

the correct remedy is to encourage agriculture and not discourage it I would exempt them; yes.

Mr. TINCHER. There was an illustration given before a joint meeting of the committees the other day about the proportion of reduction that we could make on the farmer that I think was very good, and I think our farmers ought to understand that we rather appreciated that illustration. Three gentlemen who were facing principally the wheat cost and the cost of all farm products had a meal here in Washington, for which they paid about \$11.75. They undertook to figure out how much reduction they could fix by reducing farm products. First they figured the cost of the bread, then the meat, corn, tomatoes, butter, milk, sugar, coffee, and the plowing and milling cost to the producer. They found that the producer had received for that entire meal 82 cents, so the farmer understands he can create a large reduction on that \$11.75, and if he knows that his profit is not going to be taken away from him I think it would encourage production, and we not going to do it.

Mr. FERRIS. I think so, and I am very glad to hear that.

Mr. YOUNG. Do you think it would encourage the farmer much if we were to repeal this price on wheat at the present time?

Mr. FERRIS. Well, I may not be the best evidence on that, but my information is that the farmer does not desire wheat or anything else regulated unless everything else in connection with it is regulated, while a good many Congressmen are perfectly sincere in thinking the wheat farmer has had the best of it. As a matter of fact, with abnormal prices, some errors in methods of grading and marketing, he has suffered from all this regulation.

The CHAIRMAN. Thank you very much, Mr. Ferris.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Tuesday, August 19, 1919.

The committee met at 10 o'clock a. m., Hon. Gilbert N. Haugen (chairman) presiding.

The CHAIRMAN. We have with us this morning Dr. Pennington. We will be glad to hear from you, Dr. Pennington.

STATEMENT OF M. E. PENNINGTON, IN CHARGE OF POULTRY AND EGG INVESTIGATIONS, UNITED STATES DEPARTMENT OF AGRICULTURE.

Miss PENNINGTON. Mr. Chairman, the assistance that I may be to the committee, if it is possible for me to be of assistance, will, I think, be very largely in answering such questions as may be covered by the field of work of which I have charge and in which the committee may be interested.

As I listened to the discussions the other day, it seemed to me that there were a number of points involving the evolution of our exact knowledge of the effect of low temperatures on food on which I might have an opportunity of being of some assistance. Perhaps in order to make that thought more clear, it may be advisable for me to outline very briefly the kind of work and the scope of the work

that the Food Research Laboratory has been doing in connection with the preservation of perishables. The work was begun in the year 1905. The first work was simply the examination, chemically and bacteriologically, from the laboratory point of view alone, of poultry, eggs, and milk found in cold storage—the usual market cold-storage stocks. At that time there was very little known of the laws governing the preservation of flesh by cold and there was comparatively little known of the chemical and bacteriological course which such products pursued when deterioration and decomposition took place.

We worked along those lines for approximately two or three years and then we found that what was happening in cold storage was predicted almost entirely upon what happened before the goods went into cold storage. In other words, the usual market practices—what is termed “handling” of perishables including everything which may be done to the product from the time it leaves the farm and the packing house until it finally reaches the consumer. Those are the items which especially effected changes in the products in cold storage.

Such having been determined, it became necessary, if we were to logically and accurately explain what was going on at varying low temperatures, to study accurately and along the same lines what happened to the produce before it got to storage. In the line of our work, then, on poultry and eggs especially, we went back to the country. We studied the egg from the time it was laid and the chicken from the time it was picked up to be killed, or even before that—from the time it went to the fleshing pen to be properly fleshed for eating purposes. And those are the lines along which such facts as we have obtained have been gathered. Those are the facts which it has seemed to us have been of value to the people of the country in making these foodstuffs better when they go into cold storage and thereby keeping them better after they get in storage. Beyond that, it means that there has been a rise in the quality of practically all of the quick-marketed produce in the country, since the storage plants by their requirements for long preservation have largely set the pace for the rest of the produce to follow.

We found in 1905 to 1908 rather lamentable conditions in many of the storage warehouses. As the trade did not understand how poultry should go in, or eggs, how it should be prepared, of course almost anything went in. We found chickens which were obviously unfit when they went into storage, and eggs also. We found methods of preparation which were obviously unfit for storage purposes. It has been our effort to eradicate these undesirable practices and to substitute methods which will make for the maximum of quality as well as the legitimate economic keeping period. For instance, we found when we began to do our work that a large part of the poultry going into storage was chilled in water rather than chilled in dry cold air. We found that a large proportion of the pack was scalded rather than dry picked. We found that a very large percentage of the birds were improperly bled in the killing. And we found various factors of the same type, all of which made for deterioration in storage.

