American Society of Baking

Technical Bulletin #13 **Victor E. Marx, Secretary** **November, 1925**
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MEETING OF AMERICAN SOCIETY OF BAKERY ENGINEERS
At the 106th Armory, Buffalo, N.Y.
Tuesday, September 15th, 1925, 2 P.M.
Pres. C. J. Patterson, Chairman

PRES. PATTERSON:

I want to emphasize that this is not by any means our annual meeting. We appreciate very much having the opportunity of meeting with the American Bakers Association, having the opportunity to see the wonderful exhibit that is on the floor below.

The purpose of the formation of the American Society of Bakery Engineers is for helping the man in the shop, giving him all the assistance that is possible in making a better and more uniform baked product. We want the Society to gain dignity as it goes along. We believe that the best and most efficient way of gaining that dignity is to produce results which no other organization in the baking industry has produced before. We feel that there are many things that we can do as an organization collectively to bring about more efficient operations. It is a wonderful game we are in and there are many questions, of which we are going to take up two major topics during our sessions in Buffalo.

If we care to progress, which we all do or we would not be in this organization, it is necessary for us at all times to be thinking forward on progressive thought, and to be dignified personally, for our organization, depends upon the thought that you carry and use every day, and the application you make of your thoughts.
It is very interesting to see the great number of young men coming into the industry believe that more than ever before they are looking to this industry because they realize they want the opportunities that exist for them. I believe that it is no more than co-operative that the bakery manager, his superintendent, and production manager, should give all the encouragement possible to the young, live fellows who want to stay in the industry and progress and help matters along.

We have started our bulletins. They have met with a great deal of favor. It is our intention, and has been, and will be in the future, to give you practical problems from fellows of wide experience. We have enrolled in our membership the leading production men of the industry, as well as the leading technical men of the industry and we believe that we as an organization are fortified with the personnel to give the industry a wonderful return from our efforts. We want to continue to display this thought and build up dignity that will bring us confidence, that will build up confidence in the American Bakers Association to ask us to perform any particular job that they would like to have done.

We had, last March, a very wonderful meeting, of which we published the entire proceedings. They also met with very favorable comment. We want to make all of our meetings businesslike and right down to the point. We don't like to have long drawn-out discussions on any particular subject. We would like to have all the members participating in the discussions^—and we want all the members to do that—to make it as short and concise as possible so that, for the length of time we are here, we will be able to take back as much as possible. We gained a very enviable reputation in our March meeting for really accomplishing things, and I am sure that you and our

fellow officials want to continue this and accomplish even more. We want to emphasize again that this is not an annual meeting. Our annual meeting is held in March. The announcement of the place will be made soon enough for you all to attend, and we are very anxious for you to attend. I want to again emphasize the great idea of correct thinking and dignity that will lend more progress to all of us as individuals, to our organization, and the industry.

May I diverge here for just a minute to emphasize a little example? There was a gentleman in my office not very long ago who said he had finally come to the conclusion that it was more profitable to buy a high-priced flour than a medium-priced flour. Possibly that is true, but the point is this: he concluded on absorption, claiming that this flour he had in question took two or three per cent more absorption than the other one. But, in questioning him, he had forgotten to make a direct comparison of absorption of the flour in question with the flour that he thought would not take as much absorption.

I find there is a great number of such conclusions drawn, and it is hoped thru this organization we may be able to get the facts and eliminate the guesses, and bring ourselves into one of the best organizations that ever served the industry.

I wish to read some letters and telegrams that we have had from our different members —one especially from the Southern California branch. I think that we may be very proud of this branch organization we have out in California. I think we should give our Vice-Presi- dent, Mr. Doty, a good deal of credit for having started us out there, because it seems to be a live organization, so live, in fact, that they have seen fit to send a delegate to this convention. That gives us all a real kick, whenever we can get bakery organizations all over the country operating like that. We want you all to feel free to come in with all questions and we will answer them as quickly as possible and as efficiently as possible.

(The Chairman reads letters and telegrams.)

As I said a minute ago, we have two topics for discussion. The first one is “Refrigeration during mixing”. We have a committee on engineering appointed, which has been working very faithfully on this. I wish, however, before we start this discussion, to make the announcement that we will make this discussion on refrigeration brief, for the reason that we do not believe we have time to take up such a large subject at this meeting. The subject will be handled completely, as near as our scope will allow, in our annual meeting.

I want to call on Mr. Peter Pirrie, who is chairman of the committee on engineering, to give a report on refrigeration.

MR. PIRRIE:
Mr. Chairman and Friends: This report that Mr. Patterson calls for is preliminary to the extreme. It is based on questionnaires which you men have all seen, and of which, up to date, quite a few have been returned. This report is anything but complete, but it has a large amount of vital figures and facts in it. I want you to take this as a starting point for a short discussion, remembering that more questionnaires are coming in, and that a complete report follows. Neither is this a paper which is being read. It is simply some very short notes which I have made and studying the sheet on which I collected the data from the various questionnaires.

As you all know, this questionnaire, entitled “Cooling Doughs in Mixers,” was mailed out about two months ago to the members of this organization. (Continues reading.)

A Preliminary Report on Refrigeration at the Mixer

By Engineering Committee American Society of Bakery Engineers Peter G. Pirrie, Chairman

A questionnaire was mailed out about two months ago to the membership of this society calling for data on the methods being used in the various plants for holding the sponges and doughs down to the desired temperature.

Thirty-one questionnaires were filled out and returned, twenty-six of which were used in making up this report. The other five were eliminated because they were not specific.

Twenty of the twenty-six plants reported on, or 77%, were running sponge doughs. Of these, three, or 15%, were using a slow speed mixer for the doughs. The remaining seventeen, or 85%, were using the same high speed mixer for both sponges and doughs. Of the six running straight doughs, two, or 33%, were using slow speed mixers, the revolutions being 35 and 20 respectively. The other four, or 66%, were using high speed mixers, the revolutions varying from 47 to 65.

Using the quantity of ice directly placed into the mix as a basis for forming an opinion as to the efficiency of the refrigerating equipment on the mixer, we find only four, or 15% of the plants with the necessary equipment so that they can get their ingredient water cold enough to turn out their sponges at the required temperature. In the case of doughs the same relationship holds. In every case this is accomplished by cooling the water through the use of mechanical refrigeration and in no ease, with either sponges or doughs, is it necessary to use, in addition to the cold water, either an air blast, mixer jackets or ice, excepting in one plant which finds it necessary to use small quantities of ice in the sponges occasionally. This particular plant is located in a town where sudden very hot spells are experienced. They are using water at 34° F. for both sponges and doughs and find it necessary to use ice in both sponges and doughs occasionally. The flour temperatures at this plant at no time run over 85°.

The cost of the equipment used to cool the water is given variously from $800 to $3600, with the qualification that this is the total cost of the refrigeration equipment which is used at the same time for the purpose of cooling the dough room and other general refrigeration purposes. The horsepower used by this equipment varies from 3 to 100, depending of course on the size of the plant. The operating cost is quite uniformly stated to be in the neighborhood of $150 per year, with the 100 H. P. plant not included. The $150 figure applies to plants with 3-barrel machines.

Those plants effecting the control of their dough temperatures by means of water varying from 34° to 58° on both sponges and doughs are using mixers running from 20 to 70 revolutions per minute. It is interesting to note that the higher water temperatures apply to the two extremes in speeds of mixer agitators, one plant with a 20 revolution mixer finding it necessary to use 40° water, whereas another plant with a 70 revolution mixer is getting along perfectly with 58° water. This is particularly interesting as the total number of revolutions per mix is 1050 in the case of the high speed machine and only 500 in the case of the slow speed machine. The geographical location of these two plants should have little or no effect on the dough. Obviously there is some other factor entering here which is not brought out because a sufficient number of plants have not been reported on to draw definite conclusions on this particular point. It is possible that the agitator design has an effect.

Three, or 11%%, of the plants reported on were using an air blast in their sponge mixers and six, or 23%, were using the air blast on doughs. This air blast in some cases consists merely of cool air drawn through a small fan and blown into the mixer by a very small motor, usually H. P. In other cases, this blast is really chilled air blown through special equipment costing up to $500 and using as much as 10 H. P. No operating expenses are given on this blast.

Jackets are being used by four, or 15.4%, of the plants during the mixing of the sponge, and 6, or 23%, during the mixing of the dough. Two are using city water, three are using ice water from a large tank, and one is circulating carbonic acid gas under 15 lbs. pressure through the jackets. In this particular case the incoming temperature of the gas is said to be 34° F. and the outgoing temperature 42° F. The operating expenses of this system are stated to be unknown.

The great majority of the plants reporting are using ice in mixing both sponges and doughs. The quantity of ice being used in sponges varies all the way from 1.1 lbs. to 10 lbs. per 100 lbs. of flour used. The majority of the plants report that they find it necessary to use ice in the sponges only during the summer, and in some cases only on the hottest days. The average amount used in sponges is 4.65 lbs.

Ice is being used in the dough in quantities varying from 1.83 to 17.9 lbs. per 100 lbs. of flour. In most cases less ice is being used in winter than in summer, the winter average being 5.65 lbs. of ice per 100 lbs. of flour, and the summer average being 9.8 lbs.

About one half of the plants using appreciable quantities of ice have some refrigerating equipment, the remainder have none. It would appear rather evident from the questionnaires returned that those plants located in Southern states are using both high grade refrigerating outfits and ice. One plant, which in the judgment of the committee is typical, finding it necessary to use 38° water in the mix, 40° water in the jackets for the sponge; and 38° water in the mix, city water in the jackets, and 5 lbs. of ice for each 100 lbs. of flour in the dough. Its sponge temperatures are 76° and dough 81°.

A typical Northern plant is holding its sponges at 76° and its doughs at 78° by means of 45° ingredient water, a small blower on the mixer circulating 60° air, and the use of small quantities of ice in the sponge during hot days in the summer.

The total number of revolutions used on sponges varies all the way from 180 to 725, with an average of 445. The total number of revolutions on doughs varies from 336 to 1500, with an average of 804.

Agitator horsepowers on 3-barrel high speed mixers vary from 15 to 40 H. P. The total H. P. at the mixer on 3-bbl. high speed machines varies from 15 to 47.

The absorption being realized on sponges varies from 55%% to 67%, with an average of 60.7%. The absorption being realized on doughs varies from 54% to 68%%, with an average of 61.2%, high absorptions not necessarily being associated with the highest speed agitators and some of the lower absorptions being mixed with agitators running over 60 revolutions.

This preliminary report covers the major points in a general way only. A detailed analysis of the data supplied by these questionnaires will be published in bulletin form as soon as completed.

