

TWENTY-THIRD ANNUAL REPORT

OF THE

State Food and Dairy Commissioner

TO THE

GOVERNOR OF THE STATE OF IOWA
FOR THE YEAR 1909

H. R. WRIGHT

STATE FOOD AND DAIRY COMMISSIONER

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LETTER OF TRANSMITTAL.

TO HIS EXCELLENCY, B. F. CARROLL, GOVERNOR OF IOWA:

SIR:—In compliance with the law, I have the honor to submit herewith the Twenty-third Annual Report of the Food and Dairy Commissioner.

Very respectfully,
H. R. WRIGHT,
Food and Dairy Commissioner.

DES MOINES, November 9, 1909.

OFFICE OF STATE FOOD AND DAIRY COMMISSIONER.

H. R. WRIGHT, *Commissioner.*
 B. C. ILIFF, *Deputy Dairy Commissioner.*
 W. B. JOHNSON, *Assistant Dairy Commissioner.*
 J. J. ROSS, *Assistant Dairy Commissioner.*

EXPENSES OF DAIRY DEPARTMENT OF OFFICE OF FOOD AND
 DAIRY COMMISSIONER FOR THE YEAR ENDING
 NOVEMBER 1, 1909.

Commissioner's salary	\$2,000.00	
Commissioner's expense	448.23	\$ 2,448.23
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Deputy's salary	\$1,400.00	
Deputy's expense	184.73	1,584.73
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Assistant Dairy Commissioner's salary.....	\$1,400.00	
Assistant Dairy Commissioner's expense.....	952.14	2,352.14
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Assistant Dairy Commissioner's salary.....	\$1,400.00	
Assistant Dairy Commissioner's expense.....	946.10	2,346.10
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Clerk hire (Food and Dairy).....	\$1,000.00	
Clerk hire (Food and Dairy).....	900.00	1,900.00
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Janitor hire (Food and Dairy).....	\$ 260.00	260.00
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Milk agent's fees.....	\$2,165.00	
Milk Agent's expense.....	124.47	
Milk agent's special work.....	146.75	2,436.22
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Office expenses.....		101.24
Express, freight and cartage.....		176.12
Telegraph and telephone.....		159.63
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		\$12,764.41
Less salaries which are not paid from specific appropriation.....		8,300.00
		<hr/>
		\$ 5,464.41

REPORT OF COMMISSIONER.

The law creating the office of Dairy Commissioner requires an annual report to the Governor of the state covering the dairy business of the state. Later enactments make this department responsible for the enforcement of the following laws:

PURE FOOD LAW,
 PAINT AND LINSEED OIL LAWS,
 CONCENTRATED FEEDING STUFFS LAW,
 CONDIMENTAL STOCK FOOD LAW,
 AGRICULTURAL SEEDS LAW.

The foregoing statement of expenses of this department includes all the salary and expenses of the commissioner and the deputy, and salaries of clerks, though only a minor portion of their time and services can be devoted to the work or connected with the dairy business. The law authorizing the employment of inspectors under the pure food law and providing for their compensation specifies the duties that they shall perform, their services are authorized for the specific purposes of the food law. On the other hand the dairy assistants could often do valuable work along the other lines but their time is more than occupied with the creameries. It is recommended that future legislation should authorize the employment of a certain number of inspectors, all to be paid from the same fund and to perform any of the duties of the department. The food law was passed at a time when the situation in the state was particularly bad as regards the foods then on the market and it was certain that an enormous amount of work was necessary at once. Inspectors were appointed in exact accordance with the letter of the law and devote themselves exclusively to the enforcement of the food law, including the statute relating to oleomargarine. Later the other laws mentioned above were added to the duties already imposed. The commissioner has preferred to act in exact accord with the statute and leave it to future sessions of the legislature to change the statutes if such change is deemed wise, and not to try to change them by a strained construction placed upon them.

In the report of a year ago attention was called to the desirability of additional help for the dairy work in this state but by reason of the efforts of the State Dairy Association to get an appropriation it was not thought advisable to press such recommendation to the attention of the general assembly.

The law passed appropriating money to a board of seven, of which the executive officers of the State Dairy Association make four, and the director of the Experiment Station, the Professor of Dairying and the State Dairy Commissioner the others, is given elsewhere in this report. The laws under which the assistant dairy commissioners were appointed were intended to affect mainly the creameries and then indirectly their patrons. The new law is evidently intended to touch the producer of milk and cream and the board has responded to this idea by selecting for the work Mr. H. G. Van Pelt, a dairy expert rather than a creamery expert. This work ought to have the warm support of every dairyman in the state and of course every creamery man as well.

The one marked feature of dairy development during the last twelve months is the fact that there is an immense increase in the interest in dairy bred cattle. While for years the dual purpose cow has been the choice of most Iowa dairymen, there is now a considerable change of sentiment and an increasing interest in the securing of better cows of whatever breed, and a real increase also of the desire for special purpose dairy cows. It is not too much to foresee that that interest will increase and that it will make for a very considerable permanent addition to the dairy industry of the state. So long as the average production per cow is about 140 pounds of butter per annum, there is quite evidently great room for improvement and the future looks promising in every respect, and particularly in the direction of improving the dairy cows of the state. In this work the State Dairy Expert will necessarily be a great factor and the State Dairy Association will be charged with great responsibility and will have great opportunity for advancing the interest which it represents.