About that time and due, I think, very largely to the activity of the Department of Agriculture and the publicity which was given

through the press, the warehousemen became active themselves in bettering conditions and their activity was reflected to the owners of the poultry, the poultry packers who stored the goods and, within a year or so, there was a distinct improvement not only in the conditions maintained in the warehouses but in the character of the goods going in.

In the old days there was always a tendency to sell whatever was fresh, to hold it on the market until it was obvious that the market was not desirable and then to put it into storage. You can see that, under such conditions, the goods going into storage were far from their pristine freshness. As the storage industry progressed, it was perfectly obvious to all storers that such practices were bad from the viewpoint of the reflexes of the practices themselves and also from the viewpoint of commercial success. Therefore there came very quickly a tendency to put only high class fresh goods into storage, and that tendency has increased until it is now practically a habit. It is the exception, not the rule, these days for produce to go into storage which has been held on the curb pending a good market, which market did not arrive. And with the abolishing of that attitude has gone a great many undesirable phases so far as the palatability and desirability of the product is concerned. In fact, it has revolutionized the whole industry of the preservation of food stuffs by cold.

There was another habit which has been practically abolished and which was a big factor in the quality of the goods, namely, the removal from storage of a frozen product, thawing it for sale, an undesirable market, and the return of the thawed goods for a refreezing. That was formerly a rather common practice. Not only one but maybe two thawings might be given to a product in the course of its marketing. We found that such treatment was very detrimental to the quality of the material and now it has practically been abolished to all intents and purposes. Such laws as have been enacted in the various States, ordinarily specify that nothing which has gone out of previous storage shall go back again, and therein they have made a wise provision. Of course, such a prohibition does not apply to the transfer in bond, as it were, from one warehouse to another, nor to transportation in refrigerator cars.

Such, then, briefly is the outline of the conditions as we found them in 1905, as they improved with the agitation between 1905 and 1908 and the growing of those improvements up to the present time.

Early in the investigations the department published a brief outline of the conditions as it found them, the findings on the goods which were then in storage. From those analyses we drew certain conclusions which at that time were correct. I am very happy to say that that investigation, which is embodied in department Bulletin No. 115, is now only of interest as a piece of past history. At that time we were perfectly right in saying that the goods ordinarily on the market from cold-storage showed evidence of deterioration if it had been held for three months or thereabouts. I am very glad to say now that poultry can be held for nine months, the ordinary poultry as it goes in the storage warehouse in the ordinary channels of commerce, with practically no deterioration, practically no change in palatability or in composition, as determined by the most delicate tests that we can apply in the laboratory.

Between 9 months and 12 months there is a slight change in flavor. I think to the ordinary consumer of poultry that change would not be detected. I am speaking now in terms of the greatest refinements that I can apply in the way of flavor tests. I have, therefore, as applicable to the present time, no information that would indicate that dressed poultry can not be held for 12 months in not only good but in highly desirable condition. That applies to all classes of poultry going into storage, broilers, roasters, and fowls, as well as turkeys, ducks, geese, and so on.

When it comes to the question of eggs, we found just as much of a misunderstanding, or I might say, a lack of understanding, on the part of the industry of the proper handling of an egg, as we found in connection with the dressed poultry. Eggs were gathered up here, there, and everywhere, held by the farmer, held by the country storekeeper, held by the small country shipper, held again wherever it might be easiest or perhaps commercially desirable to hold them, the result of which was, except very early in the season, that eggs going to the storage warehouse showed a rather high percentage of rots, and as the weather grew warmer a large percentage not only of rotten eggs but of deteriorated eggs. If we must, as we are quite sure we must, have poultry absolutely fresh when it goes into storage, we certainly must have eggs absolutely fresh. Should there be any choice in the results to the two products, I should say that eggs are more susceptible to storage changes because of deterioration when they enter the warehouse than is poultry. This is because we hard-freeze the poultry, hold it at a temperature not above 10° F., whereas eggs in the shell are held between 29° and 31°. Now, while cold can never repair a damaged product—you can not put Humpty Dumpty together again—yet it is a sort of “suspended animation” when the product is frozen. When the product is chilled the changes go on very, very slowly, but still they do proceed. Hence, eggs in storage do show a certain amount of deterioration, according to the length of time they are held, whereas up to 12 months, poultry is practically unchanged.

It is necessary, therefore, that eggs should be even better handled than poultry. Campaigns of education, showing every link in the chain of results of carelessness in the handling of eggs before storage, carelessness in the sorting out of the cracked eggs, the rotten eggs, the dirty eggs, the losses that means after the storage period, what it means not only in the loss of product but in actual dollars and cents for freight, carrying, and insurance charges—have helped very greatly to improve the quality of eggs going into storage. The increased information in relation to handling has also been of marked assistance in improving the quality of eggs going into general commerce. For instance, during the war emergency every effort was made to save in a wholesome, sound, high-quality condition for foodstuffs every egg that was laid. The activities in the way of the education of the people handling eggs all along the line, in determining by candling the quality of the eggs, and fixing thereby the responsibility on the proper person who permitted those eggs to deteriorate or rot, accomplished results that were little short of marvelous. Of course, it was helped by the war spirit of service, than which there was no better factor, in making progress.

