to-morrow and retain the love and admiration and highest respect of man, which means the amenities and courtesies of life, or, will she assume the place of and knock elbows and shoulders with men in the market places of the world and become a skirt-wearing man who has lost all those finer attentions and devotions to-day lavished upon woman? The woman of to-morrow must, if she can, solve the problem and cut the Gordion Knot so that she may come into her own as a power for good and progress in the world and yet with all remain the loving helpmate and highly respected wife and mother of man. Unless she can solve the problem and secure her independence and active agency for good in the world without losing the respect of mankind as a loving helpmate, society of to-morrow will be a hopeless and a sorrowful thing, holding out little but a reversion to a lower type of civilization and culture.

The world will be revamped and reconstructed after this war. The world cannot have gone through the ordeal of fire, destruction, hatred and untold suffering without some good coming out of it for those who have suffered and died that we might live and make the world safer for their orphaned little ones to live in. The war represents the last dying gasp of feudalism and the rule of the many by the rich and powerful few or, as it is often put, the rule of might against right. The holocaust will have cost millions of lives of men, and woman will more than ever preponderate in numbers in the world. Why should she not have her influence in the remodeling and revamping of government and society? If there ever was a chance for woman to assert herself for the uplift, salvation and progress of humanity, that time is to-morrow—the near future. Woman does not love war and does not want war. She does not want to give up her husband, brother or son to be brutally shot to death in droves like cattle. If the women of this country or any country had been asked whether their country should or should not go to war—the answer would never have been in doubt for one instant. Instead there would have come from the forests of Germany, the meadows of France, the hills of England, the plains of Russia, the valleys of Italy, and the fields of the United States, the never ending sound of N O—a thousand times N O—and it would have come so loud that it would have echoed down the ages to come so that the hills and mountains of the whole earth would have heard it even down to the last generation. Therefore women of the Women's Section of the A. Ph. A., women of this great country of ours, women of all nations, women of the world—all of you women of to-morrow rise in your might, rise in your dignity, rise in your power that you hold over men, for the love we men bear you and I hope will always continue to bear you, and make your influence and your strength felt in the world of to-morrow and so help direct and steer the ships of state of the world that, after this war has established democracy on earth forever and the brotherhood of man and the sisterhood of nations and destroyed autocracy and the rule of the many by the few once and forever, the ugly tentacles and the hideous fangs of war shall be buried forever, never to be resurrected.

Then followed an illustrated lecture on "Community Work in Conserving Cereal Foods and Protecting the Public Welfare," by Dr. L. F. Kebler, Chief of the Drug Division, U. S. Department of Agriculture, Bureau of Chemistry.

COMMUNITY WORK IN CONSERVING CEREAL FOODS AND PROTECTING THE PUBLIC WELFARE.*

A STEREOPTICON LECTURE.[1]

Suppose I should ask this assembly to name one of the leading industries of your community, what would your answer be? Suppose we should address a letter to the various communities in the world and ask what constitutes their chief industry? A variety of answers would undoubtedly be received. Some would say automobiles, others cotton, wool, farming, iron, steel, mining, etc. Some might mention some phase of the food problem, but the food industry as a whole would hardly be thought of. It is such a common industry and is with us all so large a

* Requested and approved by the U. S. Food Administration. Prepared by Dr. L. F. Kebler, Bureau of Chemistry, U. S. Department of Agriculture.

[1] Delivered before the Women's Section at the Chicago meeting of the A. Ph. A. Eighty slides were shown by the lecturer, illustrating the related points, and these are indicated throughout the address by the subjects presented.

part of the time, that we seldom think of it as an industry. We eat food three times a day when we can get it. Indeed, we spend the greater part of our efforts in producing, transporting, preparing, conserving and consuming our foods, so that we may live and have our being. With some the getting of food constitutes a veritable struggle for existence. By far the greatest amount of the labor on our farms is expended in raising, harvesting and marketing foods for man and the domestic animals.

The chief, ultimate purpose of all farm implements (plows, harrows, reapers, threshers, etc.) is for food production. All kitchen supplies and utensils and the capital producing them are parts of the same industry. Immense factories for preparing foods (products valued at $2,300,000,000) exist in various sections of the country. Great elevators are constructed to hold our grains. A large amount of our transportation equipment is utilized for shipping foods from one community to another. Food constitutes the greatest industry of all peoples. At present it is an international problem. The capital invested in the food industry in the United States alone (one hundred billion dollars) is greater than that invested in many of the other largest industries combined. The value of the cereals alone in the United States at the farms for 1917 is estimated at eight billion dollars. This alone certainly represents some investment. We are not only the greatest food-producing nation in the world but the largest wheat-growing country as well. Russia comes second. We produce considerable for export. England, France and Italy even in pre-war times did not grow enough wheat to meet their own needs. Considerable was imported. In the present war the demand for imported wheat is very great.

Man derives the greatest part of his nutrition from the grains. The importance of the cereals in the life of a nation is therefore clearly evident.

Cereals (wheat, corn, rye, rice, etc.), for the most part, are derived from the grass family. The only important exception is buckwheat. Most of us do not look on wheat, corn or rye as grassy in nature, but the botanist so classes them.

One or more of these grains are grown in all parts of the world. Some thrive best in cooler weather (oats), others in warmer climates (rice). The part of these grasses used for human food is the seed. Herbivorous animals, however, consume all parts of the grasses as food to make foods for us. This illustrates how closely related is the source of food for mankind and the lower animals. We do not eat grass ourselves, but we do eat it by proxy. We make the milk-and-meat-producing animals manufacture it into foods for us. In the grains of all grasses is stored up nourishment for the young plant for use during the early days of its career. By the foresight of self preservation the parent plant, in providing for its young, produces a tremendous food supply. By robbing the young plants of this food man appropriates to his own use and the use of food-producing animals, a vast amount of nutrition. From this it is evident that the nutritive elements required by man are similar to those of many of the young plants. In the final analysis, man and the lower animals are dependent on plants for their foods. After the grain plantlet is well established it possesses the power of extracting its food from the earth and air, but in order to get a start in life there must be available for ready use certain well recognized food substances. From the nature of things it is quite evident that grains contain these various essential nutritives called proteins, carbohydrates, fats, vitamins and mineral matter.

FOOD NUTRIENTS.

Proteins.—Egg albumen, red and white meats, casein, gelatin, gluten, zein, legumin, fish meat, peptones, etc.

