaner for his bread than the housekeeper's is. After this it is not touched by the hand until you unwrap it at your home.

"Second: the baker can mix his flour to make a perfect texture, color and flavor, which depend on the amount of gluten and its quality. The housekeeper can not give the time to the testing and grain grading that is necessary to perfectly blend the flour, to get the proper ratio of ingredients.

"Third: in the rising bread there are three acids which develop and have a marked effect on the fermentation, lactic, acetic and butyric acids. The lactic acid is present in the largest quantities and should develop the most rapidly. If the dough reaches too high a temperature, the acetic acid develops too rapidly and causes an over percentage of butyric acid which results usually in sour bread. At too low a temperature, lactic acid increases too rapidly with harmful results. The baker ferments his bread in automatically controlled temperatures and the housekeeper even of years' experience can not hope to compete with him on this plane.

Things Housekeeper is Unable to Control.

"Fourth: the amount and strength of the fermentation plays a part in the flavor of the bread, the appearance and food value. The baker kneads and beats his dough mechanically usually for at least thirty minutes. This dissolves or softens the gluten. The housekeeper is dependent on the yeast fermentation for this and must continue the fermentation longer than the baker, thereby losing a larger amount of the sugar and carbohydrate in the form of alcohol and carbonic acid gas. The amount of salt has much to do with the fermentation, acting as a check. The baker uses salt in quantity for flavor and uses a stronger yeast. This the housekeeper can not control, either. The baker considers that the most important control of flavor is the amount of salt used and the strength of the yeast.

"In summing up the situation, the housekeeper who manages her house in the most successful and efficient way, when she finds that she can free herself from a large number of hours of manual labor by putting the work into the hands of others equally and even better prepared to do it, she will do so at once and use that time for work which can not be trusted to others. She will give it to her family or to those who need her most. For the housekeeper who must count every penny, regardless of the amount of labor involved, I think she, too, will find that her time may be spent in other ways that will yield her a greater saving of money. That 52 hours spent in sewing or perhaps out of doors will yield her a far greater return than the 75 cents which is the greatest difference she will get and even in making that estimate there has no allowance been made for any spoiling by failure in any way and taking it for granted that all the bread made at home from a barrel of flour is of equally good quality. The baker does not put his failures on the market, you only pay him for his best."

What Distinguished State Official Says.

Another authority equally distinguished so far as the baking industry is concerned, is Dr. H. E. Barnard, State Food and Drug Commissioner of Indiana, and one of the best known authorities on food values in the United States. In a recent article written for the New York Evening Mail, he says:

"Home-made bread can not compete with the bakers' product. Ten years ago it was a courageous baker who would invite the public to his shop. Today the baker who does not throw the doors open to his critical customers is out of date and he can not get credit at the bank. I do not want to persuade the housewife to stop baking bread, but after she has visited a modern bakery I think she will."

Dr. Barnard has also done a little investigating on the question of a ten cent loaf and in another issue of the same publication says: "Ten cent bread is perfectly logical and its use will profit both the public and the baker. The public will get more than twice as much bread for a dime as it will for a nickel. It will have better eating and keeping qualities and there will be but two heels instead of four. Perhaps you don't waste the heels, but most people do.

"The grocer doubles his profit with one handling. The baker saves on fuel, labor, wrapping expenses, delivery costs and advertising. Ten cent bread is an economical proposition to everyone. The buying habit is an economical proposition to everyone. The buying habit of the customer may, per-

haps, be slow to change, but the ten cent loaf is bound to come."

Last year before bread prices had begun to advance in so many lines of foodstuffs the University of Illinois conducted a series of experiments to establish among other things the relative food value of bread. As a result of this investigation it was shown that whatever the price of a loaf might be, so long as other foods advanced somewhere near proportion, bread will be almost twice as valuable for the same cost as any other food obtainable.

In this bulletin, issued by Isabel Bevier, head of the department, it is stated:

"The peculiar value of wheat bread lies in the fact that it is one of the cheapest sources of protein. Again this form of protein known as gluten which occurs in wheat flour enhances the value of the flour because the gluten has the property of expanding and serving as a framework for the retention of air or carbon-dioxide. Because this quality is lacking in the protein of corn and oats, neither of these grains is extensively used for bread. The value of a flour, then, for bread depends upon the quantity and quality of its gluten and upon its strength, and this latter quality is usually judged by its capacity to absorb water. Large bakeries conduct experiments constantly to find just the blend of flour that will absorb the greatest amount of water, or, in other words, yield the greatest amount of bread, or take and retain water.

Bread Cheapest Food at Almost Any Price.

"It has been understood for a long time that the term cheap and dear as applied to foods mean not only the amount of money expended, but rather the amount of nutritive materials secured, for a given sum or to put it in another way, the amount of building material—protein and energy—calories, that can be secured. The following table shows how favorably bread compares with other food stuffs in these two points.

FOOD MATERIALS	PRICE	Ten cents will buy	Ten cents worth will contain	
			Protein	Value of Calories
Wheat bread	\$.05 lb.	32.0 oz.	2.9 oz.	2,400
Cheese	.... .22	7.3	1.9	886
Beef, average	.... .20	8.0	1.2	467
Porterhouse steak	.... .25	6.4	1.3	444
Dried beef	.... .25	6.4	1.1	315
Eggs	.... .24	10.0	1.3	198
Milk	.... .69 qt.	38.3	1.2	736
Potatoes	.... .60 bu.	160.0	none	2,950
Apples	.... .015 lb.	106.7	none	1,270

"It will be seen that, at the prices quoted above, ten cents expended in bread will secure more than twice the protein obtained from beef, and almost three times the energy; also that ten cents invested in bread at five cents per pound, compared with eggs at twenty-four cents per dozen, will yield more than twice as much protein and twelve times the energy."

OUR WONDER WORLD.

The part performed by worms in rendering the earth fertile is not generally understood. Darwin estimated that worms, by swallowing earth for the sake of the vegetable matter it contains, and afterwards expelling it,

bring to the surface as much as 10 tons of earth per annum on an acre. Worms are great promoters of vegetation by boring, perforating and loosening the soil, and rendering it pervious to rains and the fibers of plants by drawing straws and stalks

of leaves and twigs into it, and, most of all, by throwing up such infinite numbers of lumps of earth called wormcasts, which form a fine manure for grain and grass. The earth without worms would soon become cold, hard, void of fermentation and con-

sequently sterile. This has occurred in many cases where the worms have been either accidentally or intentionally destroyed, and the fertility of the soil thus lost has only been restored when the worms had again

collected and resumed their fertilizing work.

Star photography is one of the most tedious operations known. In some cases the exposure of the plate

must last for several hours. During all this time both the plate and telescope must be moved so that the image of the star will be stationary on the plate. The exposure for a size

star of the sixteenth magnitude is two hours, and only the image of one at a time can be secured, unless those adjoining happen to be of the same size.

Bringing Up Father

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By McManus