As a result of that war activity and because the industry from the farmer to the retailer absorbed the advantages, understood the advantages, of better handling of the egg, of candling, of refrigeration applied promptly and continuously not only to the eggs going into the storage warehouse, but also to the eggs going on the market, a large number of States this year have passed laws embodying the salient features of those war-time provisions. Where it was not possible for States, because of the legislative bodies being out of session or for other reasons, to pass such legislation, boards of health, food commissions, and such adequately empowered agencies as the State possessed have made rulings and are now enforcing the candling of eggs, which has made a tremendous difference, not only in the quality of eggs on the market, but in the number of eggs saved for food.

I have here a small chart which gives the number of rotten eggs, eggs unfit for food, sorted out of receipts in Kansas for three years—1916, 1917, and 1918. These results are compiled on, in 1916, 59,843 cases of eggs; in 1917, 44,999 cases of eggs; and in 1918, 67,991 cases of eggs. While, of course, that represents a very small proportion of the egg output of Kansas, the quantities are large enough and the field covered was broad enough to make the chart as given fairly typical of the whole State. May I say, too, that what happens in Kansas may be taken as a fair criterion of many another State?

Mr. JACOWAY. That is just as to eggs?

Miss PENNINGTON. As to eggs, yes. In 1916, 11.7 per cent of the eggs were lost in Kansas during the month of August; in 1917, 7.7 per cent were lost; in 1918, 5 per cent was lost—a reduction from about 12 per cent to 5 per cent in three years.

Now, if anyone is sufficiently interested in the subject to look up the weather records in connection with that decrease, he might say that 1916 was a hot summer and 1917 was a cool summer, so is not the increase between the number of bad eggs found in 1916 and 1917 due to better atmospheric conditions? Undoubtedly there was some influence there, but in 1918 we had another hot summer, a very hot summer, in Kansas, and in spite of that there was another drop, bringing the total number of rots down to 5 per cent.

You can see also how the number of rotten eggs varies, according to the month of the year. During March, April, and May, the percentage of eggs unfit for food is the lowest—nearly 1 per cent. During the cool weather of the autumn, the high percentage of summer loss drops again, but is not so low as the springtime—about 2 to 3 per cent.

Mr. TINCHER. I suppose the idea of using Kansas for illustration was by reason of their excellent laws which enables you to get the facts easier than a State like Pennsylvania?

Miss PENNINGTON. Pennsylvania, unfortunately, does not produce anything like enough eggs for its own consumption.

Mr. JONES. We are not busy raising chickens out there; we have other things to do.

Miss PENNINGTON. Now when it comes to determining in terms of the condition of the product in cold storage, the improvement that these better methods of handling have made, we get some very interesting results. Ordinarily, in times past, a 9 months old egg in storage—I am referring to the period between 1905 and 1908—a

9 months egg was a pretty old egg. It showed a number of signs indicating age—in the thinness of the white, the delicacy of the yolk membrane, and, more than all, the flavor. Now we have eggs 11 months in storage really better than eggs formerly held 9 months in storage, and the practices resulting in such improvements, I think I may say, as I said for the poultry, have become trade customs; not an experimental fact here and there, but a general trade practice. Such a long keeping time is not true of all eggs going into storage, however, because the season in which they are put in storage makes a great difference.

Even with the improved methods of handling, the many stages through which the eggs must pass before they come to the storage warehouse have not been brought into perfect line. Refrigeration is the thing that is most lacking; hence, there is bound to be a certain amount of deterioration in the warm weather which the handling methods have not yet overcome, although I see no reason why, if we progress in the future as we have in the past, there should not be additional improvement made and much greater strides. And therefore we ordinarily assign 10 to 11 months as the keeping time of eggs going into storage during March and April, and May, if that month happens to be cool; a shorter keeping time for the June eggs, still shorter for the July eggs—but very few eggs go into storage in July; they are not worth it; and practically none go in in August.

On the basis of the facts as I have endeavored to outline them, in department Bulletin No. 775 we have made this statement: "Spring eggs prepared for storage by commercial sorting showed, after 7 to 11 months storage, an average loss of 18.5 bad eggs to the case." And may I say that the case contains 30 dozen eggs always; it is a uniform standard package. We also say in the bulletin that "corresponding cases of eggs graded for storage by the candler showed for the similar period in storage 4 bad eggs per case as found by candling and 3 additional by breaking."