Both the central creameries and the local creameries report improvement in the quality of the cream received, a report which is strengthened by the reports from the butter markets of the improvement in the quality of butter received. There is no special or particular reason that can be alleged for this improvement except that nearly everyone has been making efforts for the improvement of the raw material that comes to our creameries of various kinds, and during this year the effect of those efforts has been suf-

ficient in amount to attract attention. The railroads also report a smaller number of cans of cream sufficiently sour and yeasty to boil over in transit. The commissioner, while not at all minimizing the necessity for very great improvement in the quality of milk and cream, does not believe that the quality of milk or cream was ever generally or uniformly objectionable. Too many people give too great weight to occasional situations and find it easier to see the objectionable side of things than that side which is the best and most desirable. In the nature of things this must have been true in the creamery business because the proportion of butter made that is above a moderate score has always been very considerable. Nor is the common excuse a good one that says the cream at a creamery cannot be improved because if rejected the patron simply goes elsewhere and no good is effected. A circular letter sent to the local creameries of the state brought 139 answers. Two of the questions were, "Have you been obliged to reject any cream on account of its bad quality?" and "Have you lost any patrons because of rejection of their bad and unwholesome cream?" To the first question 103 answered that bad cream had been refused at their creameries, of which 45 had lost patrons thereby, but the small amount of cream rejected and the small number of patrons affected is shown by the fact that of the 45 creameries that had lost patrons, one lost 20, another 11, another 7, and most of them but one or two. This seems to indicate that while patrons were lost by the practice the number so lost was negligible in the ordinary creamery. It is believed that the manager and butter-maker can, if they use sufficient vigor and tact control the delivery of milk and cream. At any rate there are plenty of creameries where they are doing it successfully, the advancement of quality reported seems to indicate that such success is more general than heretofore admitted. But there is still great need for continued effort on the part of the creamery management to improve the quality of their product.

Some effort was made to interest the legislature in some remedial legislation, or that which would make more definite the criminal laws now on the statute books relative to selling to a creamery milk or cream that is unwholesome or filthy but nothing was seriously considered. It is not at all probable that any legislature will enact a law that will enable a state official to have a patron fined for delivering cream that is simply not the best, and the law we have now is strong enough for food products. There is a wide difference between cream that is unwholesome and that which is

the ideal of the buttermaker. The cream may be too sour, or have bad flavors or odors or the cans may not be ideally clean and the cream still not unwholesome in the sense that it would make anyone sick or that it is dirty or filthy. Such cream would be undesirable but it is too much to believe that the general assembly will ever make it a criminal offense for a farmer to bring such cream to the factory. The improvement of quality must be done by the creamery managers, and by the buttermakers, through education and instruction and refusal to take that which does not meet the approval of the management. Fines and penalties will be reserved for those who bring cream that is decomposed or filthy.

A group of creameries, most of them in Worth county, have organized for the purpose of employing an expert, who is to go among the creameries and their patrons and work for quality of raw material, increase in quantity of it, the use of better methods of caring for and feeding cows, and in general the upbuilding of the dairy industry so far as it is connected with the ten or twelve creameries in the organization. The expense will probably be about five or six cents a tub of butter and the results and advantages will far outweigh that small expense. The success of this movement will be watched with great satisfaction and there will doubtless be many other such organizations in the near future. Theoretically this movement is in the right direction. The creameries of this state may expect the state to enforce laws, to assist in education and to generally encourage the creamery and dairy business, but it cannot be expected that the state will do that which can more easily and effectively be done by the creamery and which makes for the immediate and sole benefit of the creamery.

The condensed milk factories in this and other states have for years followed the policy of employing an expert to instruct their patrons and to assist them not only in producing the very best quality of milk, but also to assist them in producing increased quantities of it and such policy has been found uniformly successful. There seems no reason to suppose that the same policy vigorously carried out will not very greatly improve both the quality and the quantity of the milk and cream produced.

Another bill which did not become a law was a bill providing authority for owners of cream cans registering a distinctive name or mark and providing penalty for the stealing of them or for their use by any one not their owner. The central creameries usually own the cans in which the cream is shipped and they report considerable losses of cans and considerable confusion arising from

the use of their cans by unauthorized persons, sometimes for purposes other than transporting cream. It is evident that such losses must be borne by the producers whose products are handled and that to lessen such losses would be for the benefit of the producers as well as the manufacturer of the products. Such a law is already on the statute books to cover about all returnable containers except cream cans, and a cream can is the most expensive returnable container now used in this state. The bill was passed by the Senate but was lost on vote in the House. There are about forty creameries in this state that do a strictly centralizing business, that is receive their cream largely from a distance by rail or other conveyance, and there are 77 others that receive more or less of their product by rail, so that such a statute as proposed would affect a considerable number of our creameries.

The statistical tables given elsewhere in this report show that the creamery butter manufactured in this state during the year ending July 1, 1909, amounts to 101,907,316 pounds, which was made from 413,000,000 pounds of milk and 279,000,000 pounds of cream—all of these figures being reported by 512 creameries. The creamery list shows a larger number than this, there being 29 skim stations in the state, the product of which is, of course, reported from their respective creameries. It is estimated that approximately 18,000,000 pounds of butter is made from milk and 83,000,000 pounds from cream. Of this butter the creameries report 10,380,497 pounds consumed at home and a little more than 90,000,000 shipped outside the state.

There are still 51 creameries in this state receiving nothing but whole milk and 135 creameries that receive both milk and cream and 357 creameries that receive nothing but cream, and the tendency seems to be rapidly in the direction of eliminating the whole milk system altogether in this state, as appears from figures given above. Only 17½ per cent of the creamy butter product is made from milk.

It is not possible to make any hard and fast definition of a centralizing creamery, for the reason that 117 creameries now receive some cream by rail. There are, however, 41 creameries in the state which, in the opinion of the commissioner, are properly classed as centralized creameries. They cover practically the whole area of the state with their cream agents and advertisements for business and they make from 150,000 to 5,000,000 pounds of butter each—an aggregate of 36,000,000 pounds. It follows that the strictly local creameries make 65,000,000 pounds per annum. The

central creameries average 900,000 pounds each and the local creameries average 140,000 each. More than half the creameries of the state are co-operative—292 being so listed by their managers and 78 creameries as stock companies, most of which operate on a co-operative basis. The number of individually owned creameries is 167, which includes the 41 centralized creameries mentioned above. There is one creamery at the Agricultural College at Ames which is state property and there are three condensed milk factories in the state at Waverly, West Liberty and Perry respectively.