Respectfully submitted,
AMERICAN SOCIETY OF BAKERY ENGINEERS
Peter G. Pirrie, Chairman,
Engineering Committee

Now, gentlemen, this preliminary analysis of this data is not a report. It is simply what I could gather from these figures in the short time that was available. I think you can see that there is much in the questionnaires, much of individual practical interest to the fellows that have to use this equipment, the fellows that want to know what to do about it.

Let me just close these few remarks with another plea that you men go back home and dig up the questionnaires that you have not filled in, and have them sent in. There are a lot of you—there are over four hundred of these questionnaires out that have not been sent back. Get them in, so that we can have them by the next annual meeting, down in black and white, in the form of typical American Society of Bakery Engineer bulletins.

PRES. PATTERSON:
Members, it seems to me that that preliminary report is enough to show us that there is a great deal of work to be done. We are very anxious, and I am sure that you are, to have these things straightened out, particularly those who are getting low absorption as it is necessary for them to use a higher amount of ice and refrigeration. That is what this Society was formed for, namely, to act as a clearing house for collecting this information so that we can give it to you, who need it, in order to make your plant more efficient. We are going to open this for discussion. We want some live discussion. We want everybody to get into it. Certainly not everybody here is satisfied with the efficiency

they are getting from refrigeration. All things can be improved upon. Let us hear some discussion. Somebody start some question. If I lack volunteers, I have a lot of cards up here, so I know you all.

Mr. Ocken, what is your experience with refrigeration? How can you cheek what Mr. Pirrie has just given?

MR. OCKEN:
I haven't much to offer. I haven't any ice machine. All I use is crushed ice. We use a lot of that. In the summer months, our sponge uses as high as 200 pounds. In the wintertime we don't have to use as much, because we use water from the lake and that is cold enough so that we don't have to use much ice in the sponge, and we use anywhere from 25 to 55 pounds.

PRES. PATTERSON: Did you answer our questionnaire?

MR. OCKEN: Yes.

PRES. PATTERSON:
Before we go any farther, let me ask a question. How many in the audience are satisfied with your present method of refrigeration? Hold up your hands, you that are.

Mr. McDuffee, what do you say about it? Why are you not satisfied?

MR. McDUFFEE:
We have a 15-ton refrigerating plant, and under our method of refrigeration, it seems to be entirely inadequate. We use a large cold-air box, and a fan to blow the air into our mixer, 1,250 cubic feet a minute. We are not satisfied with it, and there is one question that I just wanted to ask in that connection, and that is if the men here had any experience with the air-cooled mixer, as compared with the mixer with a jacket on. We are inclined to make a change to the jacketed mixer. I would like to have some enlightenment along that line. We are not satisfied with our refrigeration.

PRES. PATTERSON:
Have any of your operated a blast mixer alongside of a jacket mixer? Have any of you operated the two at different times? Mr. Richard Wahl?

MR. WAHL:
Mr. President, we have not used a jacket mixer, but we have gone through this problem with a great deal of care, and we find it is going to be absolutely necessary for us to put the water jacket on to get the refrigeration, to get the mixing time in the dough the length of time that you want it. We have the cold air; we have everything that we can put on to cool that dough during mixing, and we find it is necessary to eliminate ice and put the water jacket on. I would like to hear from men that use the water jacket.

PRES. PATTERSON:
How many of you use the water jacket with mixers? What experience do you have with it?

MR. H. J. SCHOTT: I am not a member.

PRES. PATTERSON: That is all right. We are anxious to hear from you.

MR. SCHOTT:
We have just installed a water jacketed mixer. We use water just about as cold as we can get it from our refrigerating plant, about 36 degrees, and circulate 40 degree water through the jacket, and we keep our dough cool by that.

PRES. PATTERSON:
Would you prefer to have a water jacket to an air blast, or haven't you operated a blast?
Mr. Jordan, what do you know about operating a blast mixer?

MR. JORDAN:
We haven't a blast mixer. We installed a jacket mixer. The water temperature of dough is about 37 degrees, and the water in the jacket is about 37 to 40 degrees. It makes 14 minutes, 65 revolutions. We circulate the water in the jacket in about five minutes, unless the water is a little warm in the circulating tank—that is the tank that we take the jacket supply from—we have to run a little longer, but ordinarily we run five minutes out of fourteen. That is extreme weather. We don't have temperature return in the dough.

PRES. PATTERSON: Are there any questions? Mr. Edward N. Haglund.

MR. HAGLUND:
We got a mixer without any air at all, or any jacket. We use all the ice in the dough. We use about 25 pounds to 100 pounds of flour. It goes out at the right temperature.

PRES. PATTERSON:
I have heard it often said that a fellow gets a better development where he uses ice than he does with cold air or water jacket either. How many in the room are in favor of that, who believe that it is so? Will you state your experience and give your name?

MR. ---------- (of the American Gas Association):

Mr. Chairman, I am not intensely interested in refrigeration, but I do have one or two ideas on this mixing problem. In connection with evaporation of chemical solutions, the mixers are borne out, steam is run through the mixer, and evaporation takes place from within the liquid itself rather than by jacketing or any external heating. I should think that a similar method could be used for refrigerating doughs and sponges. In the application of ice to the mixing of doughs, this same effect is realized. That is, the rolling around of the ice in the dough and the sponge. It seems logical, from an engineering standpoint, that that is the correct way of refrigerating in the case of refrigerating doughs or evaporating in the evaporating solutions.

MR. WALSH: In the use of ice in refrigeration, can Mr. Pirrie give us some figures?

MR. PIRRIE:
We use quite a large quantity of ice—I forget the exact figures now—I read them to you a few minutes ago, but I took those fellows using a larger quantity of ice, up around 25 pounds to 100 pounds of flour; in other words, around 50 or 60 pounds of ice in the water with their three barrel mix. Compare that with that $150 a year that it costs to maintain the other way of doing it, and you will find that you spend a whole lot more money for ice than you are for a proper refrigerating plant. I don't think it is necessary to go into detail. That is a statement based on your questionnaires that you fellows sent in yourselves.

PRES. PATTERSON: Has anybody any further questions?

MR. BERNAUER:
So $150 a year is the operating cost. You also have depreciation on your refrigerating plant that you would not have if you were buying ice; isn't that so? In other words, if we have a $3,000 ice plant, a machine like that would depreciate. That would also be operating cost.

PRES. PATTERSON: Did you take that into consideration?

MR. PIRRIE: That was taken into account, Mr. Patterson.

PRES. PATTERSON:
As I understand, on Mr. Pirrie's report, all factors that enter into the maintenance and operation of this refrigeration plant were taken into consideration. Certainly there are some members or some attending here who have problems on refrigeration. We are progressing more rapidly than we had thought, we are led to believe that there is no one in the audience who has never had trouble with refrigeration.

MR. PIRRIE:
I would like to ask a question. In looking these questionnaires over, I got the idea that quite a few of the men who filled these questionnaires out are not able to run their mixers as long as they want to because they can't. Now, I would like to see them show their hands as to how many of you fellows in this room would mix your doughs longer if you could hold your mixer down. Now, I would like to have you show your hands, you men that are perfectly and absolutely satisfied with the mixer you have now. Now, you see they are very strongly in favor of the other way. Now, that is one of the things we are trying to do. We are trying to show our members how they can mix as long as they want to, get their doughs down to where they want to, and do it efficiently. I want to say that, as an engineer, it was awful to look at some of the things that you fellows have to do. Now, I said "some of you fellows have to do" because you have got to use the equipment that you have got. The engineer on this job eliciting these questionnaires brings out some of the worst violations of the principles of engineering that I have ever seen in years, and I am going to throw that at you because it isn't your fault. You have simply got to find out what the best way to do it is, and then somebody has got to find out how to get you the equipment to do it, and that is one of the things that this Society can do.

MR. STADELHOFER:
I have listened to your various dissertations and questions, and very few answers have been received. I would just like to make a few remarks here to impress upon you the importance of this question of refrigeration. I assure you the value of it, it is not my aim at this time to bring out, but the reason you received so very few answers and do not seem to get into the subject as you would like to have them do is undoubtedly due to the fact that refrigeration generally is not familiar to you. In order to explain to you what I mean, I wish to give to you a few items which came under my observation during the past few weeks. I happened to be down south. I found in one particular place an old style mixer, making 18 revolutions, where the man used 60 pounds of ice with 296 pounds of flour, in order to enable him to run that mix 25 minutes. He got very nice bread, with this flour that he used, namely, 57 per cent.

I found another plant, a high-grade plant, that was running a 60 revolution mixer without any ice, in the extreme South; running straight doughs four minutes and then getting the doughs out at 85 and 86. It is not necessary for me to tell you what kind of bread these people got. But, under the necessity of refrigeration—the people who used ice—the superintendent of that plant was confronted with the labor question. You cannot produce quality bread without refrigeration, whether it is in the North or in the South, with a high-speed mixer, whether you use ice or whether you use cold-air blast, or jackets or no jackets.

Let us prepare for the next meeting, for the March meeting, in a more efficient manner than we have done so far, so that we can give you concrete figures of what you have to do in the different ways of making the doughs, with a straight sponge, from sponge to the dough. That is one of the points that is least understood in the whole baking industry—how much ice to use on the sponges—if you use 60 per cent sponge and 40 per cent on the dough, or 50—50, or less. It is one of the points that should be absolutely solved, which nobody can solve for us. It is we who are responsible for the solving of this problem, and I sincerely hope that we will have a lot more data to settle the question, for those who are affiliated with the Bakery Engineers:

PRES. PATTERSON:
Mr. Stadelhofer has brought up some very good points and I desire to emphasize the fact that we are here to help you. We are of the opinion that nobody should get today, by the American method of bread-making, less than 60 per

cent absorption. If you are not getting that, then you are inefficient. We are here to help you. If you do not give us your problems, we cannot help you. We offer that assistance to you whole-heartedly, hoping that you will come back with your questions and enable us to give you this return help. I would awfully well like to have somebody get up in the audience and state his difficulties. Mr. Baker, how is your refrigeration? What do you use—a blast or a jacket?

MR. BAKER:
We are using brine for the jacket on the mixer. I just came in and did not hear the previous discussion.

PRES. PATTERSON: Mr. Martens, what is your experience?

MR. MARTENS:
I believe we use refrigeration with cold air and also the jacket, and get the best results, besides having refrigerated water.

PRES. PATTERSON:
There are two points brought out here that are very evident. In the first place, if you are getting low absorption, you are inefficient. The other is if you are using long mixing time your refrigeration costs are too high and you are inefficient again. Mr. Ehlers.

MR. EHLERS:
I am not running a plant. I am interested in the question of helping the bakers in Indiana —helping them solve some of their problems.

PRES. PATTERSON: Mr. A. B. Lee, what do you prefer?