We think that such records are ample incentive to the storage warehousemen—not the storage warehouseman, because he does not own the eggs, but to the man who does own the eggs—to put into storage good eggs and to take better care of them. And I am glad to say that he does. This bulletin has not been out a great length of time. It was published on the 3d of June, 1919, but I know by our close association with the people who are handling eggs and putting them into storage that the information here has already made some impression and we are very sure that it will make a greater impression as time goes on.

Mr. JACOWAY. Take the average farmer's cellar: How long will eggs in a case keep if placed in the cellar of an average farmer?

Miss PENNINGTON. It depends entirely on the temperature of that cellar.

Mr. JACOWAY. Certainly.

Miss PENNINGTON. It would be an entirely different matter if the cellar were in Maine or if the cellar were in Texas.

Mr. JACOWAY. Well, take it in Texas.

Miss PENNINGTON. They would not keep very long. In fact, in hot weather in Texas there are practically no edible eggs even in the country.

Mr. JACOWAY. What I am getting at is this: Would eggs, as a general rule, in the average cellar of the farmer keep long enough until he could get a sufficient amount to ship, say, in half-carload lots?

Miss PENNINGTON. Oh, no. The farmer must ship twice a week if he is going to ship fresh eggs in the summer time. The only way to hold eggs, to get a stock of any magnitude, is to hold them under refrigeration. That involves either the use of mechanical refrigeration on the part of the concentrator or ice-cooled chill rooms, which are practicable, and which are being used to a greater and greater extent all of the time. The farmer very seldom accumulates a sufficient amount of eggs to ship in carload lots; that is the function of the small country concentrator.

Mr. JACOWAY. The reason I asked that question—I looked up a record on eggs some two years ago, and do you know what per cent of the eggs spoil at the place of production?

Miss PENNINGTON. It has been variously estimated at from 2 to 8 per cent. I think that these figures in Kansas will give you as close a record—the figures in the chart that I quoted a while ago will give as close a record—on that subject as anything that I know of; because these eggs came, most of them, directly from the farmer and country concentrator. What happened to these eggs is accounted for almost entirely by the care on the farm—or the lack of it, rather.

Mr. JACOWAY. Now, could you state ordinarily, in dollars and cents, what the egg and poultry crop is in the United States—just nominally?

Miss PENNINGTON. No, sir; I can not. Unfortunately, we do not have any statistical information—we never have had—on the real value of the poultry and egg crop of the country. We have a number of estimates which are useful, and which, I have no doubt, approximate the truth, but they are not accurate.

Mr. JACOWAY. Would a billion dollars approximate the value; would not that be about the approximate amount of eggs and poultry raised a year in the United States?

Miss PENNINGTON. I would say that was conservative.

Mr. JACOWAY. That is conservative?

Miss PENNINGTON. Yes, sir.

Mr. JACOWAY. Do you think as much as 10 per cent of that product is lost or deteriorates at the point of production?

Miss PENNINGTON. I think as much as 10 per cent, up to the summer of 1918, was lost between the point of production and the market concentrator.

Mr. JACOWAY. I am talking about production now. Then, that would be \$100,000,000 out of the billion dollars of product, wouldn't it, if it were 10 per cent?

Miss PENNINGTON. Yes.

Mr. JACOWAY. Is it not also a fact that 30 per cent of that billion-dollar product is lost between the point of production and the consumer's table?

Miss PENNINGTON. I should not say that 30 per cent was lost. I should say, however, in all likelihood that 30 per cent of the product suffered a certain amount of deterioration, which resulted in a lower food desirability and monetary loss.

Mr. JACOWAY. How much would you say was lost absolutely between the point of production and the consumer's table?

Miss PENNINGTON. Approximately ten per cent.

Mr. JACOWAY. Then out of the billion dollar product, according to your information, the farmers of this country lose \$200,000,000 yearly, on account of improper methods in handling the eggs and in handling their poultry?

Miss PENNINGTON. I think the loss, if apportioned over the entire industry, would undoubtedly total that.

Mr. JACOWAY. And that great economic loss can be avoided, in your judgment, by following some of the suggestions made along these lines you are now making; is that the idea?

Miss PENNINGTON. Yes, I think so. It has been our experience that better handling has reduced the losses all along the line and there seems to be no limit to the amount of education which the farmers and the industry are willing to absorb.

Mr. JONES. Just a question for information—I probably ought to know as well as anybody else: Is it possible there is a difference in flavor between two fresh eggs, laid on the same farm on the same day?

Miss PENNINGTON. Very seldom. Practically every egg which a hen lays is a good egg. Occasionally—very seldom, but occasionally—a hen does have a hemorrhage in the oviduct, which results in a certain amount of blood being mixed with the white of the egg, in which case the fresh egg is not desirable as a food product. But that is so exceptional that it plays no part in commercial considerations.