Carbohydrates.—Glucose, dextrose, grape sugar.—Fructose, fruit sugar; sucrose (ordinary sugar), lactose, milk sugar; maltose, malt sugar; starch, corn, wheat, potato, rye, rice, etc.

Organic Fats.—Butter, lard, beef fat, fowl fat, mutton fat, fish oil, oleomargarin, olive oil, cottonseed oil, peanut oil, corn oil, sesame oil, almond oil, cacao butter, cocoanut oil, nut oils, etc.

Vitamins. Food Hormones; Food Accessories.—Water soluble; in cereals, fruits, vegetables, meats and milk.

Fat soluble; in butter, egg yolk, roots, leaves, milk, cod liver oil.

Inorganic or Mineral Matter.—Water, compounds of calcium, magnesium, iron, sulphur, phosphorus, sodium, potassium, chlorine, etc.

These food elements vary considerably both in character and amount in the different cereals, but their food- and health-giving values are very similar. Wheat contains more protein than corn, and the two differ materially in character. The fat content of oats is considerably greater than that of rice, but their food value, measured in calories, is about the same, weight for weight.

The proportion of the several constituents contained in each cereal has been carefully determined by chemical analysis, and the order of their relative richness can readily be grouped. The protein content of wheat, rye and oats is about the same. Rice, corn and millet contain materially less. The fat content of oats and corn is much greater than either rice or wheat. In the carbohydrate content, rice takes first place, oats and buckwheat rank below it.

Barley is among the first in mineral content, while polished rice represents the lowest.

The preponderance of carbohydrates in cereals indicates that they should be combined in our diet with other foods, richer in fats and proteins. We have instinctively learned to do this. Our bread is spread with butter. In the case of sandwiches the protein and fat content of bread are enhanced by the addition of butter, meat, cheese, etc., as the case may be. Puddings are enriched with protein and fat by the use of milk, eggs and butter or other fatty material. Other forms of cooking show by natural selection of many years, that there is a natural tendency to balance the food nutrients required by the system. When there is a deficiency of certain food principles the system seems to have a way of making its wants known. The need of salt or water are cases in point. Cattle will travel miles and miles to get them.

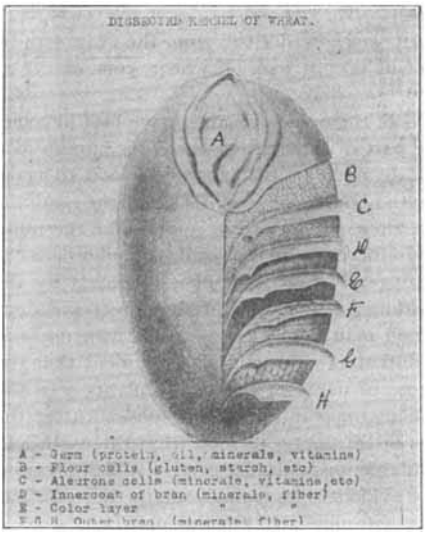

FIG. 1.

Wheat is by far the most important cereal used by man. The Chinese consider it a special gift from Heaven. The cultivation of wheat is pre-historic. It antedates the Egyptian monuments and is more ancient than the Shepherd Kings and the Hebrew scriptures. It grows in all temperate regions of the earth. There are many varieties of wheat, red wheat, white wheat, hard wheat, soft wheat, starch wheat, winter wheat and spring wheat. In normal times we consume annually about five bushels per capita. It is the great bread-making grain of the world. Bread is the very basis of the food supply of humanity and the cereal most generally and satisfactorily used is wheat. It possesses certain basic characteristics which will be considered in connection with bread making.

There is a great shortage of wheat at present in the allied and neutral countries of Europe. If we expect, as we do, to win this war for permanent peace and humanity and make this world a decent place to live in, America must help supply the allied armies and their industrial workers, their women and children, with a part of their food needs. This problem is second to none for the salvation of our country. Hungry men are not effective fighters, nor will men continue fighting with starving families at home, if by refusing to fight they can feed them. The failure of Russia is a notable example. A diet satisfies or fails in proportion to the bread it contains. Bread therefore is no longer figuratively the "Staff of Life." It is in reality.

It is impossible to know too much about the cereals and wheat in particular. On cutting a grain of wheat lengthwise into thin slices and examining them under a microscope of low power, three distinct parts can be readily made out. They consist of an external covering or skin, an internal substance or kernel and the germ. The skin or outer envelope, or "hull," as it is sometimes called, goes largely to make up the bran and is composed mainly of cellulose, impregnated with mineral matter. It contains the coloring matter of the wheat and is the protective coating of the grain of which it makes up about $13\frac{1}{2}$ percent. The kernel, also called endosperm, consists primarily of starch and the antecedents (gliadin and glutenin) of gluten. It makes up about

85 percent of the grain and furnishes the bulk of the white flour of the market. The germ is essentially the young plant and represents about 1 1/2 percent of the grain. The cells of the germ contain certain ferments or enzymes, which convert the insoluble starch and nitrogenous matter into soluble material capable of being absorbed and used by the young, growing plant. The germ is usually discarded in the manufacture of ordinary wheat flour, because the oil contained therein tends to turn rancid, thus making it difficult to keep the flour over an extended period of time.

A still higher magnification of a section of wheat grain (mounted in water) brings out the various parts more distinctly. Now we can see the bran layers, the starch granules and the gluten particles.

The chemical composition of the whole grain and the three component parts described above have been carefully worked out. The germ is characterized by its richness in protein, fat, and mineral matter; the kernel by the abundance of starch and protein it contains and the bran by the preponderance of mineral matter, cellulose and nitrogenous material.

The relative proportion of starch and protein differ in various kinds of wheat. Those grains which look so translucent and horny, are, as a rule, high in protein matter, while the grains which are soft, opaque and floury, contain less gluten and a larger proportion of starch.

Certain climatic conditions are favorable for hard wheat, others for soft wheat. The semi-arid region west of the Mississippi river, in both the United States and Canada, produces hard wheat, while soft wheat is largely grown in the states east of the Mississippi. Spring wheat belongs to the hard wheat variety, while the winter wheats are generally soft in type.

Whole wheat is not largely used as a food, although there are a few whole wheat proprietary foods placed on the market and greatly relished by many. A useful food may be prepared by soaking the berries in water, then boiling and finally mixing with milk and sugar and other suitable ingredients. This represents an old and very nourishing dish called "frumenty." It seldom graces our tables at present, although there may be some here whose environments have been such as to have actually enjoyed this dish.