MR. LEE:
Our condition in the extreme South is probably different from any other section of the country. I am in Tampa. We have been using a chilled air blast, getting air at about 38 or 40. We are also using a specially cooled water for refrigeration, getting water at about 36. In addition to that, it is necessary to use ice. I would welcome any change whereby we could solve the problem and get away from using ice. We consider our cost of refrigeration too expensive in using the ice. I believe that possibly the addition of the water jacket, the cooling jacket would meet the need.

PRES. PATTERSON:
Have you in the audience any suggestions for Mr. Lee as a means of overcoming the usage of ice?

A MEMBER:
Mr. Chairman, what difference would there be if he was to cool the tank, put the ice in the tank and use that as it is melted in the dough, as against putting in the crushed ice into the sponge or the dough?

PRES. PATTERSON: You would be losing too much refrigeration.

A MEMBER:
I have a tank. We put the water in the tank and as we use the water in the sponge, the tank fills up automatically around 48. That gives me in the sponge about nine minutes in the mixer and turn it out about 77. But when my dough is bad, I can get only about four minutes in the dough. If I put in crushed ice, I get five to six minutes, but I find it affects the working of the dough.

MR. PIRRIE:
The answer to your original question, why you do not get the same effect when you put the ice into the tank instead

of putting the ice into the dough—it is bound up in the words "but that alone." So I will try to get you to believe something without using the word. When ice melts, there isn't any immediate change in temperature of the ice. You can have both ice and water at 32 degrees Fahrenheit. Now, when ice melts, it does so in two stages. It first changes from ice at 32 to water at 32, and then it changes from water at 32 to water at some higher temperature as it takes up the heat of your ingredients. Now, the refrigeration—this word refrigeration means the elimination of heat—that is what you want to do, keep something cool, and when ice melts, every pound of ice which melts merely by the melting process, will take up as much heat as that same pound (of your ingredients) takes up in going another 144 degrees approximately—142 or 144, somewhere in there. Now, that is what the average fellow overlooks completely. The refrigerating effect of the act of melting of ice.

When you put your ice into the mixer, you get that effect, in addition to the cooling effect of water at 32, which is the melted ice. When you put the ice into a tank, you merely get the cold water, but you don't get the refrigerating effect, and that is why you cannot mix your dough as long as you want to.

A MEMBER:
If you put the ice in the dough and you don't mix it long enough to melt the ice into water?

MR. PIRRIE:
You will get the cooling effect in the trough instead of the mixer. Now, I object to the use of ice in mixers for two reasons—possibly there are other reasons. In the first place, I am satisfied in looking these questionnaires over, and also from personal opinion as I go around the country, that ice is expensive, that there are other ways of getting the same cooling effect by spending less money. In the second place, I have seen so many doughs that are mixed with ice that are not mixed because your ice is not completely melted, or it is melted only to that stage where you have local difference in the dough from what it is somewhere else. I am of the firm belief that you must have a smoother dough, or you cannot have a nice dough. So I believe that all this is going to come up next March when we have our annual meeting. There will be definite and certain statements that under certain conditions of flour temperature, with certain types of mixtures running at certain mixer speeds and in certain geographical locations you have to do this to get that result. One of the things that I predicate freely right now is that you are not going to use ice in the mixer if there is any way of getting around it, because it appears from the data the least effective refrigeration of all the methods.

MR. SMITH (of Idaho):
I live in the far country of Idaho, the home of William D. Borah, the Senator. We have cool nights out there, but awful hot days. We are running a bread plant in a town of about ten thousand people. We are equipped automatically all the way through and we run bread only and/ sell it wholesale. We have a low-speed old-type mixer, which is the only old and obsolete machine in our factory, and we are interested in a high-speed mixer. We don't use any ice, and we get satisfactory results, very satisfactory results, with a low-speed mixer and no refrigeration. But we want more absorption. We want the features or the advantages that we understand accrue to the high-speed machine. From your formal discussion here, it strikes me that the manufacturers of high-speed mixers have had a terrible amount of—well, call it gall—sometimes we call it intestinal stamina, out in our country. But to put out on the market and to foist on the bakers of America a lot of machinery, mixers, high-speed mixers, without having solved the problems themselves of this refrigeration—now, you called for an expression here of the men in this audience who were satisfied with their refrigeration and with the amount of time they are running their dough, and all that, and you did not get a rise, not one. There is not a man here, if he voted his convictions, who is satisfied with the machine he has. He is not satisfied with the refrigeration he has. He is not satisfied with the results he is getting from the machine that he has, and it is an absurd situation, absurd. Why do these manufacturers of these machines turn them out to those bakers who know nothing about refrigeration, with no information, no data, no advice as to how to operate them successfully or satisfactorily. I am here at this convention—I came a long way, but you fellows can walk here from your homes, but I cannot do that and get there in time, and I want some information, and I ought to be able to get it from the people who manufacture that machinery and take my money.

PRES. PATTERSON:
Mr. Smith, I am very glad indeed to have you express yourself. We want the Society at all times to help all our members and anybody inquiring for information. That is the point we are trying to bring out, is the lack of information on some of the phases of the baking industry. Refrigeration is one of them; and it often happens that the industry itself is as responsible for the lack of efficiency as the people who are supplying the product, and it is through the co-operation of this Society, the American Bakers Association and the equipment people, that we are trying to solve these questions and get for you the most for your money, the most efficient mixer and the most efficient refrigeration. We will be glad to give you further information, all the information we possibly can give you. Mr. Pirrie and myself, or anybody else, will be glad to talk with you and give you our experience and answer any question that you may want to ask at the present time in the meeting. We want to be as definite as we can, and get down to actual facts. If you have any further question, we will be glad to answer it. If not, we will be glad to help you in every way that we can in the purchase of an efficient bread-mixer.

MR. STADELHOFER:
I wish to say a few words in defense of the machinery manufacturers. High-speed mixers are, comparatively speaking, new. It is not so many years ago that we knew nothing about them. By accident, it was really discovered that different agitation—specifically no agitation at that time with mixers approximately 14 revolutions per minute—we found out that we got good bread. We also found out the higher the agitation, the greater the friction, the greater heating of this dough, and it was through us that the machinery manufacturers got the idea of high-speed mixers, but they themselves did not know the effects this machine had on the dough, and naturally they had to move cautiously for further information from us dough- heads. We realized that if we wanted to use these high-speed mixers, we had to use something to keep the dough cool, which naturally suggested itself in the form of ice, and the progress that has been made in regard to this refrigeration is phenomenal. Pretty nearly every man in this hall knows perfectly well that if a man had advanced 25 years ago— which is a comparatively short time in the baking industry—the idea that a bakery plant should have an ice plant, he would have been laughed at. It is different today. If you buy a high-speed mixer, you are going to get something that will certainly look to you like a fine Christmas present that Santa Claus brought you, in preference to what you have today in your low- speed mixer. It will pay you. You may have to spend a little bit of money to find out and to go through the difficulties that each one of us has gone through, but you will be very, very satisfied, no matter which machine you buy, and even if you have to dig into it yourself to find that information yourself.

PRES. PATTERSON: Are there any more questions on refrigeration?

MR. McDUFFEE:
Mr. Chairman: It seems to me that the gentleman who just spoke is very much interested in a high-speed mixer. It would seem, from the discussion here today, that most of us were dissatisfied with the high-speed mixers. Being further interested in the high-speed mixer, I would make the suggestion that you ask the high-speed mixer users if they would be willing to go back to low-speed mixers.

PRES. PATTERSON:
I will take that vote.

Unanimous in favor of high-speed mixing. Mr. McDuffee brought out a very good point. We, as an organization and as individuals, Mr. Smith, do not want you to go back to Idaho with the idea that there is not enough information in this crowd to instruct you and give you any information such as will enable you to buy a high-speed mixer that will satisfy your own needs. The point brought out here in discussion is to further the efficiency of mixing and refrigeration during mixing; and we can only bring that out by collecting information and the wants of the individual.

A MEMBER:
The point was brought out there, in one place in the questionnaire—the cooling effected by expanding carbon

dioxide in the mixer. It has never been explained, expanding carbon dioxide.

MR. PIRRIE:
Yes, it has. The question is whether carbon dioxide gas, ordinarily known as carbon dioxide, sometimes called carbonic acid gas, has ever been expanded directly in the dough for the purpose of getting refrigeration. Now, those of you who are not up on the scientific side of refrigeration—when you buy carbon dioxide in the cylinder—in the good old days it was called a beer-pump—a cylinder full of carbon dioxide—and you opened the valve and the gas gets out, it is mighty cold during the actual expanding. We had a case of that in the questionnaire. We are very much interested. A man just buys dioxide gas in cylinders under pressure. He got a reducing valve, reduced it to 15 pounds, and he just let that gas expand in the jacket around his mixer. The highest temperature in those jackets anywhere, if I remember right, was 54 degrees—no, it was lower than that—47 degrees was the highest temperature. In other words, he is holding his jacket at 47 without any power or anything else. Unfortunately, he did not tell me how much gas he was using, so I don't know what it cost him.

Now, this other question that this gentleman brought up was whether this gas could not be expanded directly into the dough, and that the refrigerating effect be produced directly in the dough itself. The whole line of those gases has been expanded into doughs, and they have pretty well gone back to air, those who are using any gas at all. Does anybody in the room know of a plant now which has a mixer with the hollow arms that you can blow air through and which is running carbon dioxide through those arms?

PRES. PATTEESON: Mr. Henry Korn.

MR. KORN:
I am from the state of Oregon, and live farther away than the man from Idaho. I have a slow-speed mixer, rather cold water and cool nights. I don't bother with this refrigeration. Whatever information I can get here, I will be very thankful for. That is about all I can say now.

PRES. PATTERSON: Mr. Leo Berk.

MR. BERK: I haven't anything to say on the refrigeration plant.

PRES. PATTERSON: Mr. John W. Blume.

MR. BLUME:
I am from North Dakota. We do not have very many hot days. We are not troubled with hot days. We use a slow-speed mixer. Fortunately our water is always cold. But I am very much interested in machine refrigeration.

PRES. PATTERSON:
Gentlemen, all of you can realize from the discussion we have had this afternoon the importance of sending in questionnaires that will enable us, as a society, to draw definite conclusions in order that we may help our members in getting more efficiency in their plants through mixing with refrigeration; also all other questionnaires that we may send out. We very urgently ask you to send in the questionnaires as a help to others. Sometimes a question seems to be very elementary, so elementary that we think anybody ought to know that. That is not the case. We like to have you answer all the questions to help us. Some day you may want information yourselves. Walter Wagner, what is your preference in the method of refrigeration?

MR. WAGNER:
I have had experience with both kinds of mixers, the water jacket and the air coolers.

PRES. PATTERSON:
You can mix dough as long as you want to, with the water jacket?

MR. WAGNER: Without any trouble.