Great pains have been taken to make the creamery list accurate and complete up to November 1, 1909. The statistics given are for the year ending July 1, 1909, and are as accurate as possible to be obtained. The number of creameries is approximately the same as last year, there having been few changes in the creamery list and those mainly due to the unavoidable errors in previous reports. The fact that so few changes have occurred seems to indicate that the causes for the closing of so many creameries which have heretofore operated in this state, seem no longer to be effective in closing the smaller creameries. It is also a fact that the relations existing between centralized creameries and local creameries are not so strained as heretofore and those interested in either of these systems are devoting their energies to the management of their respective businesses and the upbuilding of the buttermaking industry in Iowa in general. It is not too much to predict that at least in the immediate future the energies of the creamery people of the state will be devoted not to controversies among themselves but to the encouragement and development not only to buttermaking but the dairy interests in general.

FALSELY MANIPULATING THE BABCOCK TEST.

An extraordinary number of complaints have, during the past year, come to this department to the effect that operators of the Babcock test have been reading the test much higher than the facts warrant, and have by this means been obtaining business upon an unfair basis. Such complaints come to this office not only from managers of local creameries and from cream buyers in competition, but they also come from managers of centralized creameries who find their agents paying for much more butterfat than they receive. Such inaccuracies in testing may be due to lack of knowledge on the part of the operator of the test, but as a matter of

fact most operators of the test are very well informed as to the method of its use and if they fail to get reasonably accurate results such failure is by reason of carelessness or of willful manipulation.

The theory of the statute providing penalty for willful and fraudulent manipulation of the Babcock test is that the operator of the test shall be held responsible for the results which he gets, and that if he does not get correct results it is because of intention on his part to make them wrong. Considerable work has been done investigating complaints of the kind referred to and several successful prosecutions have been undertaken, though very great difficulties stand in the way of inflicting penalties upon those who raise the test and hence pay for more butterfat than is delivered. One of the persons prosecuted was a cream hauler at Dumont. His duties were to go over certain routes and collect cream from various patrons on the routes and to sample cream so collected after weighing. It was discovered that the samples of cream delivered by certain persons always tested very high and that upon the whole days collection there was very considerable shortage. Later it was ascertained that a certain delivery of cream actually tested less than 15 per cent, whereas the sample in possession of the cream hauler tested 41 per cent. The cream hauler was arrested and charged with falsely manipulating the Babcock test although he actually had nothing to do with the testing of the cream further than taking the sample, and was promptly fined \$25.00 and costs. The persons whom he had favored and evidently who had conspired with him for this purpose reimbursed the creamery company \$150 and further prosecutions were abandoned. Of course, the sampling of the cream is a necessary part of the operation of the Babcock test and as everybody knows may result in tests too high or tests too low at the pleasure of the one taking the sample. The suggestion is made that creameries employing cream haulers should check up their delivery in order to avoid not only exceptional cases of the kind above set forth but also to avoid carelessness on the part of the cream hauler.

The best interests of the dairy business will be served so far as the matter of testing is concerned when every test is accurately made. To raise the test when paying for a can of cream does not seem to most people to be very criminal. The cream agent who so raises the test takes money from his employer and gives it to the person to whom it does not belong and he does still greater injury to the dairy business as a whole because he arouses suspicion of the

correctness of the Babcock method of determining the amount of butterfat present. There are many people in the state who decline to produce and sell cream because they are unable to believe that they are getting a square deal in the payment for the same. For these reasons, the statute provides the same penalty for the raising of the test as it does for the cutting of it.

The system of buying cream and permitting the buyer to sample and test it either at once or later is a system long established in this state. The employment of cream agents on the part of the central creameries is almost universally practiced and such has been the case for several years. There is no reason to suppose that any radical change is likely to occur in the manner of doing business either on the part of the central creameries or the local creameries. There should be every effort possible put forth on the part of creamery managers, buttermakers, cream purchasing agents, and others to insure perfect sampling and accurate and correct reports and payment for the butterfat present in every can of cream sold, and such practice will be for the benefit of the creamery manager, the producer of cream, and the dairy interests generally.

ANTI-DISCRIMINATION LAW.

Prior to the season of 1909, numerous complaints came to this department from local creameries alleging that outside competitors made a practice of temporarily offering for butterfat a price higher than that usually paid either by the local creamery or the price paid by the outside creamery elsewhere, and it was alleged that competition of this kind had succeeded in closing up a number of local creameries that would not have been so closed if competition had been on a fair basis. This condition was not found alone in Iowa, but in all the states where both local and centralized creameries were found.

The states of Wisconsin, Minnesota and South Dakota have statutes similar to the following Iowa law enacted by the legislature of 1909. The statute became effective July 4th of the current year:

CHAPTER 222, ACTS OF THE THIRTY-THIRD GENERAL ASSEMBLY.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That the law as it appears in section five thousand twenty-eight-b (5028-b) of the Supplement to the Code, 1907, be amended by adding after the period at the end of said section the following:

Any person, firm, company, association or corporation, foreign or domestic, doing business in the State of Iowa and engaged in the business of buying milk, cream or butter fat for the purpose of manufacture or of buying poultry, eggs or grain for the purpose of sale or storage, that shall for the purpose of creating a monopoly or destroying the business of a competitor, discriminate between different sections, localities, communities, cities or towns of this state by purchasing such commodity or commodities at a higher price or rate in one section, locality, community, city or town than is paid for the same commodity by said person, firm, company, association or corporation in another section, locality, community, city or town, after making due allowance for the difference, if any, in the grade or quality, and in the actual cost of transportation from the point of purchase to the point of manufacture, sale or storage, shall be deemed guilty of unfair discrimination which is hereby prohibited and declared to be unlawful; but prices made to meet competition in such locality shall not be in violation of this act, and any person, firm, company, association or corporation or any officer, agent, receiver or member of any such firm, company, association or corporation found guilty of unfair discrimination as defined herein, shall be punished as provided in section five thousand twenty-eight-c (5028-c) of the Supplement to the Code, 1907.