At present the common procedure is to mill the grain into wheat flour by removing the germ and tough skin, then grinding the rest. This is easily done by the present elaborate process of the modern rolling mill. By rejecting the germ and bran the miller undoubtedly discards some of the most valuable food constituents of wheat. It is alleged this is not the miller's fault, but the caprice of the consumer, who has a natural or acquired aversion for dark bread. The aversion is claimed by some to be largely a matter of education.

The millings before the war varied from 56 percent (the finest patent flour) to 75 percent, in this country. That is, from each 100 pounds of wheat were made from 56 to 75 pounds of white, creamy flour. At present it is required to extract 74 pounds for each 100 pounds of wheat used. It is claimed that this flour is not quite as white or as good as that formerly made, but to the average consumer there is little difference excepting that he can get it only on a 50–50 basis. In England, at the present time, millers are required to make from 88 to 90 pounds of flour for each 100 pounds of wheat used. In France the extraction required is about 85 pounds and in Italy 90 pounds.

The bran is tough and fibrous and contains the coloring matter of the wheat. The miller therefore who is required to produce 85 to 90 pounds of flour from each 100 pounds of wheat can not produce as white a flour as when the bran is completely eliminated. He will furthermore be unable either to make quite as fine (size) flour or, if he does make as fine a flour, he does it at a little more expense.

The fibrous, branny material is not so easily or largely digested as the ingredients generally contained in patent wheat flour. This is one of the alleged objections raised to the use of whole wheat flour. It should be remembered, however, that the system needs a certain amount of indigestible material (roughage, ballast) to keep the bowels in good condition. This is very important. If all of our foods were entirely digested or without any practical residue, as in the case of sugar, starch, fats, meats, etc., our bodies would sooner or later be in an impaired state of health. The body also needs a certain amount of mineral matter to keep the various processes working smoothly. This is particularly true in the case of children. It is claimed by some that the deficiency of lime in our foods lowers our resistance to disease, particularly tuberculosis, which is so common in young life.

During recent years it has been found that certain substances, hitherto unknown, play a very important role in promoting growth and maintaining health. We do not know exactly what they are as yet, but for the present they are called vitamins, food accessories and food hormones. There are fat-soluble and water-soluble vitamins. Small amounts of both are required. All cereals are rich in water-soluble vitamins but poor in fat-soluble vitamins. The vitamins are contained in the outer layers of the grain and the germ. These are discarded in the making of white flour. They must therefore be obtained from other sources. Whole wheat flour contains the water-soluble vitamins. They are also present in fruit and vegetables. One or more of these must be included in the diet. Man can not live on white flour and pork or polished rice and fish and maintain health. The danger of mineral or vitamin deficiency need not be feared when an ample variety of food is eaten, and particularly is this true when there is an abundance of fruit and vegetables.

Wheat flour contains only a part of the mineral matter present in wheat. The greater proportion is in the offal which includes a number of fractions known in the trade as "red dog," "shorts," "middlings" and "bran." It is therefore clearly evident that if Graham flour is used in the manufacture of bread, a larger proportion of mineral matter will be taken into the body.

In order to make flour available for food purposes, cooking or baking in some of the many forms practiced must be resorted to. The simplest procedure is to mix the flour and water into a dough and bake. This makes a hard biscuit, difficult to masticate and harder to digest. Man was therefore early confronted with the necessity of converting flour into products that are light, porous and more easy of digestion. The problem was solved ages ago. Leavened bread was known to the Egyptian in the time of Moses. It consists in causing a gas to develop in the doughy mixture, converting it into a spongy mass, which is subsequently baked. Now in order to make bread of the above character, the flour to be used must possess the property of retaining or enmeshing the gas generated. This quality is inherent to the greatest degree in wheat flour, which contains several proteins, collectively called gluten. Gluten possesses the peculiar property of becoming viscid and tenacious when mixed with water. It also possesses sufficient coherence and stability, so that when the viscid, doughy mass is inflated or blown up with gas, it holds its spongy form until set by baking, instead of collapsing and allowing the gas to escape. Gluten also materially assists in retaining the moisture in the bread. It is therefore plainly evident that gluten plays a very important part in the making of bread and that wheat is the cereal par excellence in the economy and welfare of man. Patent wheat flour generally contains a larger percentage of gluten than does Graham flour. It also contains a minimum of substances which tend to inhibit the best leavening results. For these reasons it is possible to make a bulkier bread from white flour. A loaf of bread weighing one pound, made from white flour, is as a rule somewhat larger than a loaf of bread weighing one pound made from Graham flour. Considerable of this difference in bulk can be overcome by carefully watching the process of leavening and kneading, and baking the loaf in just the right manner. It has been shown that bread made from flours milled up to 80, 85, 90 and even 95 percent, can be made very nearly as bulky as that produced from a 74 percent flour.

The nitrogenous constituents of the other cereals such as barley, rice, corn, oats, etc., are materially lacking in agglutinating properties. The proteins do not become materially viscid when moistened and consequently these cereals are not well suited for bread making, in and of themselves. They can be mixed in certain proportion with wheat flour and make very acceptable breads. While the best kind of bread is made from wheat flour or a mixture of wheat and other cereal flour, yet larger quantities of lower grade breads are made from the flours of rye, barley, oats, corn, rice, etc.

The process for making bread light, spongy and porous, is called leavening, lightening with gas. The questions that now naturally present themselves are, what is the gas used and how is it produced? Two methods have long been in vogue, namely fermentation and baking powders. The former is by far the oldest and best. Its origin is lost in antiquity. Fermentation is due to the growth of small plants called yeast, which are capable of breaking up sugar into alcohol and carbon dioxide gas. Two pounds of sugar give about one pound each of the gas and alcohol. The gas causes the dough to swell up.

In order that yeast may produce the best results, that is the greatest amount of gas, it must grow vigorously. If its action is weak, fermentation is slow and a sour, unpalatable, heavy bread is likely to result. Such bread means a loss of food which should be carefully avoided.

Like all other plants, yeast requires air, water, protein, carbohydrate and mineral matter to build up its own structure and reproduce its species. Yeast plants, like children, require food to grow. It is plainly evident that yeast, during the process of fermentation, eats up a part of the food elements in the flour. Careful studies have shown that this amounts on the average to about 3 percent (1 barrel in 33). The tremendous amount of actual food consumed by yeast can hardly be realized. Thousands of gallons of alcohol are produced during the process of fermentation and later lost while baking. Numerous efforts have been made to recover this alcohol, but without satisfactory results. The food eaten by the yeast cells is lost.