Mr. JONES. I am not speaking of commercial poultry but, say, in two fresh eggs is there a difference in the flavor and the taste?

Miss PENNINGTON. Yes; if the hens eat different materials; according to the diet of the hens there is a difference.

Mr. JONES. That is the point I am getting at.

Miss PENNINGTON. Now is it your wish that we continue with the details of the poultry and egg improvements which are of interest to the committee, or shall I make a statement on the score of fish before you ask such questions as may seem desirable on poultry and eggs?

Mr. HEFLIN. I should think it would be better to allow Dr. Pennington to make the statement and then let us ask the questions afterwards.

Mr. HUTCHINSON. I suggest that you proceed in your own way.

Miss PENNINGTON. The study of fish has not continued as long as the study of eggs and poultry. It is relatively new. We have been engaged in the investigation of fish handling for four or five years, only. We find in general that the same fundamentals which apply to the better condition of dressed poultry on the market apply also to the better condition of fish. For instance, it is undesirable to soak fish in water, even if that is ice water, just as it is undesirable to soak poultry in water. It is absolutely necessary that fish shall go into storage as promptly as possible from the sea. And the same general practices on the part of the industry as prevailed in the matter of dressed poultry, have in times past prevailed also in connection with fish.

Formerly fish going into storage was too often fish which had been offered for sale on the markets and not accepted. Now the

practice is to put the fish into storage as quickly as possible after they are extracted from the water. To do that we have a rapidly-growing chain of fish freezers along our coasts, both the Atlantic and the Pacific coast, and now there are signs of similar activity on the coast of the Gulf of Mexico—a most wonderful source of fish, and an all-the-year-round source of fish. These freezers, which are located at the point of the catch, are filled ordinarily in the summer time when fish are being caught. The product is held in these large storage houses at very low temperatures, ordinarily at lower temperatures than prevail for the holding of poultry, and in the winter time it is shipped, ordinarily in carload lots, to the various distributing points throughout the country, frequently for long hauls; and frozen fish can be very satisfactorily shipped for practically any distance if the refrigerator car equipment and the railroad icing service maintain fair efficiency.

We find by a modification in the method of handling that it is not an impossible thing at all to ship fresh fish for long distances in refrigerator cars if those cars are well built, and if the service, the icing service is adequate; all of which is not at all impossible, but can and should and is becoming a matter of ordinary commercial practice. It has been supposed in the past by the trade that fish must have melting ice running over them if they were to be kept fresh. We know now, like a great many other ideas that the trade has tenaciously held, that that is an error. Therefore, instead of banking the barrels or boxes of fish in the refrigerator cars with fine ice, covering the whole load over as has been done in the past, we are putting ice and salt in the bunkers of the refrigerator cars, in the same way as "beef icing" is practiced, and shipping the fish in that way.

Last summer, during the stress of the war emergency, when we were saving meat and urging the consumption of fish, the department participated cooperatively in sending more than 400,000 pounds of fish from the Gulf of Mexico as far north as Indianapolis, stopping twice in transit to unload portions of the car. These shipments were made during the months of June, July, and August, when frequently for days at a time the temperatures were 100° or more. The fish arrived in good order. Shipments of the same kind were made from the Atlantic seacoast to the Middle West, and it was demonstrated without any question that by a certain revision of methods it is possible to ship fish for long distances; and what we have considered heretofore to be an extremely perishable product, to be vouched for only at the source of production, and sometimes then with reservations, we know now to have really marked keeping powers. We believe that it is a product that can be subjected to the ordinary commercial usages, in ordinary commercial ways, with a very great increase in the consumption and a much wider distribution.

There is one point in the storage of fish which I should bring out, because it varies in that particular from every product that I know of, in that each fish, or each small group of fish, is covered with a thin jacket of ice when it is stored. As the fish come from the catch they are usually washed in water and put into pans, which may be, generally are, about 25 inches long and of suitable width. Ordina-

rily the fish are in one layer and laid spoon fashion, head to tail, until the pan is entirely filled. It is always desirable to freeze anything that is to be frozen as promptly as possible, and this prompt freezing gives particularly good results with fish; the lack of it correspondingly bad results. Hence there have been built what have been termed "shelf freezers." Instead of running the cold brine through pipes on the walls or on the ceiling, as is ordinarily the custom of the warehouse, these brine-carrying pipes have been made into shelves one above the other.

The pans are slid in on the shelves flat on the brine pipes, and therefore there is a direct contact between the metal of the pan and the metal of the pipe and a very quick freezing, or, I should say, a very quick abstraction of the heat of the fish by the cold brine circulating in the pipes. Under such circumstances fish will freeze solid in from 6 to 18 hours.