MR. NICOLAIT:
The most effective means of refrigeration that I found yet is the jacket method, running brine to an insulated jacket, circulating at the rate of 20 gallons per minute; calcium brine, of course. We find, with brine at 25 degrees like that, that we can give the sponge alone 15 minutes mixing, which we find so very adequate. That is, in my opinion, the most economical means. If additional refrigeration is required, we can lower the temperature of the brine, or use air in addition. That has been my preference for refrigerating dough while mixing it.

A MEMBER:
Mr. Chairman, can Mr. Pirrie tell us on the question of 67 per cent, what kind of system they have?

MR. PIRRIE:
I don't have the specific questionnaire with me. It is in my room at the hotel and if you will look me up there, or if this subject comes up, I will answer the question then. I don't remember, but I have the questionnaire down at the hotel, and I will be glad to give it to you.

PRES. PATTERSON:
Those who use water jacket mixers, how many have found it necessary to use brine instead of cold water?
(Hands go up.)
How many of you are going along merely with cold water?
(Hands go up.)
It is about an even break.

A MEMBER:
Gentlemen; that may be true as to the kind of doughs they run. For a straight dough, I think cold water is adequate.

PRES. PATTERSON:
I think one of the gentlemen who voted in favor of cold water runs a sponge dough. Am I right, Mr. Jordan?

MR. JORDAN: Yes sir, run it in about 14 or 15 minutes, 65 revolutions.

PRES. PATTERSON:
That is out in Kansas. How many of you care to go on with this discussion of refrigeration? Hold up your hands. I will ask you what you want to know about it.

A MEMBER:
I would like to know a lot more. I am experienced with low and high speed mixers. We are considering installing proper refrigeration, and I would like to find out all I can about this refrigeration in mixing doughs. But I say I will never go back to the slow-speed mixer, even with the conditions I have to put up with right now.

MR. ASKEW:
Naturally I am interested in this question, and I cannot give you any information on it, I am sorry to say, but I would like to ask Mr. Nicolait if lie ever bad any cost on the cooling of dough with the brine method. It seems to me it would be rather expensive, keeping brine temperature down to a point where it would be able to cool that amount of dough, if he was running very many doughs and very heavy dough. We have a reasonably high speed mixer that we are using, but have no jackets and no refrigeration. We use crushed ice. It is expensive, crushed ice is. I want to know if this brine system is more expensive than crushed ice.

MR. NICOLAIT:

Elaborating on what I said before: the size of the compressor that we use on the brine system mixing dough by circulating calcium brine—it is a calcium solution, one pound of calcium to every gallon of water, while brine generally, I believe, is made up of four pounds of calcium to every gallon of water. Now, that calcium brine is cooled in a separate tank by direct expansion of an ammonia compressor, and the same compressor also supplies cold water that we use in the dough. The water is used as low as we can get it—around 32 or 34 —and the brine is used at 25, while sponge doughs we get an adequate mixer, and the size of compressor necessary is over four compressor or equal to a four ton machine.

PRES. PATTERSON: What do you use, Mr. Campion?

MR. CAMPION: Cold air and cold water.

PRES. PATTERSON: What is the temperature of each?

MR. CAMPION: Cold water is 40, and the cold air is 60.

PRES. PATTERSON: How long do you mix?

MR. CAMPION: Seven minutes.

PRES. PATTERSON: Sponge or straight dough?

MR. CAMPION: Sponge.

A MEMBER:
What is the best method of producing cold air, and how about cold air through the dough affecting the material of the dough?

PRES. PATTERSON: Mr. Wahl, will you answer that question?

MR. WAHL: I did not hear the question.
(Question repeated.)

MR. WAHL:
The only benefit I can find that it has is that it might give you a whiter crumb or bleached dough.

PRES. PATTERSON:
I think by using refrigeration, you are allowed to mix longer, and due to that longer mixing you get a better development of the gluten, at the same time you get a whiter and silkier dough.

MR. STADELHOFER:
There is no special benefit in the use of air to get cold dough. It permits you to mix your doughs longer by the introduction of cold air. Outside of the bleaching effect, it does not have any other effect on the dough.

MR. PIRRIE:
* * * Those fellows that are pumping cold air into their dough, there is a difference. Adding cold air at the freezing point or to as high as 60 degrees, I don't think that any goes into that dough above 60 degrees is doing much cooling. There are several systems. There is a blower at the top of the mixer blows right down into the mixer. You can find a cool spot around your bakery; run it into the ice box. It would appear that those that are using it are satisfied, or they would shut off the motor. It is doing some good. Another system of blowing air at the dough is to pre-cool that air in a special apparatus which is bought and used for the purpose, and that is really using cold air. This apparatus is made

on different lines by the different companies, but it is all on the principle of getting that air cold by bringing it in contact with coils that either contain brine or are cooled by direct ammonia expansion. The coldest temperature I found was about 32 degrees and you blow that air in large volume at the dough or into the dough—and by large volume I meant about 800 cubic feet, or about. Some are using a thousand cubic feet of air a minute. Some of them are blowing it at the dough and some of them through the dough, into the dough, and from the questionnaires I am unable to tell which system is giving the best results. The facts of the case are that such air—I mean with cold air blown at the dough or into the dough—does make it possible to prolong the mixing period and thereby get better bread. That is what we are really driving at.

Now, there is another point in this connection, and that is that there may be a better method of doing that job. I don't know right now whether there is or not. There may be. That is what we want to find out. I think one idea that is probably sticking up most in the minds of a lot of you fellows in this room is that when I am talking, or somebody else is talking, about refrigeration at the mixer, that you are thinking of an ammonia compressor and a lot of pipes and a great big mechanical plant, or a little mechanical plant. Now, that is not what we are talking about. That is one of the things we are talking about. Refrigeration at the mixer is the art of keeping your dough cool as long as you want to keep it cool, and that keeping of the dough cool may be done with a mechanical refrigerating equipment, which is one form of refrigeration only. It may be done with a cold air blast, which is another form of refrigeration. It may be done by sinking ice into the mixer, which is another form of refrigeration. It may be done by expansion of gas into the dough or into the jacket, which is another form of refrigeration. I could reel off about fourteen different forms of refrigeration, and we want to find out which one to use. We don't know. There are different systerns in use. I don't agree with this gentleman from out West, who says we are not satisfied with our high-speed mixers and with the systems of refrigeration. I am not quite sure what the word contented means, but I will say that we are satisfied but we are not contented with it, meaning that we are sold on the idea, but that we are looking for a still better way of doing it.

MR. SMITH:
I based my conclusion on the satisfaction of these fellows from the vote taken on the floor.

PRES. PATTERSON:
We would like to have Mr. Cordrey give us some practical information on the question of refrigeration.

MR. CORDREY:
We put in refrigeration for high-speed mixers, about twelve. Of those, there are still two mining with ice. The hub of the whole problem is the temperature of the ingredients that go into the mix. The amount of refrigeration required is determined by these factors: the temperature of the flour, the temperature of the condensed milk, the temperature of the water, the temperature of all of the ingredients. I have some customers in this room and some of them are satisfied, but they did not get up to say so. We put in four plants for one concern in the northern part of Michigan. They say they get satisfactory gluten development. Our gluten development operating—with that development. Let me state, however, that one of my customers would not be satisfied with that operation. You boys have no standard as to operations, number of revolutions. One wants 65 E. P. M. operations in 16 minutes. He may be right. I don't know. The other fellow is satisfied with six minutes. So the fellow that is satisfied with six minutes and thinks he has gluten development at the end of six minutes, he naturally will have a very difficult refrigeration problem.

Mr. Wahl says he has a high flour temperature condition. He is using approximately 40 pounds of condensed milk at refrigerator temperature. The amount of milk I use is the amount of water I can get into that mix, and in adding a lot of milk, I raise the heat. He wants an additional 15 minutes operating period. I looked over his conditions and intend to give him about 1,500 cubic feet with 33 degrees air. I find that I am still 7,000 heat units short when he gets his 15 minute mix on it. In other words, I have to put in ice to take out the 7,000 heat units. In Mr. Wahl's case, I think it is absolutely impossible to go far enough with air alone to overcome the heat that is generated by the mixer. The only thing is to get a water jacket on the mixer. Consequently, if the flour is low, the milk temperature is down, the general conditions are right, you can run under test 15 minutes on that type of mixer with 1,000 feet of cold air at 30

degrees. Those were the conditions that I faced and analyzed properly in his case.

Last year we put in 12 plants. In each case, with the exception of two, we are getting satisfactory results without ice. Mr. Wahl is the only case and another man in Springfield. He used about 12 pounds of ice. His condition is not such, however, that cannot be corrected without a water jacket.

We talk about putting 1,500 cubic feet through that mixture. * * * There is a certain rate of heat flow that is possible, and beyond that, it is not possible and there is so much heat can be taken out in that period. If you put a million feet of air through there, you would just be lifting yourself by your boot straps—there is a limit beyond which you cannot go. The general temperature condition of the bakery, the temperature condition of the ingredients, if your heat balance cannot be maintained, you have to go to a water jacket; or if it is so high that a water jacket cannot do it, then you have got to add air.

I have a job in Detroit this year with a water jacket only. They are able to run with 33 degree water on high-speed mixers, 12 or 13 minutes under test. However, they limit their mixing periods to ten minutes. Now, they have a fairly low temperature ingredient condition.

This is a big subject. I just want to leave this thought with you: the last 15 years I have been through the development of the ice cream industry, at least its expansion, and I thought they had some problems. But you boys, in your refrigeration for high-speed mixing, have larger problems and more than the ice cream industry or any of these other industries ever had, and it is going to take some time to put some of them out as they should be whipped out.

I think this association is going to get somewhere with these questionnaires along this line. When we have our information in March, I think that information enough will be brought into the matter that will make deductions logical.

A combination of water jacket and air, I believe, makes an ideal installation. Where you use the water jacket and air, you can keep the temperature of the water in the water jacket to a point where the precipitation of moisture either on the inside or the outside of the dough can be prevented—taking the balance of the heat out with a blast. As to economy, it is always more economical to cool, refrigerate with a water jacket alone. The cooling of air is an uneconomical proposition. However, when you make a combination of the two, it becomes economical again because the amount of air you use is small in comparison, and the temperature at which it leaves the mixer is so near the point of the temperature of the dough that the loss is a minimum.

This subject is a big one. I have studied it very diligently for the last four years, and I don't know much about it yet. If there is any question that someone would like to ask me, I will be glad to answer it.

A MEMBER:
May I ask the gentleman one question? He referred to having been interested in the ice cream manufacturers and their problems in the last few years, and it seems certain to me that the ice cream manufacturers overcome this big problem by a jacket on a cylinder in which they put brine. Just as Mr. Nicolait referred to a minute ago, not using a brine jacket on the mixer, and this gentleman referred to not using brine in the mixer jacket. I would like to ask if he has any ground for that and what objection he has to it.