The penalty fixed in section five thousand and twenty-eight-c (5028-c) is a fine of not less than \$500 nor more than \$5,000, or imprisonment in the county jail not to exceed one year or both penalties.

In order that the statute might be better understood a circular letter as follows was sent to the manager of every creamery in the state about August first:

SIR:

I am in receipt of your communication of the 3d inst., requesting an interpretation of Chapter 222, Acts of the Thirty-third General Assembly which amends section 5028-b of the Supplement to the Code 1907, relating to unfair discrimination. You request to be advised specifically:

1. As to whether the Act requires a purchaser of cream to pay the same price to all persons throughout the state on the same day.
2. In the case of a cream purchasing agent, buying cream in the locality where there is a local creamery, is the cream purchasing agent permitted to pay a higher price in that locality than is paid by his employer elsewhere, and if so to what extent.
3. If the purchaser raises the test on butter fat above what is actually shown by the test would this constitute a violation of the Act?
4. Is the Food and Dairy Department charged with any responsibility in the enforcement of this statute?

1 and 2. Your first and second questions are so closely related that they may be answered jointly.

The purpose of the Act was to prohibit any person, firm, company, association or corporation doing business in this state and engaged in the business of buying milk, cream or butter fat for the purpose of manufacture, or of buying poultry, eggs or grain for the purpose of sale or storage from destroying the business of a competitor or creating a mono-

poly by paying different prices in different parts of the state for the same grade and quality of the article purchased after making due allowance for the difference in transportation from the point of purchase to the point of manufacture, sale or storage. The thing prohibited by the Act is the discrimination in price for an illegal purpose, viz: For the destroying of competition or the creating of a monopoly. The Act itself, however, permits the paying of a different price in one place than is paid generally by the same person at different points throughout the state, provided the change in price is made in good faith to meet competition in a particular locality.

3. The payment of a different price than that generally paid throughout the state for the same article, considering the difference in cost of transportation, by the indirect method of fraudulently reading the butter fat test is as clearly illegal and a violation of the Act as though a different price were paid in the regular way, provided that this is done for the purpose of destroying the business of a competitor or creating a monopoly.

4. The enforcement of this Act is by section 5028-e of the Supplement to the Code, 1907, especially enjoined upon the county attorney and the attorney general.

I conclude, therefore, that the only duty incumbent upon you in reference to this Act is that which necessarily results from the nature of the Act and its relation to your department.

Considering that complaints for violation of this act will constantly be presented to your department, I suggest that you refer all such complaints to the county attorney of the county where the law is violated, and also to the department of justice.

June 4, 1909.

H. W. BYERS,
Attorney General.

H. R. WRIGHT,
State Food and Dairy Commissioner.

It must be noted that the enforcement of this statute is by law imposed upon the county attorneys of the respective counties and the attorney general, and that complaints of its violation should be properly addressed to these officials. The state also has laws requiring the county officers to investigate complaints and prosecute offenders.

The impression that the law is intended to destroy or prevent competition is entirely unwarranted. The impression that the statute prohibits absolutely a creamery from paying different prices to different individuals is not correct. Careful reading of the letter of the attorney general is invited on this point. For example, if a local creamery's price on butterfat is 25 cents and that of an outside creamery at other points is 20 cents, it is manifest that a law prohibiting the outside creamery from paying more than 20 cents at the local point would wholly destroy competition be-

tween the two, and competition having been destroyed a local monopoly would be created. No courts anywhere have sustained statutes resulting in monopoly, or which destroy competition. So that a statute specifically requiring the central creamery to pay the same price for all its products would be clearly unconstitutional—a fact pointed out by the best lawyers in the state when the bill was considered in the legislature. It, therefore, follows that the outside creamery may come into the territory of the local creamery and compete with the local creamery, that is, pay as much for butterfat as the price paid by the local creamery.

Numerous complaints come to this office that outside creameries are paying more near the local creamery than the outside creamery pays at home, but we have not received any complaints during the last several months, which would indicate a violation of the statute. While there is still friction between the two competing systems it is believed that at least the existence of the statute has done considerable good. A local creamery can in every case, by giving better service, easily compete with an outside creamery when the outside firm is prohibited by law from paying more than the standards set by the prices of the local concern. At any rate, the complaints that the centralizers were running the local creamery out of business have practically ceased in this state and I believe the same is the fact in other states.

OLEOMARGARINE.

The following statistics of the manufacture of oleomargarine for the several years ending in each case on June 30th, are from the reports of the Collector of Internal Revenue for the United States.

1901	104,943,856
1902	126,316,472
1903	71,804,102
1904	48,071,480
1905	49,880,982
1906	53,146,459
1907	68,988,639
1908	79,107,273
1909	90,621,844

Until 1902 the sale of oleomargarine was under little or no restriction so far as the federal government was concerned except that all oleomargarine paid a tax of two cents a pound and the

manufacturers and retailers each paid license fees. From the figures it will appear that the amount of this product manufactured and sold in this country for the year 1902 was more than the total creamery butter production of the state of Iowa by 25,000,000 pounds, and as practically every pound of it was sold for butter the influence upon the markets can well be estimated. Under the present oleomargarine law, which levies a ten cent tax upon oleomargarine that is colored and only a quarter of a cent upon uncolored, the make of the product immediately fell to less than half the former proportions but has steadily increased under a campaign of advertising and effort on the part of the makers, until the amount again approaches 100,000,000 pounds annually.

When the law was first enacted "uncolored" oleomargarine was nearly white, or of a very light straw color. There is now found on the market oleomargarine, sold as "uncolored" under the quarter cent tax, which has a high yellow color, and would pass unquestioned as butter in any market, so far as color is concerned.