The next question that prompts itself is where do the yeast cells originally come from? If we expose dough to the air these plant cells will ultimately find their way into it and start to grow and multiply. From this it would appear that yeast cells are floating about in the atmosphere. Yeast spores are in fact found about us on every hand.

During the time the dough is exposed, other small plants called bacteria also find their way into it and begin to grow. These bacteria frequently cause acids to develop so that the dough not only ferments but may become sour. For want of something better this sour, fermented dough was early used in the making of bread. It was called "leaven." A little of it was added to the fresh dough and the yeast present began to grow with greater or lesser rapidity, depending upon conditions. Most of the batch was baked, but a small part was set aside to start fermentation in subsequent batches of bread. Other forms of yeast were used. Some of us still have in mind the product known as "jug yeast." The only part played by the jug was that it served as a practical, efficient container for developing this yeast. From the nature of things it was evident that the various forms of yeast available would prove unsatisfactory. The housewife experienced many difficulties in keeping her yeast good. It often happened that the yeast batch was not in the best condition when needed for bread making. To prepare a new batch would require considerable time and labor. An accommodating neighbor is then a friend indeed.

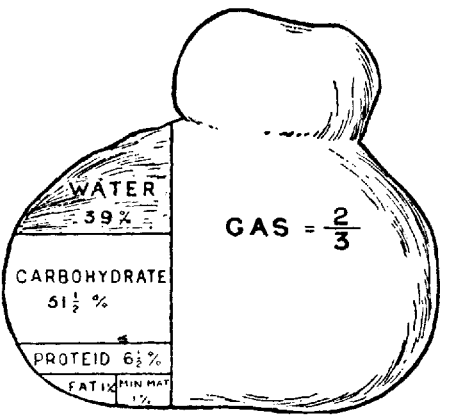

FIG. 17.—DIAGRAMMATIC REPRESENTATION OF THE COMPOSITION OF A LOAF

FIG. 2.

Salt-raising bread is dependent upon a new and independent spontaneous fermentation for each baking. In its preparation there is added neither yeast nor a portion of fermented dough from a previous baking. It is therefore a matter of chance whether a good bread will be produced or not. There is, however, less likelihood of failure in places where the process has been in vogue for some time. The fermentation is started by mixing corn meal, salt and hot milk into a stiff batter and allowing it to stand in a warm place from 15 to 20 hours, or until fermentation is well established. The mass is then mixed with flour and water to produce the sponge. Salt is added to retard the growth of undesirable bacteria. It is certainly poor economy to use this method at any time and particularly now.

In order to overcome some of these difficulties, dried yeast cakes were provided. They are prepared by mixing strong stock yeast with corn meal and drying. These yeast cakes are of great service in places where compressed yeast can not be obtained. Old yeast cakes should not be used. They are liable to be weak or moldy, and result in the production of a low grade of bread, which means loss of food. Compressed yeast, known to all of us, represents the purest form of commercial yeast and should be used whenever available. In concluding the fermentation process for making the bread, the idea of saving food or avoiding the making of sour, sodden, soggy, unpalatable, indigestible wheat food products, can not be too vigorously emphasized.

The inevitable waste in making bread by the method of fermentation has received careful and diligent study. The obstacles to be overcome are numerous. In spite of all the work that has been done, it is still the most satisfactory and acceptable process. Ordinary bread made by other than the fermentation process is not so highly esteemed. Fermentation produces cer-

tain aromatic substances which impart a sweetish, agreeable flavor to the bread. Yeast also introduces some of the desirable vitamin into the bread made from devitamined flour.

The chief outcome of the various investigations have resulted in the development of a variety of baking powders. Baking powders consist of mixtures of various chemicals. They are quite generally used for simple, quick baking, including such foods as cakes, biscuits, gems, pancakes, etc. Self-raising flour contains some form of baking powder. There are many brands of baking powder on the market and they are quite generally employed for certain forms of baking. We have cream of tartar baking powders, alum baking powders and phosphate baking powders.

Aerated Bread. A variety of bread was introduced a number of years ago which was raised by means of mechanically injecting the gas into the dough. The method has not proven successful commercially. The cause for its failure is probably due to the fact that the bread does not possess the flavor or odor which appeals to the public taste. The psychology of foods plays a very important part in the life of a nation and must be reckoned with in matters of diet, if we expect to make progress.

MAIZE. INDIAN CORN.

Next to wheat, the most important cereal used for human food in the United States is maize. It is America's greatest cereal crop and our most important substitute for wheat. It is the great stock cereal. For the year 1917 we grew over 3 billion bushels, an average of 26.4 bushels to the acre. The boy farmers of late have shown us that this is less than a third of a crop. The possibilities for materially increasing this valuable cereal crop are therefore excellent.

We are told that there are several hundred varieties of corn, but for our purpose they may be grouped under three heads, namely: Field corn, sweet corn, and popcorn. Field corn is undoubtedly the most important and most generally used substitute for wheat in the United States. It is a staple article of diet. Some classes use it more largely than others. Our own Dixie people have learned to prepare many choice dishes from it. Ireland and Italy use it largely. It is literally the staff of life in Mexico, where the crop is of greater money value than the output of that country's famed gold mines. One probable reason why corn is not used more abundantly by some is because it is often associated with pellagra, a disease common among the poorer classes of the Southern states. Corn was looked on for years as the cause of this disease in some way, but the idea has been exploded in recent times.

The general structure of the corn kernel is similar to that of wheat. An examination of the kernel shows that it consists of four different parts. These may be designated as the coat or hull, the hard, glutinous layer underneath the hull, the chit or germ, and the starchy matter constituting the chief portion of the kernel.

The fine separation of the different parts of the corn by mechanical means has not been developed to the extent obtaining in the case of wheat. Like wheat, corn is prepared for food in many different ways. We have the white and yellow corn meal. Some prefer one to the other, depending upon custom. The food value is apparently the same. On the whole, corn is claimed to possess as much food value as wheat and this applies to all corn, whether flinty or starchy, or white or yellow, or any other color.