MR. CORDREY:
Yes, we have gone into that, and that was one of the objections—the objection that I see to low temperature brine on a mixer jacket is that you get a precipitation of moisture on the inside of your bowl and outside of your bowl. Naturally, the flour dust collects on the outside of the bowl and it runs up and down. In the second place, the accumulation of moisture on the inside of the bowl. We used air on it under one run, and we used brine on it under the other run in the jacket. There was approximately 20 per cent difference in operating time between the one mixer

and the brine-cooled mixer. Now, there could be only one answer—that the precipitation of moisture on the inside of that bowl—you find a volume of water and dough hit it and slopped around, and .slopped around. In other words it takes longer to develop the dough with the brine-cooled jacket than with the air-cooling method. We know that the sloppiness on the outside of the bowls means something and we try to get away from it. That is why we have gone to the air-cooling method.

You fellows have had problems for years and we have not paid any attention to it, and I have been asleep with the rest of them. It is only the last few years I have paid any attention to your problem at all, but the mixer man came along and built a jacket on it, and another decided he would not put a jacket on it. He got by with it. Minimum temperature condition came along in another place and he fell down. We have been forced, though, to follow the mixer manufacturer. In 80 per cent of the cases in the northern part of the United States, it is possible to get a refrigeration result on a high speed mixer with air alone, but where your conditions are extraordinary, you cannot do it. But in order to eliminate these two objections with the brine jacket—to the low temperature brine jacket, let me state—because if I count in the brine jacket not over 20 degrees lower than the temperature in the dough—say 65 degrees—we get a cooling effect, as it works out, equivalent to 70,000 heat units without moisture either inside or outside. Then I have 70,000 heat units to eliminate with air, which can be done far from economically.

PRES. PATTERSON:
We want to emphasize to you the fact that we have not by any means attempted to draw conclusions from this discussion. We have reiterated that several times and I again want to speak of it, and that is that we are going to continue this, and we want each of you between now and the first of February to send in all of the data you can get. We want to collect the data between now and then so that, in our annual meeting in March, we will be able to conclude at least on a portion of these major topics on refrigeration. Please bear that in mind. We do not want this society to get the reputation that we cannot conclude on our problems or get definite answers. And, of course, to cover the entire problem it is necessary for each of you to give us what help you can. Tomorrow we are going to take up, at two o'clock, in this room, a discussion on the proper way to handle the new wheat flour. We hope that you will all tbinlr on that this evening, and not come back tomorrow afternoon with no troubles in your shop. We want you to feel free to ask all the questions you feel fit to ask. There are going to be presented problems that are interesting to all of you on flour.

We will now adjourn until tomorrow afternoon, two o'clock.

SECOND SESSION
Wednesday, September 16th, 1925 — 2 P.M.
PRES. C. J. PATTERSON, Chairman

PRES. PATTERSON:
This is our last session, and we will try to make it as short and interesting and snappy as we can. I would like to make a couple of announcements before we proceed with our program. I feel that we as an organization, as individuals and as an industry, owe a great deal to the leaders of the industry, those men who make a great personal sacrifice, as well as financial, to make the industry more progressive. There is certainly a wonderful spirit in a personality of that kind. I do not think it is more than right that we, all of us, should reciprocate in appreciating a personality of that kind. I want to call your attention to the fact that there are subscriptions being given by the different organizations of the American Baking industry for the Julius Fleischmann memorial. I think that it is our duty as an organization, inasmuch as the Fleischmann Company has been so active in many years, to help this subscription, individually and collectively, also through our companies. I at this time would like to have a motion from the audience in regard to this. I feel that it would be very appropriate for our organization to vote that we subscribe to this memorial. I call on Mr. Dick Wahl.

MR. WAHL:
Mr. President, may I make the motion that the American Society of Bakery Engineers, the officers, the executive

committee, give due consideration to this move and co-operate in the Julius Fleischmann memorial, and that each member of the Society of Bakery Engineers do his part in helping it along. I would like to make a motion that the officers of the American Society of Bakery Engineers give this due consideration and act upon it.

PRES. PATTERSON:
Mr. Wahl, you put that in the form of a motion as having the Society sponsor the movement.

MR. WAHL: Yes.

PRES. PATTERSON:
All of you heard the motion, which was to have a vote from the Society to sponsor the movement for the support and cooperation and the fulfillment of the Julius Fleischmann memorial.

(Motion seconded and unanimously carried.)

PRES. PATTERSON:
The second announcement to be made perhaps gets to our patriotic feeling and our support to the Government. The Government naturally has reserve training corps all over the country in different branches and different divisions. The Bakers Reserve Officers Corps has been taken up by our Society and it is strongly advocated and supported by the American Bakers Association. The movement is getting more efficiency in the personnel of the Army, or in the reserve officers corps, at least, in the baking divisions or companies. We have now an opportunity to have selected from this organization the officers of these different companies.

All of yon who are in favor and would like to support this movement, the Society would be more than glad to have you join. It gives you an opportunity to become a reserve officer, and you all know what that means in time of war. We have a very great enthusiasm throughout the baking industry in the support of this. Mr. Julian Livingston has made a thorough investigation and highly recommends the movement. Perhaps some of you were in the Army during the War, and know of the inefficiency of the baking companies, due to the lack of the proper personnel; and this gives you a very excellent opportunity to become a reserve officer. I would like to have Mr. Dick Wahl say something regarding this movement also.

MR. WAHL:
Mr. President, there was going to be a gentleman present this afternoon to talk to us about the plan as it is being carried out. I wonder if he is here.

PRES. PATTERSON: I don't see him. I don't think he is.

MR. WAHL:
Mr. Julian Livingston is working with the Commissary Department to organize a reserve corps and form baking divisions throughout the country in different sections to carry on the work so that it will be properly organized and we will have the right kind of men properly trained to carry this work through. There will be three officers, a captain and two lieutenants, in each division, and the first move will be made to organize the captain and the lieutenant in the division, and after that we will work on the privates and the companies. Every member of the American Society of Bakery Engineers is given the invitation to join the new corps. At the same time, I would suggest that these men write to Mr. Livingston in Chicago or to our Secretary, and send in their applications. If you are desirous to become a captain, put that in the application; if you desire to become a lieutenant, put that in the application.

(Further explanation.)

MR. PLATT:
Mr. President, I know nothing about the present plans, but I did have the honor to command a bakery company for

about one year during the past war. I can say that it is a job very well worth filling. You meet extraordinary difficulties in mixing and baking bread in tents in the wintertime. It takes all you know in regard to baking, and then, when you are all through with that, it takes all you have got in the way of managing men, because you have the management of them, not only during their working hours, but during their play time, you have control of their recreation, their eating, everything they do. It takes all you have and then some. It is a job well worth doing, and I was one of those who was in the Army comparatively early during the war and saw the great need of a trained personnel. I saw it in myself and there were few people greener than I was, and I saw it in many others who were almost as green. Of course, the waste was terrific. I still am in the Reserve Division and during the present time you meet a very fine body of men among the reserve officers. You meet reserve officers of all the branches of the service, and it is one of the greatest pleasures I have in meeting them in my own home town and elsewhere. It is a thing worth doing. It is a great service to the Government, and it is also a great experience. Just because you don't happen to be what you conceive to be a military man is no reason for keeping away. This idea that some people have of a colonel, that his main object is to bawl you out—he is more than glad to meet you halfway, and it is one of the most interesting experiences and one that is worth while.

MR. WAHL:
Mr. President, would I be in order if I made an announcement in our next publication to the effect that the application should be sent in as soon as possible?

PRES. PATTERSON: I think that is in order.
(Motion seconded.)

PRES. PATTERSON:
It has been moved and seconded that we publish in our next bulletin, which will be the first of October, that we carry application blanks in that bulletin for those who are interested and desire to make this move, to fill it out and return it to our Secretary.

(Motion unanimously carried.)

(Mr. Nels Johnson gives a brief talk on the Southern California Society of Bakery Engineers.)

PRES. PATTERSON:
Our subject this afternoon is flour—the proper way to handle the new crop. That is always of vital interest to the man in the bake shop as to what is necessary or is unnecessary in order to meet the requirements of the new flour that comes into his bakery. We should at this time have collected considerable information in our shops and as to how it should be worked, and we hope that all of you will feel free to give your experience and ask any questions in the hope that we get them straightened out and that you will return home with a better idea of how to handle your new wheat flour.

We have a very large gathering this afternoon. We do not want to make our meetings at all tiresome. We want to make it snappy, interesting, and will now take up the question for discussion. Is there anyone here who has trouble or would like to ask questions about the qualities of the new wheat flour?

MR. STADELHOFER:
Mr. President, I hope you don't think I am presuming a little more than the rest of them, but in order to get this thing going, I thought I would start this thing off. We have today not the same difficulties as we had years ago, which is no doubt due to the fact that the milling industry has made great progress in solving these problems in such a way as to overcome the difficulties in a comparatively short time. The difficulties of new flours, as you all know, consists of a certain thing which we really don't know, and I would like to recommend very strongly to the milling experts to dig into it. It is that unknown quantity "X" that really does create the trouble. I have come, from personal observations for many years, to the conclusion that it is the inside and bacterial activities of the new wheat, of which we do not

really know anything; and I believe the millers are the men that will shortly solve that problem. So, consequently, we can only advise and give each other such experiences as we have had ourselves.

I have had recently the opportunity to work with three distinct new flours. Now, don't get any misunderstanding—I don't believe there is anybody here that can speak intelligently upon the activities of the new Northern flours. This flour I am speaking about was Kansas flour and Oklahoma flour. I was very fortunate in coming into one of the best places in the South, that was equipped with an excellent laboratory which enabled me to make these tests in the laboratory and then go to work and find out what they would do on a large scale. The party in question was in trouble and sent to New Orleans and I went to see the party.

Through a number of years I have used artificial means to overcome this newness of flour. The artificial means were lime or dry calcium sulphate, or acidity. In that particular case, I had three carloads of flour, each one from a different section of Kansas, and one Oklahoma flour. So I really had a fair representation of the flours of that section of the country. I had Northern flour as a check flour which was used also in that bakery—used it as a check flour, and I found the following facts: by using a small quantity—in the first place, I wish to state that, in making these 400 gram laboratory tests, I did not adopt the usual method with an abnormal amount of yeast or such as is generally used, but I used 1.75 per cent, and in fact used a formula which later on I used in batches of 420 pounds of flour.

I made these tests with and without acidity. For the acidity that I used, I used vinegar, and used also a very small percentage of yeast food, namely .123. The flours differ slightly in absorption, but not to a great extent. This I found out, of course, in the action of the flour, using in my test 60 per cent. The doughs which were run at a fairly high temperature gave, with the added acidity, an excellent result, and the fermentation period or the condition period of these doughs was just slightly above normal. Or, in other words, with the warmer temperature that I adopted, they matured slightly faster than they would if I had used the normal temperature about 80.