This state has a law which prohibits the sale of oleomargarine "having a yellow color," whether it derives that color from its ingredients or from some artificial source. The Supreme Court, in the case *State vs. Armour Packing Co.*, in the following words, which were the instructions of the trial judge, interprets this phrase:

You will observe that the change in the indictment is not for coloring imitation butter, nor for selling it without it being marked as required, but it is for unlawfully selling it, it having a yellow color. The statute as applied to this charge prohibits the selling of imitation butter, or substitute for butter, having a yellow color. The words "yellow color" here used mean the natural yellow color of butter made from milk, or cream of cows, without any coloring matter having been added thereto. If you find that the defendant sold the firkin and its contents * * * and if you find that the substance is a substitute for butter, you will then determine whether or not it is of a yellow color, as herein defined to you; and this you will determine from your own knowledge, experience or observation, whether the contents of the firkin of imitation butter or substitute for butter in evidence is of a yellow color—that is, of a natural color of butter made from milk or cream from cows.

Commenting the Supreme Court says further: The question propounded to the expert as to whether the substance sold bore the yellow color of true butter was not a matter of expert evidence. The law was not enacted for experts but for the common people, who might be deceived by the appearance of the substitute. Moreover, the product itself was introduced in evidence, and was before the jury. Every one is presumed to know the color of an article which is in such general use as butter, and as to whether or not an article intended as a substitute therefor bears the yellow

color of true butter. Liability to fraud and deceit was the fundamental thought in the minds of the legislature.

From the foregoing it will be seen that there is still much "uncolored" oleomargarine which nevertheless is of such a shade of yellow as to resemble butter and that the sale of it violates the law of this state. Further that the question of the depth of the shade permitted to be used in oleomargarine is only that which does not permit the product to have the yellow color of any butter that might be made from milk or cream of cows.

Heretofore the makers of oleomargarine have sent into this state a product that is nearly or quite white but each year the product increases a little in yellow shade, apparently, and every year there is a considerable amount of oleomargarine found in this state that is of a high yellow color. The attempt seems to be to get the highest possible shade of yellow color and still escape prosecution. While not a great deal of work in the way of prosecutions has been done it is evident that but for the possibility of such prosecution many dealers would sell the highest shade of yellow oleomargarine that they could secure.

The manufacturers of oleomargarine are this year making a vigorous campaign for the further sale of this product. Notwithstanding the fact that all materials from which oleomargarine is made have increased in price yet the finished product is this year sold for less than it was a year ago, and therefore more dealers have been induced to take out retailers' license and start handling the substitute product.

It is quite evident that an attempt is being made to introduce the product wherever possible and that a low price is to be the attraction. The high price of butter and the low price that is being made on oleomargarine are evidently depended upon to still further increase the sales of the substitute product this winter.

Oleomargarine does not compete with butter, but it takes the place of butter nevertheless. While the makers sometimes advertise it as a better article than butter, no real attempt has been made to compete with butter on any such grounds. It is distinctly a substitute for the real article and not a competitor in the strict sense. It is a substitute for butter in another sense, that is it is too often served in restaurants and hotels in the place of butter and so takes the place of butter by fraud and deception.

It is probable that some new attempt may be made this winter in Congress to repeal or amend the present oleomargarine statute which places a ten cent tax on the colored variety and the cream-

ery and dairy people of this state should be aroused and watchful in their own interests. The manufacturers of oleomargarine are few in number but represent powerful and rich corporations. They are fully organized and have immense sums of money at their disposal for the purpose of presenting their claims to Congress. The dairymen of the country, on the other hand, while several millions in number, are but little organized and their influence cannot be quickly and easily made effective. It therefore becomes necessary for every friend of the dairy industry to be active in the support of those who devote their energies to dealing with the oleomargarine question. The National Dairy Union, which secured the passage of the present law, is now as heretofore officered by men whose every purpose is unselfish and who may be depended upon to look after the interests of the dairymen in Congress, provided only they have the support of the rest of us so that their efforts may be effective. The situation is full of possibilities disastrous to the dairy interests of the country, and every support ought to be given to the organization that for so long has given faithful leadership to the butter making interests of the country.

FREIGHT RATES ON BUTTER.

During the last winter a petition of carload shippers was presented to the Western Classification Committee praying a substantial reduction of the carload rate upon butter, eggs and dressed poultry, from Chicago to New York and the seaboard generally. It appears that the Western Classification Committee acts as an advisory committee to the Central Freight Association in New York, which latter association actually has authority over such rates, and in such capacity they advised that, instead of the decrease in the carload rate, an increase should be put in force affecting the rates on shipments in less than carload amounts.

As is well known the western roads all run refrigerator cars once or twice a week over their lines and pick up the shipments of butter made by the smaller creameries until the car is loaded to its capacity. However, if a shipper has as much as 10,000 pounds he may secure a refrigerator car, ice it at his own expense, and have the exclusive use of that car for his shipment to the point of destination. All such shipments that are east bound, whether large or small center in Chicago, and are there turned over to the lines

whose representatives are familiar to every creamery of the state. The freight rates upon such shipments are composed of the rate from the point of origin to Chicago, and the rate from Chicago to the seaboard, principally, of course New York City. Upon all shipments, whether a carload of the minimum of 10,000 pounds or larger, or the smaller shipments of 100 or 50 or 10 tubs the rate from Chicago to the Atlantic coast is at present 65 cents per hundred pounds. That is, the car load shipper has no advantage in freight rate over his smaller competitor so far as the rate from Chicago to the east is concerned. The petition asked that the car load shipper be given an advantage of ten cents a hundred pounds by lowering the rate which he should pay, and the answer made by the Western Classification Committee was to recommend that the car load shipper be given this advantage, but by an increase of the rate of his competitor, the less than car load shipper. Since about 60,000,000 pounds of butter is annually shipped from this state to New York City and other cities in the east, and since this amount of butter ready to ship will weigh gross about 70,000,000 pounds, it will readily be understood that such an increase of rate would increase the freight charges upon butter annually shipped in less than carloads by about \$70,000 with a similar increase for other western butter producing states. And this charge would fall wholly upon the producer of this butter for the reason that no increase in the price received for the butter could be hoped for while the carload shipper could put his butter on the market for less expense.