MR. JONES. That is the application of the cold storage, or is it at the point of production?

MISS PENNINGTON. This is freezing now at the point of production. After the fish are frozen in the pans they are taken out and run through a tank of cold water. The fish are so very cold that just the moment the water strikes them it freezes, and if the fish is pushed fairly rapidly through the water it comes out with a complete envelope of ice. That is what is termed in the trade "glazing," and all fish now to be held hard frozen are glazed. That glaze slowly evaporates. Ordinarily it must be renewed about every three months that the fish are held. That is something that the owners of the fish used to be a bit careless about, with a consequent deterioration of the fish, but they have learned how necessary it is in the maintenance of the quality, and hence the glazing is now very carefully attended to.

MR. YOUNG. You speak of the glaze evaporating. Does the flesh of the fish absorb the water from it?

MISS PENNINGTON. No, sir. Ice is subject in a certain degree to the same physical laws that govern water, and in the low temperatures of the storage warehouses there is a gradual evaporation of the ice, just as there would be an evaporation of water at higher temperatures. It is very slow, but it does occur. The fish does not absorb the ice glaze, but the air does carry it off.

When the fish are shipped from storage they are ordinarily put into boxes, large boxes, which may hold anywhere from 100 to 600 pounds. They should be handled hard frozen all the way to the consumer. The real difficulties that we are contending with now lie mostly in the hands of the retailer, where the fish is thawed and sold either as fresh fish or nothing is said about it. The fish should go to the housewife, if possible, hard frozen, to be thawed by her in her own house refrigerator, which can readily be done without contamination of the other articles in the refrigerator. And when it is thawed in the cold air it is ready for cooking in the ordinary fashion; there is nothing to alter, nothing unusual, nothing that needs any special instruction, in regard to the cooking of frozen fish. They are just fresh fish when thawed out, much nearer fresh fish than most of the so-called fresh fish on the market. I would much rather take my chances on a frozen fish held 12 months in

storage than the so-called fresh fish from the ordinary fish market, handled in the ordinary way in fine ice.

We have no reason to believe that fish will deteriorate in storage either in palatability or food value in a period beyond 12 months. In fact, we have kept certain kinds of fish for 27 months without any striking differences. In the later periods of storage, as with poultry, there is a loss of palatability, but we find no differences from the consumer's standpoint or from the laboratory standpoint which are of any significance up to a period of 12 months.

MR. JONES. On what was Senator McKellar's suggestion based of holding fish only for a period of two months, as I recall it, or not exceeding four months? What was the basis of his reasoning for insisting upon that provision in his bill; do you know?

MISS PENNINGTON. No, sir; I have no information on that subject; I do not know what Senator McKellar had in mind.

MR. JONES. You know in his proposed bill he provides that fish should be released from storage at the expiration of two months.

MISS PENNINGTON. I have not read the bill carefully; I have heard certain quotations from it.

MR. JONES. That was in the bill, as I recall it, but you have no information on what that was based?

MISS PENNINGTON. No, I have no information on what that was based. I am quite certain that such a provision would make a very great difference to the consumers of this country, when it came to the maintenance of the fish supply—an undesirable difference from my viewpoint—because it would greatly limit our stocks of fish in seasons when fishing can not be pursued. Agricultural crops are uncertain, but the crop of fish is far more uncertain than any agricultural product of which I know. Fish come, fish go; we do not know where they come from, we do not know to where they go. But we know at some seasons they are in the sea, visible, and can be caught; and at other seasons they are absent, and for long periods certain varieties of fish will not appear in large schools.

MR. JONES. I come from the Lake Erie region, and they tell me the supply of fish up there this year is very, very scarce. Has that been verified by your department?

MISS PENNINGTON. I have heard statements made to that effect, but I have not verified the statements. We have had a great deal of interference with the fishing on the east seacoast on account of the many heavy storms.

MR. JONES. Pardon me for interrupting your discourse, but I thought I would get the information there.

MISS PENNINGTON. It is no interruption at all. I think I have practically finished the statement I had in mind.

MR. HEFLIN. At what season do they catch the fish for storage—the last season?

MISS PENNINGTON. You mean how long does fishing continue for storage?

MR. HEFLIN. Yes.

MISS PENNINGTON. On our east coast it may continue well into October, when the finest of our weakfish arrive. The autumn storms generally end the fishing period. Sometimes those come early, and our fishing season is short; sometimes they are later, when the fish-

ing period will continue longer. That can never be predicted, can never be determined.

Mr. HEFLIN. When does it begin again the next year, about?

Miss PENNINGTON. That, again, is very largely determined by the weather, but generally about March or April. As soon as the March winds permit, the fishermen go out. The ground fishing, the fishing for cod, haddock, and hake, off the banks, continues to a certain extent all the year around, although it is greatly reduced in the winter time. Fishing for the migratory fish, such as mackerel, weakfish, and whiting, absolutely ceases in the winter time on all the north coasts, but continues on the south coast.