The difference in the maturing time of the flours was only three or four minutes between the three of them; indicating again that the flours are along the same line. So far as the protein content is concerned—I don't care to speak about it—they are going to be much higher than usual, and consequently will add a great deal to the quality of the flour. I am fairly confident to say that they wili all be very good. The difficulty is simply in the stages through which we are going at the present time.

The fermenting period on that dough with 1.75 yeast was a total varying from 236 to 242 minutes. The results were excellent. It showed plainly that those doughs that were— and both with and without acidity, gave excellent results. Of course, with the small amount of acidity added, it naturally added bleaching effect. The loaf was somewhat whiter, the crumb was somewhat whiter, and better, and more silky than the other loaves were.

Later on, as I stated, I made several batches with 420 pounds of flour, using the identical ingredients which had been used, such as the lard, sugar and condensed milk. I reduced the temperature of those doughs to 82. Being, of course, 4 degrees lower than had been the habit of running the doughs, eliminating every fault of which the man had complained, namely dark color, open texture and streaks; and also gave me an entirely different volume from what they had. In other words, the party was very much elated to see the workings of the new flours—as they had been scared, and a great many of you and other bakers will become scared when they do not have the proper result the first time with the new flour.

In conclusion I just wish to say that I have got to the opinion that most of your difficulties which you may encounter would be absolutely eliminated by a slightly higher temperature, and the developments in your mixers have to be watched more carefully. You may have to change the time slightly in the running time. In other words, as I said many times before, there is no such thing as for one man to get up and tell you how long you should run your dough. Run it as long as you can, by all means, without baking it. If you do that, you will have excellent results, with a shortening of your fermenting period. These experiences were not based only on one plant—in three plants, and in each plant the identical thing occurred: namely, by raising the temperature three or four degrees above what you are

used to running your dough, you will overcome most all your difficulties which are generally presented by your new flours.

PRES. PATTERSON: Are there any questions?

A MEMBER: What was that time, Mr. Stadelhofer, the fermentation time?

MR. STADELHOFER:
There was 420 pounds of flour—and, by the way, these flours were out of these three cars —some if it was all new flour; it was not 50-50.

A MEMBER: Short time or longer time?

MR. STADELHOFER:
They were short. 252 pounds of water; 7 pounds and 5 ounces of yeast; ¾ pound of aready; one pound of 90 grain vinegar; 7 pounds and 5 ounces of salt; 6 ¼ pounds of malt; 6 ¼ pounds of sugar; 16 ¾ pounds of sweetened condensed milk partly skimmed; 10% pounds of shortening; that dough run 14 minutes in a 60 revolution mixer; came out 82 degrees Fahrenheit; had one dough punch with one hour and three-quarters; had a pull-over in 30 minutes, and goes through the divider in 15 minutes. Two hours and 30 minutes total time.

In the sponges of the new flour I have not found any trouble. In one, in order to prevent curling, I raised my sponges to 65 per cent and gave them approximately 15 or 20, which was longer than I do otherwise, and you will get a beautiful loaf of bread. With 65 per cent, that means ten minutes in the dough; give the dough ten minutes.

The absorption is phenomenal, the amount of absorption of 65. In one particular case, with a slow-speed mixer, I used 65 per cent. You will have no trouble in that line at all. We are all going to make money for the bosses this year.

That flour was two weeks old, practically speaking. It came from Kansas, wonderful flour. I have also seen wheat in Kansas and Montana, wheat that contained 19 ½ of protein. I went to the editor of the paper, and asked whether he knew what he was publishing. He said yes, he knew why I asked, and he made sure that it was correct. I believe you will find some Montana flours this year with the highest protein content in the history of the United States.

It does not guarantee a pretty loaf of bread, but it is going to help us.

A MEMBER: Have you the details of the sponge dough also? How much yeast for that?

MR. STADELHOFER:
I can give it to you if you wish to. Let me see, what did we use there? We used 1 ½ per cent of yeast—that is the total amount into the sponge, and had generally 2 ¾ hours straight dough and let the sponge stand for four hours, with 65 per cent of the flour in the sponge.

A MEMBER: How much arcady in the sponge ?

MR. STADELHOFER:
Keep your sponges as you have been keeping them, 74 and 75, with that amount of yeast and the arcady.

It is simply a question with which we are now confronted. If you follow this advice I am giving to you, you will not run into any trouble. I don't know anything about the Northern flours, but the indications are that they are absolutely the same in comparison as Eastern flours are because they have practically the same influences on the wheat, and the ripening of the wheat that the Kansas and Oklahoma sections had. So that, when we get the Northern wheats, and we

combine the two of them, why, we ought to be able to make small balloons out of…

A MEMBER: How long do you let the dough stand?

MR. STADELHOFER:
Ten to fifteen minutes with 65 per cent sponge. Maybe in November and December, I would advise 25 minutes with the same flours. Use your own judgment on that. I am just giving you my present experiences—and I tell you, Gentlemen, that I had the fortune, or misfortune, perhaps, of traveling from the lakes to the Gulf. I happened to pick these things up because I knew you would be interested, and I really gathered this stuff together to bring it to you.

MR. OLSEN:
Mr. President, Mr. Stadelhofer's findings are certainly very interesting. In his initial remarks, I believe he made the statement that it was rather early to form an opinion of the new spring wheat crop. I think that the millers in the Northwest generally agree at this time that the quality of the spring wheat crop is an assured fact. In our own laboratory, we made our first bakings of experimental size samples of new spring wheat, I believe, on August 5th, and since that time we have made an intensive survey of the entire northwest, mainly Minnesota, South and North Dakota, and Eastern Montana. The wheat continues to run high in protein, and the test weight is higher than was at first expected. The flour takes up fully as much water in the dough as the old crop, and the bread shows exceptionally large volume. We have not found it necessary to make any changes in fermentation, at least on straight doughs. Mr. Stadelhofer referred to unusually high protein, I believe, in Montana wheat. It might interest you to know that we have had occasion, and do right along, to test samples of Canadian wheat for our affiliated organizations and we actually found one sample of new Canadian wheat to contain 21 per cent of crude protein, the highest figure that we have ever had in our own laboratory.

PRES. PATTERSON:
Mr. Stadelhofer, is it your opinion that this new flour is going to take more fermentation to produce the same results'?

MR. STADELHOFER:
In the later stages. It does not now. It is now slightly below normal. That, of course, may be due to the fact that I used higher temperature. By using that, that test had perhaps the effect of taking those few minutes of further length of time. Later on there is no question whatsoever that these flours will require a longer fermentation to the (slack) of the protein. Naturally, we do not want to have warm doughs. But, for the present, it is not necessary to ferment these flours longer. This particular party did send out the usual—had the usual fermentation, had the dark streak in the bread. They will not act any different from any other year if you treat them the same as you treated your other doughs. You have to go by the rules and regulations, and use good, common sense. It does not make a difference whether the material is condemnable or not on the looks of it. The thing that counts is the eventual result. And this is what I found, and I have simply adopted my old, old standby, and I think you will find that when you are in trouble, when things are running wrong, when you are running in a wrong groove, turn things upside down; you cannot make it any worse; nine times out of ten you find the right solution.

MR. HERMAN:
Our observations with the new crop in Kansas have varied to some extent the experiences of Mr. Stadelhofer as related. We have had occasion to bake out a certain sample of flour daily for the past two and one-half months. We have found our baking results consistent, approximately nine weeks on that sample. The fermentation period approximated very closely the fermentation period of the old crop at the tail end of the crop. After a period of about nine weeks, we noticed that the flour was not baking out, particularly as regards the outer characteristics and the volume. Since that time, we reduced the fermentation period 11 per cent and are getting wonderful results out of the same flour. Now, that flour is just approximately two and one-half months old now. The absorption on that flour at this time is 68 per cent and it has been stored under normal conditions. It started out 63 per cent. The color is decidedly brighter and the grain is much tighter.

PRES. PATTERSON: Was that due to the loss of moisture?

MR. HERMAN:
Undoubtedly; although, in that connection, the moisture at the present time is 11.7. It was milled out at 12.8.

PRES. PATTERSON:
Are there any questions'? How many are finding the new wheat flour taking less time than the old wheat flour? Raise your hands. How many are finding it is taking a longer time?
How many are using it? One man in the audience, as far as I can see, was using new wheat flour.

A MEMBER:
When we receive magazines that are advocating low temperature with high per cent of yeast, there must be some of them here that believe in that. Low temperatures on the new flour and more yeast—we see that in the magazines.

MR. STADELHOFER:
I certainly would not condemn that. No doubt these men are actuated by absolutely pm ' motives. During certain years, we really did get better results with a low temperature, a verv cold temperature, but naturally you have to make up for it in another way, and there is no other way except by the addition of yeast. But I do not believe it is necessary this year—absolutely not.

PRES. PATTERSON:
We all appreciate what Mr. Stadelhofer is offering up and I do not think it is more than fair that we should reciprocate.

Have any of you other fellows anything to ask about flour?

MR. PIRRIE:
I did not read this year's article myself. Was it that you were referring to? In the handling of new wheat flour, undoubtedly there are differences of opinion, and different people can undoubtedly get good results in different ways. That must always be remembered. I don't remember what our report on the new flour was, because I did not do the work and I did not read it. I am not quite sure that this year we recommended low temperature and a large amount of yeast. I think our recommendation was similar to yours, Mr. Stadelhofer.

MR. STADELHOFER:
Perhaps the opinion is prevalent. I am green. I would like to get advice. I am always ready and willing to listen and to learn, because I have repeatedly made that statement, and I make it again: I want to stay green; I don't want to become ripe, because after ripeness comes rottenness.

PRES. PATTERSON:
Mr. Wahl asked me about my experiences. I will tell you what they are. We have made quite a survey of flour, the new wheat. We have found a great deal of similarity with the past crop with this reason: that where you are working flour from a wide territory, you will find the fermentation requirements of your different flours varying over quite a large range. I found that to be true in every past crop. I think with last year's crop most of us agree that flour as it was worked on tlie sponge method, had a very narrow working tolerance. We have found on this crop that there are flours taking longer fermentation using the same formula of temperature and yeast percentage. We have found flours equal in their requirement and we have found flours a great deal shorter in their requirement. We have also found over three or four years that the fermentation required for flour from over a wide area have the widest and largest variation of any factor pertaining to the manufacture of bread. When we are speaking of flour and its fermentation and the manufacture of bread, let us all, at all times, keep our comparisons straight, so that we will know what has produced the finished results. In other words, if we change our formula and our temperature on this crop, as

compared with the old crop, then we have taken too big a bite and perhaps are going to lose some valuable comparison when we are transcribing this for our friends who may not be getting as good results. Those are the general results that we have had from Nebraska, Kansas and Oklahoma flours, and the fermentation requirement of flour is the most important one to consider and the largest factor that we have to work with. It is quite desirable to take that into consideration when you are purchasing flour.