The protein (zein) of corn differs materially from that of wheat in both chemical and physical properties. The particularly striking feature is that zein does not become viscid or sticky on moistening. A mixture of corn flour and water does not produce a doughy mass. It can not be inflated by fermentation. This restricts the use of corn meal in the preparation of a desirable light bread.

Corn bread, corn cakes, and corn buns are eaten in large quantities. They are made from a number of mixtures and are raised to some extent by the common leavening agents; that is, yeast, baking powder and baking soda. Wheat flour is a common ingredient of these mixtures. They represent excellent and tasty dishes.

Johnny cake was originally a mixture of stone-ground corn meal, water and salt, baked into unleavened cakes. The name Johnny cake is frequently applied to a mixture of corn meal, milk, eggs, butter and baking powder. The complaint is at times heard that Johnny cake is more expensive than wheat bread because of the cost of the original ingredients composing it. From the information available it would appear that the original Johnny cake has been materially changed but that the old name has been retained. The expense of what might be called

modern Johnny cake is due to the addition of costly ingredients, not really a part of the original mixture. It is, however, not so much a question of the increased cost of the Johnny cake as it is a question of saving wheat for helping in this war. We must be willing to deny ourselves until it hurts, even our pocketbooks.

Hoe Cake.—Hoe cake is similar to old time Johnny cake. It was originally baked on a hoe, hence the name.

Pone Cakes (Corn pone).—A bread made from corn meal, with or without the use of milk and eggs.

Corn mush, corn pudding, or hasty pudding is made by gradually adding corn meal to hot water with vigorous stirring so as to avoid lumping. This mixture is often eaten either warm, cold or fried, with milk, syrup, butter, etc., as custom, means or habit may decree.

Corn Starch.—Starch made from corn.

Glucose.—Commonly made from corn, but can be made from other starch-bearing products.

Corn grits is corn hulled and broken.

Hominy is hulled corn, broken and soaked, then cooked for table use.

Corn Flakes.—During recent years they have come to play an important part at our breakfast tables. They are made by treating grits or broken corn by special malting processes, rolled while moist and toasted on continuous moving belts in large ovens. The flakes are nutritious and represent an excellent article of food.

Large amounts of alcohol and alcoholic beverages are made from corn. Its utilization for the latter purpose has been restricted by law as a conservation measure. It is plainly evident that the uses of field corn are many.

Sugar corn is a specially developed variety of maize of high sugar content, eaten while the starch is still soft. It is cooked and eaten while in the milk and is an esteemed delicacy of our tables. Who has not heard of our delicious roasting ears? Sweet corn should be eaten or cooked as soon as possible after being collected because of the rapid reduction of sugar content after being removed from the stalk. Who has not eaten some of the insipid corn purchased on the market? The ears may be either cooked in hot water or roasted. Roasting ears are best eaten hot. Enormous quantities are canned every year. Our Maine canned corn is known far and wide. Sweet corn is also dried while still unripe. When cooked and served with milk it forms a very tasty dish with a flavor all its own. Drying is a most excellent way to save this very important food at small expense. This feature has not been developed to the extent that it should be in these strenuous times. Sweet corn is of high food value. By proper planting this fine vegetable may be available in Washington from July to frost time, about the middle of October. Further north the period of time is shorter and is lengthened as we go south.

Popcorn is a highly prized food. It is largely used as a delicacy in this country. This variety of corn is hard and consists of small grains, which have the property of exploding when heated, resulting in a great enlargement of the starch grains. Popped corn is a delicious, attractive, edible food, particularly prized by children. Popcorn and apples call to mind fond recollections of childhood days when winter evenings were spent popping corn and eating apples around the fireplace.

Appeal after appeal has been made for us to eat more corn and save the wheat for the brave men at the front, fighting for our beloved land and our allies. Some of us have been wont to demur and ask why should we thus deny ourselves? Can not the allies eat corn as well as we? The reply is that Italy has been eating large amounts of corn and will eat still more. The corn consumed in England is rapidly increasing. In fact the food that these two countries are eating as bread would hardly be recognized by us as bread. A certain speaker from England said, "When I took ship to this country, it was almost impossible for me to stop eating bread. It was such a superior article to what we are eating in England." These two countries are therefore doing their bit in these matters.

Now, how about France? The story there is different. It is the land in which the battle rages and has raged for several years. It is where our boys are fighting to dethrone autocracy. Many of the best farms are laid waste. They can not be used to grow food. Implements and fruit trees are destroyed. Farm tools must be imported and fruit trees grown before food can be produced. There are no mills in France to grind corn, fuel is very scarce, coal $75 a ton. In pre-war times bread was generally made and baked in large bakeries. Very little home bread

baking existed. Corn bread, in order to be satisfactory, must be eaten hot, soon after it is baked. Re-heating destroys its palatability. French women do not know how to bake corn products. To make acceptable corn dishes requires practice and experience. In the process of learning there is always more or less waste. All of the able-bodied men are either at the front or engaged in transporting supplies for the army or busy manufacturing ammunitions for war. No able bodied man force is at home. Only the aged, infirm, maimed, and the hundreds of thousands afflicted with tuberculosis are there to help the women. It can therefore be seen that to the lot of the women has fallen a stupendous task. They are compelled not only to take care of the home, if there is any left, but to raise the food, do the farm work, plow, sow and reap. Is this not enough? Would you now impose upon them the added task of learning to cook new foods, when they are already bowed down with sorrow and grief and untold burdens? Can we spare the food that must necessarily be wasted during the process of learning? Finally, where are they going to get the bake ovens and the fuel to do the baking with? It is no longer a theory that confronts us, but a condition. Can we conscientiously add to the burdens of these noble, self-sacrificing women? The French people came to our rescue in times of stress and trouble. They have and are acquitting themselves well in the present conflict. They have been doing far more than their part to make it possible to preserve liberty to the world. They saved Europe from autocratic oppression. Are we not willing to help a little by eating more corn that these gallant people may be able to continue in the struggle which will win the war for permanent peace and liberty?

OATS.

Scientists tell us that one pound of corn will give a little more heat (1685 calories) than a pound of oats (1670 calories), but on the whole oats may be regarded as the most nutritive of cereals. They are rich in fat, mineral and nitrogenous matter, but contain less carbohydrate than the other cereals.

Large quantities of oats are produced in this country and Europe. They grow best in cool, moist climates. On the farm we look on oats as horse grain. It is considered inhuman to make a horse work hard and not feed him oats. This cereal was not well thought of as a human food by many people in this country even 25 years ago.