Mr. HEFLIN. If Senator McKellar's idea should prevail about allowing fish to remain in cold storage not longer than two months there would be three or four months in the winter season when there would be no fish supply at all?

Miss PENNINGTON. There certainly would be.

Mr. YOUNG. In former years there used to be a very fine fish, the red snapper, I believe, in the Galveston section of the country. I have heard complaint in the last two years that the catch of the red snapper has been limited. Is that because the species has been exterminated, or what is the cause of it?

Miss PENNINGTON. The red snapper is still caught in the Gulf. They are, however, going further away, further out, to get them. Now the bulk of the red snapper comes from the Campeche Banks, off Mexico. The red snapper is going through the same cycle as the western halibut, just the same cycle as the eastern halibut has already passed through. There are very few halibut now on our eastern coast and a steadily decreasing supply on the west coast. There are a number of what the fishermen call "holes" all over the gulf which still produce the red snapper; for example, a number of such "holes" are off St. Andrews, Fla., and elsewhere, but the fish are not so plentiful as they used to be.

Mr. YOUNG. Have the Fisheries Bureau any reason to assign for this shortage—this disappearing of this species?

Miss PENNINGTON. I have never heard any discussion on that subject.

The CHAIRMAN. If it meets with the approval of Dr. Pennington and the committee, the committee will recess until 2 o'clock. We have another important matter which we wish to take up in executive session at this time.

(The committee thereupon went into executive session, after which a recess until 2 o'clock p. m. was taken.)

AFTER RECESS.

The committee reassembled at the expiration of the recess.

The CHAIRMAN. Are you through with your statement, Dr. Pennington?

Miss PENNINGTON. Yes, thank you, Mr. Chairman; and may I express my appreciation of your courtesy and the patience of the committee this morning while I was making that statement?

The CHAIRMAN. We are very grateful to you. There may be some questions. I understood you to say that in your opinion the maximum that commodities should be kept in cold storage is 12 months?

MISS PENNINGTON. That would be my suggestion. Mr. Chairman, that there be a flat storage period of 12 months.

THE CHAIRMAN. Would you apply it to all commodities?

MISS PENNINGTON. The commodities which have been discussed, such as poultry, eggs, and fish; those are the commodities in which I am especially interested and where the investigations as I know them would indicate that a 12-months limit is justified.

THE CHAIRMAN. Dr. Campbell in his testimony before the committee I understood to suggest 10 or 11 months for eggs.

MISS PENNINGTON. Eggs will keep from 10 to 11 months. However, they regulate themselves, by going out of storage, because they do not keep longer than that period of time, and because the incoming crop makes it commercially imperative that they be removed from storage. When it comes to a month's variation of that kind, it has seemed to me that the gain to the administering of such a law by having a flat time covering the various commodities would more than make up for any slight disparity that there might be between the phraseology of the law and what might appear to be the facts.

Again, all of the information that we have tends to show that the better the handling, the more intelligent we are in the preparation for storage and the storage of these commodities, the longer we can hold them in desirably good condition.

THE CHAIRMAN. What can be done to insure their going into storage in good condition?

MISS PENNINGTON. I should say that a continuation of the investigational and education campaign for which this committee has already made provision in the Department of Agriculture will best insure that. Certainly, the results which have been obtained during the last ten years indicate that such educational work makes a profound impression on the industry.

THE CHAIRMAN. You have no suggestions to make as to additional legislation in that respect?

MISS PENNINGTON. No, sir; I think the food and drugs act as now provided, and as it is now being enforced, takes ample care of any undesirable, deteriorated, filthy, decomposed—or whatever the phrase may be—food products on the market in interstate commerce. There is no essential difference between the products coming out of storage which fall under that provision as given in the food and drugs act and products which have not been in cold storage.

THE CHAIRMAN. Dr. Campbell, in referring to the storage of fish, stated:

We have observed some that we have kept for a period of 27 months.

Fish, then, can be kept for a period considerably over 12 months without deterioration?

MISS PENNINGTON. Yes: there are quite a number of varieties of fish that we know can be kept considerably beyond 12 months. However, there you have the economic phase, in the sense that fish are seasonal products; the catch of one year should not, in normal years, at least, interfere with the catch of succeeding years; there should be a seasonal incoming of new material and a seasonal outgoing of preserved material, which would make for a continuation of the industry and a balanced food supply.

The CHAIRMAN. After all, if it is wholesome after 12 months, it would be well to preserve it for the future if there is no demand or market for it?