May I call on Mr. C. Gr. Harrel for his experience with new wheat flour ?

MR. HARREL:
Mr. President, our experience is like Mr. Stadelhofer's. We have not found any great difference from the past crop. ( ) is running about the same and the fermentation period practically the same. That is the average of the conditions. Of course, in every number of flours, you will find some radical flour where the fermentation will run shorter or longer. We have found a very small percentage this past year. While I am talking, Mr. President—I was told not to mention this question, but there is a question that I would like to ask: on last year's crop a great number of people complained of a condition which they called sweating of the flour—the sweating of the flour, or a perspiration that goes on. I might ask what that is, how to overcome it, but I will not do that. I would like to ask if any of the people present have experienced that condition on the present crop. Personally we have not experienced that but I would like to hear from some others.

MR. STADELHOFER:
I guess I am one of the oldest men in the hall, and naturally I have to reach back to a time when you men, most of you, were babies. It was then that the intervening period between the new and the old crop was dreaded from year to year. We were not accomplished in the baking industry as we are today. We did not know, as we know today, about fermentation. I reach out back to a period when we did not even use compressed yeast, as we use it today—when we had stock, when we used our own yeast. It was the same, no matter which yeast you used. During that period I believe that phrase was coined "sweating flour," and I think that the importance of this is that, so far as the flour is concerned, it did not sweat. We only knew that expression that flour went into a sweat. Whatever it meant, I cannot tell you, but this is the reason, I think: when the doughs were made, we knew at that period as well as we do today that one of the factors was to make the dough a little stiffer than usual, but when that dough lays a few minutes and it started to sweat, it did not sweat really but it looked as if it was sweat; it had these beads on it and blisters. And that, I think, was the original reason why we claimed that flour was in a sweat. It showed in the dough and does show today.

If you have these doughs, especially with a cold temperature—whenever you get one of those doughs that glisten, that shine will not get off and you have these small blisters. They do not need to rise, sometimes when they do rise, you know you are going to have trouble. But if they show on the surface, that is a dead-sure indication of your flour being absolutely fresh and new, and if that is the case, a small addition of limewater will do wonders in your dough. Slack 20 pounds of ordinary building lime in a 50-gallon barrel of water. Then use about from one to one and one-half gallon of this limewater per barrel of flour. In other words, that has the property of taking off that superfluous moisture which is contained in the new flour, and I think that is the reason. I think it is an expression that we should not tolerate today any more, "flour that sweats." It used to be used some 35 or 40 years ago.

PRES. PATTERSON:
I heartily agree with Mr. Stadelhofer on the question of sweat. It is such an unknown factor, as far as we are concerned. Mr. Anderson, what is your experience?

MR. ANDERSON:
I disagree with Mr. Stadelhofer. My experience has been about the same. It is a thing I don't know very much about. The trouble was in my storing facilities. I think the moisture in the flour is evaporated and later we find that the flour has lost a certain amount of weight. The moisture in the flour has gotton away and I think that is the sweat. If the flour is matured, if it works okeh so that is the only thing I fear in the shop is sweating flour. * * *

PRES. PATTERSON:
Did anybody else have any experience with sweat? Are there any questions to be asked about it? How many think that 90 per cent of the bake-shop trouble is due to improper fermentation? Hold your hands up.

(Hands go up.)

Then, if we correct our fermentation, we get good bread. How many are in favor of that? (Hands go up.)

That being the case, does not that throw some reflection on this problem of sweat as to its importance? We do not want to overlook any factors that are giving us trouble, but let us be sure that they are factors of trouble before we worry about them. Mr. Anderson expressed his experience about his work and his observation. During that time, Mr. Anderson, did you try to alter your fermentation in order to get good bread?

MR. ANDERSON:
I had to. I had to change the acidity in my dough. When I changed the acidity in my dough, I got good results. My experience has been in the line that when you start to monkey, you monkey and don't know where you are at. I appreciate the comment "turn everything upside down." That is all right if you get back right. My attitude is, if you invite trouble you will get it, SO why not let it alone? I would like to hear from some of the men from the mills, the millers. I think we have less trouble because the miller has discovered that he is better off by reserving a certain amount of old wheat, and when the new crop comes in he knows how to mix it. I have seen the milling of grain in California, and I know that when that came on we were all waiting around and did not know what was what. I think we ought to have some of the millers express their opinion. It is just like a sickness you got to go through, and I say go through it as quickly as you can.

MR. THOMAS:
Mr. Stadelhofer made a remark a little while ago that is quite significant, and that is that the millers are learning more about milling flour to suit the bakers' needs all the time. If you want to get to the bottom of this question of flour that is satisfactory to the bakers ' use, you have really got to go back farther than has been mentioned here today. You have to go back to the blending of the grain. There is the secret. The millers, as they are operating today, are taking the grain as it comes from certain localities, mill this grain into flour and thoroughly test the flour before the grain is placed in any certain wheat mix.

This testing of course consists of all the information we can get from the chemical laboratory, but what is more important, we are going into the actual baking characteristics of that flour, and from the results we get from the chemical laboratory, together with the characteristics that show in the bake, we take that wheat and allot it to certain mixes.

Now, if grain comes through that from all physical characteristics, and sometimes from chemical characteristics, seems to be perfect, it should go, judging only from those two standards, into certain baking mixes, when the actual baking does not come up to standard. Once in a while you find out that those flours will not bake. We are taking that wheat and keeping it out of the bakers' mixers. So I think that accounts a whole lot for some of the statements that Mr. Stadelhofer made, that you are experiencing less and less trouble from year to year as you slip into the new crop.

It is true, however, that we are doing exactly what Mr. Anderson says—that we are carrying a stock of old crop wheat, and instead of simply jumping off from the tail end of the old crop into a large percentage of new, we are blending it in, starting with a small percentage and gradually increasing. Now, that helps you to slip into the new crop without baking difficulty.

There is one characteristic we have found in the Southwest flours that has not been brought out, and it is important. It is important from this standpoint: there are a lot of bakers who are buying on fixed chemical specifications. It is

true, if you use the same Southwest wheat mixes that you were using last year, and take the same mill extraction, the ash in the resulting flour will show two or three points higher. This is true with exactly the same mill steams going into that flour. It simply means that the southwestern wheats have a correspondingly higher mineral content. You can expect a little higher ash. Whereas some bakers will insist on receiving the same low ash, if they only realized that if they are getting the same mill extraction they are receiving a flour, altho it has a little higher ash, it is just as white and just as bright and it is really a stronger baking flour. So the bakers should not make the mistake of insisting on a very low ash, because if they do they are merely requiring the millers to mill out of the flour certain baking satisfaction.

Now, as far as the northwestern crop is concerned, it is a little early to give a complete picture. We haven't as yet a complete cross-section of what the entire crop offers, but it is true that the maturing of the grain took place under practically the same weather conditions as it did in the southwest. It matured in very warm, dry weather. That makes for a good, strong, stable flour and everything that we have seen in the northwest indicates that you are going to get that flour this year from the northwest.

I might go a little bit farther and tell you something about the characteristics of the grains in the various parts of the wheat belt. But really that is our problem and we have to study that very carefully, and after we get that information, then we do our blending to give you a flour that will act uniformly.

We want the bakers to feel that we are in this game with them and that we are going to play the game with them, and all the intelligence that you have in your shop, we are going to try to use, because the only way we can interpret our product is in your finished product.

MR. WAHL:
Mr. President, I would like to carry Mr. Thomas' remarks a little farther in reference to ash. I think our society, our organization, would do the industry a great benefit at this time if we would show some of the bakers who buy flour that the ash test is not important. I think that we ought to bring that out in our next publication and make an issue on it, and I would like to put that in the form of a motion: whether we ought to consider the ash test in buying flour or whether we ought not to. I think it is important and it should be decided. I mean that we should throw some light on it and show the baker it is not as important as he has believed it to be in the past.

PRES. PATTERSON:
How many bakers in the audience believe that the ash governs the fermentation requirement of flour? How many believe it has no effect on fermentation?

MR. ANDERSON:
Would it be possible to have one of the men who are well up in milling to explain to me and everybody else here just what ash means, because I think that many of us, years ago, were led to believe that ash really meant more than it does?

MR. THOMAS:
Let us study a grain of wheat; the nearer you go to the center of the wheat grain, the lower will be the ash content and also the lower the quantity of protein. As you go from the center of the wheat kernel out toward the bran, your ash content increases. Naturally, the lower grade flour, or the flour taken next to the bran, has the higher ash. This matter of ash is important because if it goes too high, it indicates
that you are really getting your flour from that part of the grain. You will find out in every crop that somewhere between that center of the wheat berry and the bran, there is the best mix of that flour to give you the most satisfaction. Now, that is the problem we have in every crop, but, to get more elasticity, and the greater stability in your flour, it will usually require quite a bit higher ash than the ordinary baker would think. Does that explain it?

MR. ANDERSON:

Yes. In your opinion, what does ash mean to the baker? Does he need that information?

MR. THOMAS:
I think ash is a splendid check for uniformity after you have found out just what you want.

MR. WAHL:
During the war, when we had to use substitutes in large quantities, I found a flour that ran approximately 14% dry gluten. That same flour ran 63-100ths per cent of ash. Nearly every baker who was approached, to purchase that flour, would not have anything to do with it, due to the high ash content, 63-100ths per cent. When it came down to the final analysis, the ash in that flour, the mineral salts which compose that ash, was very beneficial in helping the fermentation of that high percentage of dry gluten, with the result that this high percentage of dry gluten helped to carry the large amount of substitute that we had to use. Now, it was this information or lack of knowledge on the bakers' part that helped them use very good flour at that time, due to a wrong understanding of the scientific aspect.

MR. HERBERT:
My conception of the ash situation is that it has been decidedly overdone, possibly through the sales organization of some millers during the early days. I think the ash content is very important to the flour mill. To the baker, it gives him some slight indication of the grade of flour that he is obtaining. Aside from a certain protection in that respect, I don't see that he gets much benefit out of it. It is helpful to the mill in maintaining their grade.

PRES. PATTERSON:
I have always considered the ash content of flour a secondary factor. In buying flour, the final consideration of a flour is its fermentation qualities or its adaptation to your particular conditions, its absorption and its color. It is true that the color of flour is indirectly controlled by the ash content. If the ash goes up, the color of your flour becomes duller, but after you have once purchased your flour, the ash content is a protection on the delivery of a grade of flour the same as you have purchased. If that ash fluctuates two-hundredths of one per cent each way, that is too large, or if you are buying on 42 ash content and it goes to 45 or 46, then you have an opportunity to complain to your mill about the longer extraction of the flour delivered on your contract. As far as the ash content giving any information as to how to handle the flour in your bake-shop, I have never seen a case where the ash content was an indication as to how to handle flour or as to the fermentation.