The grain is closely invested with a hull. This hull, representing about 25 percent, is removed when used for human food. Horses are fed the unhulled grain. The oat grain with the hull removed is of the same general composition and structure as wheat. There is an external covering, the chit and the kernel proper. The protein of oats possesses very little agglutinating power. Oat flour therefore is not well adapted for bread making, but by mixing fine oatmeal with wheat flour, a good loaf can be produced. Oat meal when cooked in the form of porridge and eaten with milk forms an almost complete food. The various food elements of oats are well absorbed. For example, 95% of the protein, 93% of the fat and 96% of the carbohydrates are utilized. Oatmeal is sometimes stated to be heating, whatever that may be.

On account of the close adherence of the hull to the grain it is difficult to make a complete separation by the ordinary methods of grinding. The result is that a goodly amount of fibrous matter in the form of small particles is left in the meal. These particles tend to act as stimulants to the sluggish intestines, and are even irritating to some persons. The slight laxative effects produced by oatmeal are of service to persons suffering from habitual constipation, and persons leading a sedentary life. Rolled oats are considered superior to the ground material by some. The great pressure of the rollers seems to rupture the cell walls. The heat applied by means of the rollers seems to have a favorable influence on the fatty matter, rendering it less liable to turn rancid.

Oats are the basis of many of the "breakfast foods." They are usually sold to the consumer in package form. This adds to their cost but does not enhance their food value. It should be stated, however, that the handling of prepared oats in package form is believed to be more sanitary than the old time open barrel method. By reason of the fact that certain packaged oats have been heated and otherwise treated, they are more convenient to use and less troublesome to prepare.

RYE.

Next to wheat, rye is the great bread-making grain of the world. It is the principal supply of bread in many European countries and is used quite considerably in the United States by citizens of foreign birth. Rye resembles wheat in physical appearance, structure and chem-

ical composition. It does not contain the proteins that form gluten, as in the case of wheat, but it comes nearer doing so than any other cereal. Rye bread is more susceptible to leavening than any of the flours obtained from other cereals excepting wheat. Bread made from pure rye flour is rather dark in color, of a peculiar flavor, and apt to be dense, moist and tough. It keeps well, and if made from a fine flour, is about as digestible as bread made from wheat flour.

The composition of rye flour varies with the kind of rye used and its degree of fineness. The finest flours are deficient in proteins (building material) when compared with wheat flour, but somewhat superior to corn meal. More acceptable bread can be made from mixtures consisting of wheat and rye flours. In the case of breads made from the coarser flours, there is likely to be a material loss of the food unabsorbed by the system. This is particularly true in the case of the black bread (pumpernickel), the loss of which is said to amount to about 40 percent.

During pre-war times large quantities of rye were used in the manufacture of whiskey. This loss of food is conserved by a federal law forbidding the manufacture of ardent spirits.

BARLEY.

Barley is a great brewing grain. It contains a ferment (diastase) that converts starch into sugar. This cereal is comparatively rich in mineral matter and low in protein content. The mineral matter is located chiefly in the outer layers of the grain. Barley is used largely as a feeding grain, for horses and cattle. Distillers' and brewers' grains are also used for this purpose. Pearl barley is the whole grain with the hull removed. In this form it is used as a human food in the making of soups and barley water. Barley water is quite largely employed by physicians for diluting cow's milk in infant feeding. It does not possess much food value but is of service on account of the demulcent properties it contains. The gluten-forming elements are not contained in barley to any extent, in consequence of which dough made from the flour of this grain is not well suited to make good bread. Acceptable loaves can be prepared when mixed with wheat flours. Barley flour is used in preparing various dishes.

Malt is barley germinated artificially, then dried at a low temperature. It is used largely for converting starch into maltose sugar.

Malt extract is a syrupy saccharine mixture obtained from malt and used by physicians in the treatment of illness. It is also an ingredient in some brands of bread.

RICE.

Rice is not looked on as of great importance to us in the United States, but is in reality the "staff of life" for about one-half of the human race. It forms a staple food for China, Japan, Siam and the peoples of other oriental countries. Rice is high in starch and low in protein and fat. It is well adapted for the nourishment of those engaged in hard labor. Although rice offers sustenance for multitudes of people in the tropics, it does not seem to be so well adapted for those in the temperate zone. There are about 100 varieties of rice. They differ from one another, as in the case of wheat. We have red rice, glutinous rice, Carolina rice, round rice, etc. All rice is grown in damp, swampy soil, or on soil that can be flooded by irrigation. It is harvested and threshed like wheat. The grain in its natural state is of a brownish or yellowish or reddish color. We usually see it on the market as "pearled" or "polished" rice. This adds to its physical appearance but lowers its nutritive and health-giving value in some respects. In the polishing of rice, the bran removed contains the greater proportion of the ash and virtually all of the growing and health-giving elements, *viz.*, the so-called vitamins. Persons living on a diet restricted to polished rice and fish, are liable to suffer with the disease commonly known as beri-beri, a serious nervous condition, commonly called multiple or polyneuritis.

BUCKWHEAT.

On account of manner of use, buckwheat is generally considered along with the cereals, but botanically it does not belong to this group. It grows throughout the world, particularly in the temperate zone, in a cool, moist climate. It is a hardy plant. A profitable yield may be produced on soil too poor to grow most other crops. On rich soil we are liable to have a rank growth with a lodging of the grain. Buckwheat contains about the same amount of proteins and carbohydrates as corn, but less fat and more mineral matter. The seeds are enclosed in a dark, hard, indigestible shell, which is largely removed in the process of milling. The flour possesses a more or less dark tint, depending upon the amount of husk present. Buckwheat possesses some ag glutinating properties and the dough is therefore susceptible of a considerable degree of aeration

The dough may be leavened by either yeast, baking powder or baking soda and sour milk. When mixed with wheat flour very satisfactory bread can be made. The fermentation process is slow and not as commonly used as baking powder for the making of griddle cakes. If baking powder or baking soda and sour milk is used the cakes can be baked as soon as the batter is stirred up. Some brands of flour (self-rising) are mixed with the requisite quantity of baking powder to save the housewife this trouble. Buckwheat griddle cakes are highly prized in the United States. A too liberal eating of these cakes is liable to cause a rash in some persons. Undoubtedly some members of this audience will recall cases in their own experience or at least have had their attention directed to this condition.

MILLET.