By authority of the Executive Council of the state the dairy commissioner has twice appeared before the Central Freight Association in New York City and made vigorous protest against the increase of rate proposed. The Secretary of the National Creamery Buttermakers' Association and representatives of other states and of the Chicago and New York butter markets have been active in like manner. Final consideration of the matter has been put over from time to time by the Central Freight Association and and it is now deferred until April 1, 1910. Such action seems to indicate that there is still probability that the rate will be increased unless further action is taken by the western creameries and it is therefore recommended that managers of each creamery of this state write a letter of protest to both the Chicago and New York agents of the line patronized by his creamery.

The rate of 65 cents per hundred upon butter shipments from Chicago to the east was established so long ago that no one now is able to tell when it was first put in. At any rate it was established

when the cost of railroad service was much greater than now, when refrigerator cars were small and expensively iced. The rates which our western creameries have paid for years have added to the profits of the various transportation companies, have helped to improve their road beds, and double track their roads and to enlarge their equipment so that now their cost of the service must necessarily be less than it was twenty-five or thirty years ago. Yet we not only still pay the same rate as thirty years ago but it is now proposed to raise that rate more than fifteen per cent, or \$70,000 in the aggregate. It is impossible to believe that the rate of 65 cents is not remunerative to the railroad companies, because they have voluntarily put into effect a minimum of 10,000 pounds and upon such a shipment their earnings per car would be but \$65 between Chicago and New York. But less than carload shipments are aggregated together in Chicago and cars go forward carrying more than 30,000 pounds each, upon which their earnings are \$195 per car, less the cost of reloading at Chicago, which cost is probably less than \$10 per car. The 10,000 pound minimum was established because that is approximately the weight of a single tier of tubs of butter in the car. The less than carload shipments are reloaded by the employes of the eastern roads and the cars invariably carry three tiers of tubs, and sometimes four or more. If the income of \$65 per car for icing and hauling from Chicago to the east were not a remunerative rate, the roads would long ago have raised the minimum and so compelled the shipper to load more heavily, especially as the cars are made to carry as high as 60,000 pounds each. But the minimum has not been changed and it seems to have been left low purposely to encourage the smaller shipments in carloads.

There seems to be on the part of some railroad representatives and also upon the part of some of the carload shippers a theory that the large shipper has an inherent right to have his products carried to market for less money than that paid for similar service by his smaller competitor. That is, because he is doing business on a large scale he should therefore be favored. A good many times rates are fixed on the basis of the "value of the service," which is only another way of saying that the rate is to be all the traffic will bear. Fortunately the Interstate Commerce Commission has again and again declared that rates must be established somewhat upon the "cost of the service." It is hardly possible that the cost of service upon a car that carries 30,000 pounds, can be very much greater than the cost to the company of transporting the same car the same distance with the same icing and carrying 10,

000 pounds of the same product. It is therefore hardly probable that in case appeal is made to the Interstate Commerce Commission a rate will be permitted which still further increases the disproportion between the income per car to the companies from the less than carloads, and that from carloads.

The creamery people of this state should between now and April 1, 1910, make the various refrigerator transportation lines of the east, to whom the L. C. L. shippers annually pay \$500,000 in freight charges, understand that no increase in rates will be permitted until every method of protest is exhausted and that prompt and vigorous appeal to the Interstate Commerce Commission will be made in case such increase in rates is attempted. Indeed there is some reason to suppose that an appeal to the Interstate Commerce Commission for a substantial reduction of the eastern rate upon butter might be granted in view of the fact that the rate of almost every other product has been reduced in the last ten or twenty years, and in view of the further fact that the rate on dressed meat, the only other product that can be compared to butter, is but 45 cents per hundred, and has been for more than ten years.

The question of discrimination as between the carload and the less than carload shipper is of more importance than the mere difference of freight rate that each would pay. There exists now, as outlined above a real discrimination in favor of the carload shipper if we consider only the cost of the service to the railroads and their income from each of the two classes of shipments, but since the rate is the same they both get into the eastern markets at the same proportionate expense and hence go upon the market upon equal terms. But a real difference in the rates paid by two classes of shippers of the same product enables the one paying the less rate to monopolize the market. Indeed, a situation exists in the butter business which conclusively proves this contention. The price of butter upon the western coasts of this country is always much higher than upon the eastern coast, yet small shipments of butter are never made west, for the reason that the less than carload rate is 30 per cent higher than the rate upon carloads. Only the shipper of carloads can get to the markets of the west, notwithstanding the attractive prices that may be offered.

LAW MAKING APPROPRIATION FOR THE STATE DAIRY ASSOCIATION.

Section 1. Whenever the organization now existing in the State of Iowa and known as the Iowa State Dairy Association shall have filed with the

Secretary of State of the State of Iowa verified proofs of its organization, the names of its president, vice-president, secretary and treasurer, and that it has one hundred (100) bona fide members, such association shall be recognized as the Iowa State Dairy Association of the State of Iowa, and be entitled to the benefits of this act.

Sec. 2. For the purpose of aiding in the promotion and development of the dairy industry of the State of Iowa, such association shall cause to be made such inspection of dairy farms, dairy cattle, dairy barns and other buildings and appliances used in connection therewith, dairy products and methods as they shall deem best and shall arrange to furnish such instruction and general assistance, either by institutes or otherwise, as they may deem proper to advance the general interests of the dairy industry of the State.