Miss PENNINGTON. I do not believe in destroying any foodstuffs which is wholesome and desirable. There might be, and there has been in a number of State laws, as well as in the so-called uniform State law, a provision by which the flat 12 months' limit could, on examination and proper certification by a recognized official, be extended for a comparatively short and definite period of time, which provision takes care of—

The CHAIRMAN (interposing). It would take care of that situation in that way?

Miss PENNINGTON. Yes; I would suggest that way, and the utilization under regulation of foodstuffs that are desirable—

The CHAIRMAN. With regard to poultry held in cold storage, Dr. Campbell stated:

We have found that poultry can be kept for a period of two or three months, but nevertheless its palatability is affected.

Miss PENNINGTON. That is a statement which I tried to make clear this morning, when I said that in the beginning of our work, nearly 10 years ago, we found conditions in storage which were such that most, if not all—certainly a very large part—of the poultry was not a desirable food product after being kept relatively a few months. It so happened that Mr. Campbell, when he made that statement before this committee, had been provided with a copy of that very old bulletin. As I stated this morning, that bulletin is interesting now simply as a bit of history—past history.

The conditions at present are very different in every respect, both in the preparation of goods for storage and holding goods in storage; and the practices of food conservation on which cold storage is predicated are such that I believe the 12 months' flat limit for poultry to be thoroughly justified, not only from the standpoint of the palatability and desirability of the foodstuff, but, on the economic side, from the viewpoint of a year-around food supply for the people.

The CHAIRMAN. Dr. Campbell's conclusions were based upon bulletins which contained findings of a number of years ago?

Miss PENNINGTON. Yes, and which I am very glad to say have been outlawed by progress.

The CHAIRMAN. What suggestions have you to make in reference to regulations governing cold-storage plants, proper reports, and examinations of the plants as to sanitary condition?

Miss PENNINGTON. I think, from a general contact with refrigerating warehouses and cold storage in general, Mr. Chairman, that such legislation would be highly desirable from all viewpoints.

Of course, the work with which I am officially charged and for which especially the Secretary directed me to come to this committee does not take in such questions as that; and yet, because of contact with them frequently, I can not help but have some opinions.

And my personal opinion along those lines indicates that such legislation, properly drawn, taking into account the great fundamental differences between the distribution and marketing of perishable foods and imperishable foods, would be a very great advantage to the consumers of the country, and, incidentally, to the industries along that line—the food industries dealing with perishable staples.

It seems to me that there should be a mechanism by which there is a reporting of foodstuffs held in storage; reporting should be done frequently; I should say once a month. It is a custom of the warehousemen to make up reports for the own purposes once a month; and I can see no reason why those reports should not be sent in to any Federal officer who may be designated, for general information and such arrangements as would, of course, be made in connection with the Federal law. I think there is every reason to welcome the authority which would be vested in such a public official to investigate the sanitary conditions of warehouses and to look into any question in connection with them that might be of public importance.

The CHAIRMAN. Then, in your opinion the Secretary should be given authority to inspect the plants at any and all times?

MISS PENNINGTON. I should say so, Mr. Chairman.

The CHAIRMAN. And to collect samples.

MISS PENNINGTON. If that is necessary. Whether that would be desirable, in view of the provisions of the food and drugs act, is a question that I think I am scarcely capable of making a decision upon. Dr. Alsberg or Mr. Campbell would give you a much more independent opinion upon that point. I fancy they will say that the provisions are all in the food and drugs act; they can take samples of any product that goes into interstate commerce.

The CHAIRMAN. That would be true, under the food and drugs act; but that is administered by a different bureau. Do you think that it is important, to authorize the Secretary to promulgate rules and regulations?

MISS PENNINGTON. Yes.

The CHAIRMAN. I believe that is all, Dr. Pennington; we are indeed very grateful to you.

We will now hear from the gentlemen representing Armour & Co.

Mr. KIRK. Mr. Chairman, my name is Kirk, and I represent Armour & Co. I asked permission to appear before this committee, to give you some information as to our experience in handling these food products in cold storage.

We have here three of our men, representing different branches of the industry, whose statements, we think, will throw considerable light upon the subject under consideration.

I will ask Mr. Waddell to speak first.

STATEMENT OF MR. F. W. WADDELL, IN CHARGE OF PORK AND HOG DIVISION, ARMOUR & CO., CHICAGO, ILL.

The CHAIRMAN. Will you kindly give your full name for the record?

Mr. WADDELL. F. W. Waddell.

The CHAIRMAN. And whom do you represent?

Mr. WADDELL. Armour & Co.

Mr. ANDERSON. In what capacity do you represent them?

Mr. WADDELL. I have charge of the pork and hog division, the board of trade provision operations, and our public cold storage.

I just want to say that Armour & Co. have always been very anxious to present their records, or to give any information which will be of a helpful nature to the country generally, to the industry and to the Federal Government.