It is estimated that the millets are eaten by about one-third of the inhabitants of the earth. Tremendous quantities are consumed in India, China, Japan, Africa and elsewhere. This cereal is, however, little used in this country for human food. During recent years the utility of the millets for this purpose has been carefully studied. They compare favorably in composition with the other cereals. The commoner varieties of millet are fox-tail millet, broom-corn millet, barnyard millet and Indian millet. The common sorghum belongs to this group, as does also kaffir corn. Some of the millets are well adapted for use in the fermentation or brewing industries.

It is clearly evident from the foregoing that the food value of the various grains is about the same. More appetizing, palatable and digestible dishes can be made from some than from others. Wheat easily takes first place in this respect. An effort has also been made to guard against loss by improper handling or treatment.

In our homes, aside from the children, who receives first consideration? Is it not the bread-winner, the one or ones who make the home possible? Who would not sacrifice to make father or mother, or brother better fitted to feed their loved ones or take care of and protect our homes? Not only are our homes threatened at present, but the liberty and safety of our country as well. Many a home has sent out a defender. They must all be fed with the best of food in order to fight the enemy effectually. If they fail, we are lost. The menace is at our very shores. We must be prepared to sacrifice and do our duty.

The President in the preparedness parade set a fine example of willingness to serve and forego all ostentation. He marched, carrying our emblem of freedom, like thousands of other citizens did in this parade. Millions of men and women are doing their bit. A million of the finest young men in the United States will soon be fighting side by side with the brave soldiers of the allies. Many of us can not fight, but we can help save food and thus help the fighters fight in this noble cause for liberty.

The greatest flag in the world is now before you. Ten thousand blue jackets are massed to form this living emblem of the American union. These noble boys, the flower of our homes, are laying down their lives, sacrificing their future, that old glory may float and proclaim liberty to the world.

What is more noble than an unselfish spirit? It is not so much what we have or give, but what we share, that shows our real character. Do you know that the world's food crop is short? Do you know that the United States is the greatest food-producing country in the world? Do you know that by our substituting other grains for wheat, by sharing we can help the fighters at the front and save people from starving? By saving a slice of bread a day, we make it possible to send wheat to the war stricken countries. We can not be too fully imbued with the grand principles laid down in the American's Creed, written by Wm. P. Page, which is as follows:

THE AMERICAN'S CREED.

> I believe in the United States of America as a government of the people, by the people, for the people, whose just powers are derived from the consent of the governed; a democracy in a republic; a sovereign nation of many sovereign states; a perfect union, one and inseparable; established upon these principles of freedom, equality, justice and humanity for which American patriots sacrificed their lives and fortunes.
>
> I therefore believe it is my duty to my country to love it; to support its constitution; to obey its laws; to respect its flag, and to defend it against all enemies.

I cannot more fittingly close this lecture than by quoting a few lines of a recent song which I am sure will appeal to you as it did to me.

"Somewhere in France is daddy,
Somewhere in France is he;
Fighting for home and country,
Fighting for liberty.
I pray every night for the Allies,
And ask God to help them to win,
For daddy won't come back
Until the Stars and Stripes they tack
On Kaiser Wilhelm's flagpole in Berlin."

A paper by Miss Elsa Schmidt was presented by Mrs. H. C. Christensen, entitled, "Women." Miss Schmidt contrasted the viewpoints of the past with the present, relating to women's activities. Formerly only a few lines were open to women, now there is no occupation in which they are not represented to a greater or lesser extent, and it should be the purpose of those now engaged to induce others to enter their chosen fields of activity. Pharmacy presented opportunities, she said, and the Women's Section should help in every way to augment the number of women so engaged. She pointed out that publicity was essential in the promotion; not only should articles on the subject be written for publications reaching the young women while they are in high school, but they should be interviewed and the possibilities in pharmacy explained to them; the interest of teachers and school officers should be enlisted to encourage their students to prepare for the study of pharmacy.

The last paper of the program was by Miss Helen E. Stouffer, on "Belladonna Culture."

Miss Stouffer presented her observations on belladonna culture in the drug garden of the Valparaiso Pharmacy School. She described the seed of belladonna and the difficulties encountered in its germination, due to the character of the seed-coat, which also sustains the vitality of the seed. Soaking the seeds in warm water for several weeks promotes germination. The seedlings are transplanted when 8 or 10 inches high.

Miss Stouffer stated that medium rich sedimentary loam was best suited for the plants. Lime, she said, improved the cultural qualities of heavy soil, or one tending to sour, but her experience did not show, as some contend, that the alkaloidal content of the plant was increased thereby.

The opinion prevails that sun-grown belladonna is richer in alkaloidal content than that of shade-grown plants. In Miss Stouffer's experience this did not prove out; she reports, that plants of the sunny bed, containing both flowers and some fruit, yielded 0.309 percent alkaloids, while those of the half-shaded beds showed 0.382 percent. Plants, containing neither buds nor flowers, of the sunny bed, yielded 0.356 percent of alkaloids, while those of the half-shaded beds, containing neither flowers nor fruit, showed 0.416 percent. Her experience is that just before flowering is the most economic time for collection of leaves. While the plants contain more alkaloid at maximum flowering time, due to growth, unless the size of the plants increased very materially, the alkaloidal strength lost offsets that in the added foliage.

Miss Stouffer reports on the fact that leaves of young hyoscyamus plants have assayed twice the normal alkaloidal content and concludes that the same would be true of belladonna.

The growth of the plants was slower in shaded woodland, but there was no material difference in growth of those half-shaded and those grown in the sun.

She states that there are many difficulties encountered in belladonna culture and the greatest source of trouble and destruction is the potato beetle. This she overcame by planting a row of potatoes around the belladonna bed; the beetles attacked the former and practically left the belladonna plants untouched.

The experience of the author is that belladonna grown in partially shaded beds is richer in alkaloids than that grown in the sun, and the leaves are richest in alkaloids just before the plants flower.

On motion of Mrs. Whelpley, duly seconded, the above papers and addresses were received and referred for publication.

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS.

This Committee recommends the adoption of the spirit of the President's recommendations, also that of the Secretary.

Further, we recommend that the committee to be appointed under the direction of the Executive Board shall be privileged to employ any suitable means to obtain results.

Respectfully submitted,

MRS. H. M. WHELPLEY,
MRS. M. M. GRAY,
CLARA HULSKAMP.