MR. FRANK GROUT:
President Patterson, I think Mr. Thomas and the other gentlemen have covered that subject pretty thoroughly, and I am of about the same opinion as they are. I have never experienced that ash has any great bearing on the differences in fermentation, unless it gets up exceedingly high, and I think it has been overdone.

MR. TODD:
I think some of the laboratories were a little misleading on the question of ash.

MR. PIRRIE:
Mr. President, Mr. put a question to me about as clearly as he could. This is a sample. Suppose that a mill sends you a sample or a load of flour. That flour is perfectly satisfactory to you and it has an ash, say, of .42. Now, suppose that that mill later on finds that by changing its blend, that it can give you a better flour. It is easily possible that in the change the ash has been raised. Are you going to condemn that better flour because it has attached to it numerical value which has only an indirect relationship? Now, there are a good many bakers who will condemn, undoubtedly, that ash flour. I would like to make this suggestion—to put it in some practical form—get somebody of the milling industry to write you as short an article as possible on what the ash means to the baker. Get somebody in the baking industry or a member to write a similar article to the millers.

A MEMBER:
Do they buy flour on ash, or do they buy flour to get results after it gets into the shop?

PRES. PATTERSON: There are quite a few buy on ash content.

A MEMBER:
If they are getting good results in the shop, why should they criticize ash content?

MR. KRANTZ:
I almost feel that I should rise in defense of the ash test. I don't believe that ash within itself has any effect on fermentation, within limits, but I think the ash test performs a great mission in telling us what extraction we are getting from a particular flour. I suppose our only salvation as bakery engineers is to get a more thorough knowledge of what ash is. If we are going to make the statement that ash is of no importance, we are going to run great danger in going too far, as the industry did a year ago by giving too much importance to ash. I suppose we are absolutely at a loss to state in a few words just the importance of ash in that regard. To give my opinion of that in a few words is this: that we should consider the comparison of the ash content and the protein content, and by a thorough understanding of what they mean, we shall have no difficulty in judging the quality of the flour in accordance with that.

While I am on my feet, I would like to say this regarding milling and service to bakers. Yesterday, here, we had Mr. Smith from Idaho, and he was rapping the machinery people severely for putting out machinery that gave the bakers trouble. Years ago I think the millers were doing much more harm to the bakers by sending out new or flour made directly from new wheat, and through the difficulties of the bakers, they learned a lesson and they blend the wheat as Mr. Thomas has explained to us, and I think the millers are doing the bakery industry a great service in that regard by carefully blending new and old wheat at the change of season, and I think they have a lot to learn in that line yet. I will say personally I had no trouble with new wheat this year. Last year I had considerable trouble, and I will say this, that by raising the temperature up to 86, I saved a great deal of trouble that I had last year.

PRES. PATTERSON:
Mr. Krantz, we want to emphasize the fact—at least, we don't want the members to go away thinking that we do not put any importance on the ash content. It was stated that ash content is a protection on the grade of the flour purchased. The important question to consider is whether or not the ash had any effect on the baking. We also must give the miller a certain working tolerance, and not hold him to an ash of .42 or .43. The miller must be given working tolerance on the ash and when you buy .42 ash, I think that should be taken into consideration.

I think, if I may take up the ash question directly, it is this: the present wheat crop is going to deliver to you the same grade of flour at a higher ash content than last year, and it is the millers' desire that you know that in advance. It is not an attempt on their part to give you a flour of a lower percentage. I believe that we all should be very heartily in favor of that move. If Mother Earth produces wheat that has its mineral content distributed a little differently throughout the wheat berry, and we cannot so quickly adjust our mechanical process to meet it, as long as it hasn't any harmful effect on the flour for baking, I think we should be reasonable and be grateful that we have supporters in our milling friends who will produce good, high-grade flour for bread as they have in the past.

(Motion by Mr. Todd.)

PRES. PATTERSON:
It has been moved by Mr. Todd that we have a miller write an article explaining of what value the ash is to the baker, and also have a practical baker write an article of the same nature, handing it to some neutral party to act as a clearing house, and give us an impartial answer. Motion was seconded and carried.

How many would like to have discussion on the effect that the quantity of protein has on the baking quality of flour? As we have experienced this year wheat with a very high protein content, and in our past conversations and discussions here we have learned that there is not much difference in the fermentation requirements of this year from

those of last year, it seems reasonable to conclude that, at least as far as this year is concerned, the higher protein content is not having a very great effect upon the fermentation of (dough). I believe there has been the idea of bakers in the past that the higher the protein content, the longer the fermentation period. Is that about correct, Mr. Stadelhofer? How many have that idea, that the higher the protein content, the longer the fermentation should be to get the same results, keeping your formulas and temperature in each case the same? This crop seems to have demonstrated that at least does not function properly or in that direction every year. We will have Mr. Anderson give us his idea on the effect of protein on fermentation requirement.

MR. ANDERSON:
My opinion is the higher the protein, the more fermentation you have to give it. My reason for that is that the more protein you have, the closer or the stronger extraction of flour you have; consequently your elasticity of the gluten is a little harder to break. That is my opinion, and **I** always try to work it to that. The shorter patent flour **I** used, the lower gluten **I** had, but it was also of a better quality. When **I** go into higher protein flour, **I** gen**erally give** more fermentation, and **I** generally get a good result. **I** don't know if **I** am right. That has been my experience.

PRES. PATTERSON:
I think we ought also to be careful in our idea of the meaning of the extraction of flour. We had that discussion up in March, and it was pretty definitely settled here. Most of the mills in the northwest have one extraction figure, and that is the total amount of flour derived from a given weight of wheat. Other mills figure each grade of flour on the extraction basis. The fellow who is using the one extraction figure to get a certain amount of flour from a different amount of wheat uses percentage of flour and not percentage of extraction; and there is sometimes a confusion of figures arrived at on these different bases.

MR. GROUT:
Answering the question, I think that that is true in a great many cases, Mr. Patterson. However, we have found, this year's crop particularly, that a good many of the higher protein flours do not have the baking qualities of some of the low gluten flour. So we have disregarded the protein standard, more or less, and are relying more or less upon the qualities of that particular protein. It is true that if you find a high protein wheat with a very good quality of protein, it naturally will take longer fermentation.

PRES. PATTERSON:
I think that is a very good thing to suggest, and I want to caution you at the present time not at all times to judge your fermentation from the amount of protein the flour has, because, just as Mr. Grout said, you find that with a low protein flour you get better results than with a high protein flour.

MR. THOMAS:
It seems to me that the factor that is more important to the baker than this matter of how long it takes fermentation, where it reaches a point where you can get good bread, is this factor: that, after you reach that point, what is the stability of your flour or how long will it lay and still make good bread. I don't know of any better term to call it by than merely the stability. I don't mean that the fermentation is not important—it is very important— but how long has it got to go on to properly mature? How long a period of insurance is there in it?

PRES. PATTERSON:
I think this year's crop is going to have a wider period of tolerance than last year's crop. If you have a large fluctuation you can have fifteen minutes or twenty minutes.

MR. STADELHOFER:
In other words, so far as the protein content is concerned, we might illustrate it this way: that you develop—it depends upon the development of that gluten and naturally affects the length of fermentation of that dough. I don't think we can give you any definite explanation of that. In other words, each one of you try to establish his own standard, and it is only practical experience will teach, us that. We may go on for two weeks with certain flour and

get good results, and we apply one of these laboratory methods in a practical way and we don't get it. Therefore, it is up to us individually to establish that standard when that gluten is developed to that point and not to develop it over that point; that when the dough is separated into a thousand pieces and put through the various machines and into the proofer, that gluten has been injured to that extent that there is nothing left in the final stage or in the baking stage in the oven. You may have reduction of gluten and developing perfectly up to that stage where you divide it into pieces, mold your bread, and then have to prove it and get bad results.

What Mr. Patterson means to say, and what I also mean to say, is that in this flour we have a much greater time limit in which we can still give good bread, than we had formerly. Therefore, it is always safe beyond the peak, but from the right side of the peak—not from the wrong side of the peak. In other words, it is much safer to have some reserve strength left in the final proving of the loaf and the baking of the loaf.

A MEMBER:
When the new flour comes in, if you have trouble, you have got three kinds of flour to find out what the trouble is, whereas, if you have only one kind of flour, you. have only one source of trouble. You have first, second and third grade, and blend them right in the shop.

PRES. PATTERSON:
You might mean that the miller was using 75 and 95 and 100 per cent flour—on that basis —blend them all together.

ANOTHER MEMBER:
We do that a great deal in Canada, blending the grades. I don't think it is common over here. We blend a short with a middle patent.

PRES. PATTERSON:
I don't know if I can exactly answer that question.

MR. STADELHOFER:
I had a case recently where the baker claimed that he had trouble; also there was only one flour in there, and here is what I did to find out. He said he had used good flour for years and never got into trouble, but now he was getting into trouble. I went to work and made three little doughs of five pounds each from each one of those flours, and it was a very easy matter to find out which one of the flours gave him the trouble. We cut that particular flour out and the trouble was ended. He said, "What about this flour? I am going to send it back." I said, "No, you won't; not by any means. You just let this flour lay for a while and it will work just the same as it worked years before."

This is such an easy matter for the average baker to do; just a little hand dough, five pounds. Be exact. Use three pounds of water; 62 ounces of yeast; three ounces of sugar; two ounces of salt, and nothing else, and make that dough, but be careful that you are fair to each one of these flours, and then find out how they act singly. And if you have one of those blends in your case—the gentleman referred to three grades—it is simply a way of interpreting to himself the flours that he had. In that case, if you find that you have trouble, if you test out these three flours singly in small batches like that, you can easily tell.

PRES. PATTERSON:
As it was announced yesterday, this is not our annual meeting, and we want to emphasize that the Society was formed to help the production manager in every way possible. We want you all here for this meeting with the idea that you are going to get all the help you asked for, but you are not going to get any that you don't ask for, that we don't know about. We do not know your problems. We would like you to come to the annual meeting next year impressed with the idea that if you come and want something, that you can get it for the asking. It is perfectly logical for you to think that we cannot give it to you unless you allow us to know your problems. There are not so many secrets in the baking industry today as there were supposed to have been years ago. Consequently, we are all out to

help each other, and all the information we can pass on, we are perfectly willing to do it, and we want you all to go home and tell all your associates and your fellow members what we are going to do when we meet at our annual meeting at Chicago in March, 1926.

This meeting is adjourned.