Sec. 3. For all the purposes of this act the said association shall act by and through an executive committee of seven (7) members, consisting of the president, vice-president, secretary and treasurer of the Iowa State Dairy Association, the dean of the Iowa State College of Agriculture and Mechanic Arts, and the Professor of dairying at the same institution and the Food and Dairy Commissioner in the State of Iowa.

Sec. 4. They may employ two or more competent persons who shall devote their entire time to such inspection and instruction under the direction of the said executive committee, and who shall hold office at the pleasure of the committee, and who shall each receive a salary of not to exceed fifteen hundred dollars (\$1,500.00) per annum, and actual expenses while engaged in such work.

Sec. 5. The salaries of all persons employed under the provision of this act shall be paid monthly out of the appropriation herein provided and all traveling expenses and all general expenses incurred by the association in carrying out the purposes of this act shall be paid out of the said appropriation and in the manner provided by sections 170-d, 170-e and 170-f of the Supplement to the Code, 1907, and upon statements filed with the Executive Council as therein provided; but no such bill shall be paid until after it shall have been audited and approved by the association in such manner as the executive committee shall provide.

Sec. 6. The said association may require such reports from their employes as they shall deem proper, and shall make to the Governor an annual report of their proceedings under this act, which report shall be published as a part of the proceedings of the annual convention of the Iowa State Dairy Association.

Sec. 7. For the purpose of carrying into effect the provisions of this act and the payment of all expenses connected therewith, there is hereby appropriated out of any funds in the treasury of the State, not otherwise appropriated, the sum of ten thousand dollars (\$10,000.00) or so much thereof as may be necessary to pay the salaries and expenses of the employes appointed under the provisions of this act and the expenses incurred by the Iowa State Dairy Association in developing and promoting the dairy industry of the state as by this act provided.

THE PRICE OF BUTTER.

For more than a year a shortage of butter has been felt in the markets of the country and dairymen have congratulated themselves upon the relatively high price of butter. There is no disputing the fact that butter is short in quantity in this country nor that the price received for it is higher than heretofore for several years. The higher prices received by our creamery patrons for their butterfat is not wholly attributable to the market price for butter. A part of such increase in the price received by the farmer is due to the fact that our creameries are better managed than before, fewer losses occur and the expense of operation is therefore less than before and hence the income of the farmer per pound of fat is increased.

Nor is the price of butter a thing for special and particular congratulation for the farmer, for the reason that the value of everything he feeds his cows is increased in much greater proportion than the increase in the price received for his butterfat or his butter in the market. Pasture, corn, oats, hay, all the feeds that go to produce milk on the farm have very greatly increased in market value. On the other hand, hogs, cattle, sheep, which the farmer might produce with his feed instead of milk, have also very much increased. It is also true that grains, such as wheat, flax, barley, which the farmer might raise to sell, have very much increased in market value. That is to say, the farmer's increase of cost of feed is greater than his increase of income; or if he had turned his feeds into pork or beef or mutton he would have received a greater proportionate increase of return for his feed; or if he had raised grains to sell, his income would have been increased in greater proportion. It must be borne in mind that this comparison has nothing to do with the question of how he shall get the greatest aggregate income from his farm, but only shows that any slight increase in the price of butter is not to be pointed out as the only increase in farm products, but is only one of a dozen such increases in values of farm products, that the increase in the price received by the farmer for his butterfat is less in proportion than increase he has received from the sale of other farm products. A study of the following tables of butter prices, taken from the market reports, and the tables of prices of farm products, taken from the Year-book of the Department of Agriculture, will be of value.

SHOWING AVERAGE MONTHLY PRICE OF EXTRA WESTERN CREAMERY BUTTER IN NEW YORK MARKET.

Month	Twelve months ending Nov. 1,											
	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
November	\$.2325	\$.2337	\$.2690	\$.2487	\$.2412	\$.2650	\$.2317	\$.2481	\$.2350	\$.2762	\$.2725	\$.2257
December	.2250	.2160	.2730	.2510	.2510	.2920	.2423	.2055	.2480	.2104	.2587	.2131
January	.3040	.1975	.2650	.2362	.2425	.2762	.2270	.2010	.2650	.2080	.2069	.2152
February	.3042	.2100	.2500	.2350	.2362	.2300	.2517	.2318	.2700	.2254	.2323	.2009
March	.1937	.2075	.2550	.2312	.2540	.2890	.2452	.2807	.2700	.2051	.2840	.2953
April	.1950	.1962	.1960	.2099	.2525	.2725	.2281	.2008	.2188	.2009	.2855	.2708
May	.1580	.1740	.2012	.1500	.2275	.2200	.2012	.2371	.2017	.2501	.2369	.2658
June	.1687	.1880	.1950	.1925	.2195	.2160	.1808	.2049	.2022	.2300	.2329	.2681
July	.1687	.1825	.1960	.1960	.2131	.2012	.1707	.2056	.2062	.2481	.2243	.2523
August	.1860	.2000	.2100	.2050	.1900	.1940	.1793	.2111	.2257	.2488	.2285	.2719
September	.2025	.2262	.2150	.2110	.2170	.2075	.1947	.2068	.2462	.2781	.2388	.2013
October	.2235	.2400	.2100	.2200	.2362	.2100	.2095	.2184	.2611	.2915	.2673	.2064
Average value per lb. per year	\$.1971	\$.2065	\$.2278	\$.2165	\$.2416	\$.2417	\$.2140	\$.2487	\$.2375	\$.2826	\$.2658	\$.2380

AVERAGE VALUES ON DECEMBER 1ST OF EACH YEAR.