On motion the report was adopted. Mrs. Thatcher presented the

REPORT OF THE COMMITTEE ON RESOLUTIONS.

We, the Women's Section, now in session with the A. Ph. A., have certainly derived a great deal of pleasure out of the entertainments so generously planned for us by the ladies of Chicago. Each event has been deeply appreciated, and shall always be a source of very happy memories. Our heartiest thanks can but mildly express our gratitude.

To those who have been contributors, Miss Vittum, whose stirring address will not soon be forgotten; Mrs. Light and Mrs. Kennedy, whose music was an added pleasure; Drs. Dohme and Kebler, who made our afternoon session so attractive; we offer our deepest appreciation.

As it has pleased God in His infinite wisdom to bereave so many of our members,—Mrs. Charles Holzhauer, Mrs. A. B. Huested, Mrs. W. L. Dewoody, Mrs. Joseph P. Remington, and Mrs. George Timmons,—let us take this opportunity to condole with them by offering them a few words of comfort, knowing that "God works in a mysterious way His wonders to perform," though very often so unintelligible to us! May they find some balm to heal their very great sorrow.

We bow in reverence to Him and give thanks for our many blessings.

MRS. E. S. THATCHER,
ANNA G. BAGLEY,
MRS. IDA E. KEBLER.

On motion of Miss Bagley, seconded by Mrs. Kebler, the report was accepted.

Mrs. M. M. Gray, Chairman of Committee on Nominations, presented the names of the following for nominees of the Section:

President, Miss Zada M. Cooper.
First Vice-President, Mrs. W. L. Dewoody.
Second Vice-President, Mrs. F. J. Wulling.
Third Vice-President, Mrs. F. W. Meissner.
Secretary-Treasurer, Mrs. H. R. Kenaston.
Historian, Miss Bertha Ott.
Member of the Executive Committee, Miss Zada M. Cooper.
Chairman Membership and Press Committee, Mrs. John Culley.

Miss Cooper declined to serve another year and Miss Anna G. Bagley was nominated as President. The Secretary was directed by vote to cast an affirmative ballot for the nominees, which was done, and the President declared the officers elected.

The following officers being present, were installed by Mrs. L. F. Kebler.

President, Miss Anna G. Bagley, Columbus, Ohio.
Second Vice-President, Mrs. F. W. Meissner, La Porte, Indiana.
Secretary-Treasurer, Mrs. H. R. Kenaston, Bonesteel, South Dakota.
Member of Executive Committee, Miss Zada M. Cooper, Iowa City, Iowa.

By vote of the Section, the Executive Board was directed to elect the officers not present at the meeting and that the Secretary notify them of their election.

Upon motion, duly seconded and carried, the Secretary was directed to write letters to all pharmaceutical associations and conventions during the year.

The President submitted to the Secretary the following committees:

COMMITTEE ON MEMBERSHIP AND PRESS.

Chairman, Mrs. John Culley, 2579 Monroe Ave., Ogden, Utah.

District No. 1, Maine, New Hampshire, Vermont, Massachusetts and New York—Mrs. St. Claire Ransford Gay, 2787 Broadway, New York.

District No. 2, Connecticut, Rhode Island, Pennsylvania, New Jersey and Delaware—Mrs. C. H. LaWall, 39 S 10th St., Philadelphia, Pa.

District No. 3, Maryland, Virginia, W. Virginia, District of Columbia and North Carolina—Mrs. Lyman F. Kebler, Bureau of Chemistry, Washington, D. C.

District No. 4, S. Carolina, Tennessee, Georgia, Alabama and Florida—Mrs. E. A. Ruddiman, 1916 Adelicia St., Nashville, Tenn.

District No. 5, Mississippi, Louisiana, Arkansas, Texas and New Mexico—Mrs. Emily K. Hilton, Sorocco, N. Mexico.

District No. 6, Kentucky, Ohio, Indiana and Michigan—Miss Elizabeth Jenkins, 5th St. & Wayne Ave., Dayton, Ohio.

District No. 7, Illinois, Wisconsin, Iowa and Minnesota—Mrs. M. M. Gray, 4151 Gladys Ave., Chicago, Ill.

District No. 8, Missouri, Kansas, Nebraska, N. Dakota, S. Dakota and Oklahoma—Mrs. D. F. Jones, 106 Granite Block, Watertown, South Dakota.

District No. 9, Colorado, Wyoming, Montana, Idaho and Utah—Miss Marjorie Ford, Denver, Colorado.

District No. 10, Arizona, Nevada, California, Oregon and Washington—Mrs. Jennie Maguire White, 416 Hayes St., San Francisco, Cal.

OUTLOOK COMMITTEE.

Mrs. G. D. Timmons, Chairman, 458 Greenwich St., Valparaiso, Indiana.
Mrs. John G. Godding, 278 Dartmouth St., Boston, Mass.
Mrs. Geo. H. Schafer, 713 Front St., Ft. Madison, Iowa.
Miss Daisy Frick, Audubon, Iowa.
Miss Clara Hulskamp, 546 W. St. Catharine St., Louisville, Ky.
Mrs. H. M. Whelpley, 2342 Albion Place, St. Louis, Mo.
Mrs. E. G. Fine, 814 Spruce St., Boulder, Colo.
Mrs. W. Bruce Philip, 1410 Fruitvale Ave., Fruitvale, Cal.
Mrs. E. S. Thatcher, 334 Ogden Ave., Milwaukee, Wis.

HOSPITAL COMMITTEE.

Miss Bertha Ott, Chairman, Bethesda Hospital, Cincinnati, Ohio.
Miss Mary R. Hamilton, Rochester General Hospital, Rochester, Pa.
Miss Norman C. Hawley, Butterworth Hospital, Grand Rapids, Mich.
Miss Leafy A. Sauer, South Side Hospital, Pittsburgh, Pa.

In behalf of the members of the Women's Section, it is my privilege to express our appreciation and gratitude for the many courtesies extended to make our stay in Chicago enjoyable and profitable. Especially do we acknowledge the trip to Municipal Pier; luncheon under the auspices of the Chicago Retail Druggists' Association; the ladies' card party in the Florentine Room of the Congress Hotel; the President's reception; luncheon served by courtesy of the Chicago Veteran Druggists' Association; the automobile tour of the city; visit to the Art Institute, Hull House and the Field Museum.

On motion the session adjourned.

MRS. H. R. KENASTON, *Secretary.*

ZADA M. COOPER, *President.*