Graduating Thesis.

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Food Adulterations.

Outline.

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B. Why adulteration is used.
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Food Adulterations.

The subject, Food Adulterations is in reality a very serious one from one point of view, and should be very carefully investigated. But adulteration is not carried on to such an extent as is generally supposed. The majority of the people seem to think that the rare thing is getting food that is not adulterated. This is humorously expressed by a little poem written by Robert J. Burdette which reads as follows:

Placid, I am, content, serene
I take my slab of gypsum bread,
And chunks of oleomargarine
Upon its tasteless sides were spread.

The egg I eat was never laid
By any cackling, feathered hen,
But from the Lord knows what 'tis made
In Newark by unfeathered men.

I wash my simple breakfast down
With fragrant chickory so sweet
Or with the best black tea in town —
Dried willow-leaves - I calmly sleep.

But if from manis vile arts I flee
And drink pure water from the pump,
I gulp down Infusoriae,
And hideous Rotatoriae,
And wriggling polygastricae,
And slimy dicotomideae,
And hard shelled ophryocerinae,
And double barrelled Kolpodae,
Non-loricated ,
And various animalculae;
Of middle, high and low degree;
For nature just beats all creation
In multiplied adulteration.

Burdette's is, of course, a sarcastically pessimistic view. The department of Agriculture reported, in 1890, that only about fifteen per cent of the food supply of the United States is adulterated. That per cent is too large for it is possible, and all food should be pure. It means that the people pay

opt every year seven hundred million dollars for food which they do not get.

This latter clause is now probably the greatest sin of adulteration. Dr. Hassall says, "Both body and mind are corrupted, and vice and disease equally encouraged by the habitual use of impure and improper food or drink"; but he probably refers more to the preparation of the food than to the raw material.

Adulterations are of two kinds:

1. Those which are harmless.
2. Those positively injurious to the health.

The majority of adulterations belong to the first class. Prussian blue is the only facing used for tea which is really injurious and only a very small per cent of that is found. The amount of alum is very limited in comparison with the tea flour, bean flour, rice etc that is used in bread.

In fact, there is no incentive for selling injurious food. That would soon be found out and stopped. The aim of adulteration seems to be to enable the manufacturers to get money for which they do not give full value

The ones who suffer most from these practices are the farmers. They produce the raw material, and it comes back to them cheapened, weakened and even occasionally poisoned by the addition of foreign material. His thy pick nature is thus injured, and his pocket book depleted.

Many times the buyer is to blame in not getting pure food, because he does not know it from the adulterated. He chooses the pure white loaf, thinking he has the best when really alum added to damaged or low grade flour will whiten it so that it will pass off on the market for high grade.

The universal cry for cheapness is another encouragement for adulteration. As the present industrial machinery the real articles cannot be furnished to the buyer for the price he demands with any profit to the seller. So the producer adds a cheap adulterant, and tries to ease his conscience by saying if the people want to be cheated will first have to cheat them.

Each party seems to deserve a portion of the blame. The movement to correct the evil will, however, probably have to come from the buyer. If he were willing to pay the neces-

any price for the pure article and could detect it from the adulterated, he could easily secure it on the market now.

To find out to what extent adulteration is carried on, I have investigated the experiments with three staple articles of food carried on by the experiment station at Washington. The results of these experiments I give, in brief below:

Meat.

Meat cannot well be adulterated except where it is prepared for the table before leaving the market. There are many instances where diseased meat is sold on the home market. This practice was so extensive that our meat was excluded from the foreign market until 1890, when the inspection offices were established. Now our meat is gaining admittance into foreign ports and the practice of selling diseased meat is very much decreased at home.

Tea.

The chief adulterations for tea are facings with Prussian blue, indigo, turmeric or plumbago; the addition of spent or foreign leaves, mineral matter and astringents.

Facings are easily detected by means of the microscope. It is generally conceded that they are not deleterious to health, because of the small quantity used. It is estimated that a person would have to use about a pound of the faced tea to get enough to injure him.

The object of facing seems to be to give a gloss to the inferior tea and make it sell for a better quality.

Catechu is sometimes added to increase the astringent effect of the tea and make it seem stronger than it is.

Soapstone, gypsum and some of the iron salts occasionally used to weight the tea and, in the case of the iron sulphide, to color the infusion.

The presence of spent leaves in tea is not easily detected, because the composition

of the tea varies so. The extract must be analyzed chemically, and compared with the extract from the foreign leaves.

Foreign leaves are best detected by the microscope. They are seldom used. In fact, none of the adulterations of tea are used much now, except facing.

Bread.

The chief adulterations of bread are;

Organic.	Inorganic.
Rice flour	Alum.
Bean flour	Borax.
Pea flour	Copper sulphate.
Potatoes	Zinc sulphate
	Chalk.

There is little evidence that any of these are used now except alum. The question of the injurious effect of alum rests more on theory than on observation. All are agreed so far as it is investigated that it is harmful. Dr. Hassall says that it hardens the gluten rendering it more indigestible

To test a crumb of bread for alum, soak it a few minutes in ammoniacal tincture of logwood, and squeeze out the water. The crumb will be of a blue color while the tincture is pink. This test is not decisive, but shows that it requires further investigation.

The use of other flours than wheat is detected by means of the microscope. The spectroscope is the best test for rye flour.

The most common adulteration of bread is potato. Of course there is no harm in potato, but the trouble is, their use allows the bread to take up more moisture, and so the consumer pays the price of bread for pure water.

If people would inform themselves regarding the differences between pure and adulterated food there are simple tests which show the presence or absence of nearly all foreign or inferior material. For instance, in buying canned meats or vegetables if the cans are concave in the heads they are very likely not to be keeping well. Soak tea leaves in cold water and

compare with a similar infusion of the genuine leaves. The color and taste will reveal the presence of any foreign, mineral matter or astringent substance.

These tests are perhaps not infallible guides, but they assist very much in the selection of foods.

Armed with his microscope the investigator in his home has far greater detective power than the chemist with all his reactions. He can detect the definite forms and natures of the various ingredients in mixtures. For instance, he can see the intimate structure of the coffee grain then of oak or mahogany dust, and then compare the two.

In this way the individual purchaser may protect himself in a great degree. But unless we can have laws to protect the market a great deal of money will be spent every year for food which has not the nutrition it ought to have.

In 1889, 1890 a vigorous attempt was made to establish a law which would require all food to be marked and sold under its proper name. Michigan, Minnesota,

New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Virginia and Wisconsin now have state laws on the subject. They have been practically ineffective, however, because the different states do not work together.

The law of New York, prior to 1890, had the penalty attached only when the adulterant was injurious to health. The law was a failure, because practically none of the adulterants used could be proven deleterious to health.

The law in Massachusetts is practically the same as the "Paddock" bill proposed. Analysists and Inspectors make monthly reports of work. For the month of October 1894 29.8% of the milk examined was found adulterated, but only suspicious samples were examined. Eleven cases were brought up during the month for violations of the law and fines amounting to $247 were imposed. The law is quite strictly enforced and the per centage of adulteration is fast diminishing.

In Europe, on the continent,

every dealer is held responsible for the quality of his goods whether foreign or domestic.

We, as Americans seem to resent laws which take so much control over our business, and still we let compulsory education grow. Here is the use of fostering such an institution as this for weak, unhealthy bodies. Strong bodies can never be grown on weak impoure and improperly cooked food. So adulteration is a subject which affects us as vitally as a people.

A question which affects the health, wealth and development of the people is no local or individual matter. It is national and must be dealt with as all national questions are - by Congress. Nothing very satisfactory can be done until we have a National law and that carefully and severely enforced.