	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
Corn	\$.287	\$.303	\$.357	\$.605	\$.403	\$.423	\$.441	\$.412	\$.309	\$.516	\$.606
Oats	.255	.249	.258	.399	.307	.341	.313	.291	.317	.443	.472
Hay	6.00	7.27	8.80	10.01	9.06	9.03	8.72	8.52	10.37	11.68	8.98
Wheat	4.40	.584	.619	.624	.63	.696	.924	.748	.667	.874	.928
Hogs	4.40	5.00	6.20	7.03	7.78	6.15	5.99	6.18	7.62	6.05	6.55
Cows	29.66	31.60	30.00	29.23	30.21	29.21	27.44	29.44	31.00	30.67	32.36

ADULTERATED BUTTER.

The statute of this state makes eighty per cent the standard on butter, that is to say, butter containing less than eighty per cent butterfat is denominated "adulterated."

The Internal Revenue Department of the United States defines adulterated butter, among other things, as butter which has sixteen per cent or more of water, and upon adulterated butter there is a tax of ten cents a pound and a license fee of \$600.00 for the manufacture. The Internal Revenue officials have authority to seize and detain any butter which seems to them suspicious, and if the analysis shows more than sixteen per cent of water the tax of ten cents a pound is assessed and the license fee of \$600.00 is also assessed and a penalty of \$300.00 is demanded. So far as known to this department efforts to escape penalties after they are

once assessed have been practically useless. The year for which the license runs expires June 30th of each year and the license is demanded for the part of the year yet remaining at the rate of \$600.00. Creameries in this state and in surrounding states have paid penalties ranging from several hundred dollars up to several thousand dollars. It is the policy of the Internal Revenue Department not to make public cases of this character but the Dairy Commissioner has personally investigated the records in the office of the Internal Revenue Collector at Dubuque and Burlington and find there listed the names of eight creameries that have paid penalties described above.

As heretofore several times pointed out in reports of this department and in circular letters, the only safe way for a creamery to operate is for the butter-maker to test every churning carefully and accurately and know how much water there is in it. The matter is of such importance that if the butter-maker fails to so test every churning his employer is warranted in discharging him without further notice.

The testing of butter for water is a matter that requires more skill, more care and more time than the testing of milk and cream with the Babcock test. The percentage of water in butter is not uniform in the various parts of most churns, nor is it uniform in all parts of a tub of butter. The government regulations for taking a sample of butter under the Internal Revenue Act follow:

Hereafter in procuring these samples the use of the "butter trier" will be entirely abandoned. The quantity required from each package will be obtained from the top and bottom or side of the butter contained in the tubs by cutting a V or wedge shaped strip about two inches wide, one and one-half inches deep, and of sufficient length to make up the required weight of the sample, which must be approximately one pound. This can be accomplished by removing the butter from the tub. A V-shaped strip of this character should be taken from each of opposite sides of the package of butter, or from both the top and the bottom of same, but it is regarded as sufficient if two such strips are obtained—that is, from the top and bottom in one case and from the two sides in the other instance. Butter put up in prints will be sampled by taking a one pound print from the box.

The foregoing is given to suggest a proper method of taking sample of butter for testing before shipment of same upon the market, in order to make sure that no butter leaves the creamery which has as much as 16 per cent of water.

CHEESE.

The manufacture of cheese in this state is extremely small, only about a half million pounds being manufactured in nine factories. The hand separator and the shipping of cream have superseded the cheese factory almost altogether in this state, though natural conditions have long since made it certain that cheese factories could not profitably exist in very many localities in competition with creameries, and there seems to be no reason to suppose that the future in cheese making in this state will be different from the past.

CITY MILK INSPECTION.

The growth of the city milk inspection in this state is indicated by the following table showing the number of permits for milk dealers issued in the years from 1896 to 1909. The years end in every case on the 4th of July:

	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Number	566	620	574	676	714	784	821	783	780	827	803	1006	1078	1149

Cities	Popu-lation	Inspectors
Burlington	25,318	Oscar C. Hoerr
Cedar Rapids	28,759	Dr. J. W. Griffith
Clinton	22,756	F. R. Allen
Council Bluffs	25,321	H. A. Lennox
Davenport	39,797	H. J. High
Des Moines	75,626	J. P. Morey
Dubuque	41,941	Dr. F. J. Kennedy
Fort Dodge	14,369	D. C. Benjamin
Keokuk	14,604	Arthur J. Anderson
Marshalltown	12,045	Dr. E. M. Singleton
Muscatine	15,087	Dr. John Tillie
Ottumwa	20,181	E. B. Hill
Sioux City	40,952	O. N. Hanson
Waterloo	18,071	Theo. Peek
Total	394,737	

Very considerable progress has been made in the cities listed above in the direction of sanitary milk. Some of the cities, notably Waterloo, Cedar Rapids, Dubuque and Marshalltown have adopted ordinances providing for city milk inspection at the expense and

under the direction of the city council, and prohibiting the sale of milk except from cows that have been tested with the tuberculin test and shown to be free from tuberculosis. The last General Assembly declined to make any change in the statutes relating either to city milk inspection by this department or the statutes relating to the use of the tuberculin test. The commissioner regrets that the amount of money and authority given to this department is not sufficient to insure the best quality of milk in the large cities of this state, and calls attention to this fact hoping that the city authorities will take such steps as may be proper to supplement the efforts of this department in this direction.

TABLE SHOWING NUMBER OF POUNDS OF MILK RECEIVED, NUMBER OF POUNDS OF CREAM RECEIVED, POUNDS OF BUTTER MADE AND POUNDS SOLD TO PATRONS AND OTHERS IN IOWA SO FAR AS REPORTED BY THE CREAMERIES.

Counties	Number Reporting	Pounds of Milk Received	Pounds of Cream Received	Pounds of Butter Made	Pounds Sold to Patrons	Pounds Sold in Iowa
Adair	4	190,597	2,600,634	914,553	26,671	22,872
Adams	3		669,302	369,680	6,987	6,987
Allamakee	8		7,014,669	1,887,130	93,822	76,299
Appanoose	9	2,888,291	3,408,719	1,455,366	64,699	16,804
Audubon	6	451,149	1,650,497	560,032	4,215	5,403
Benton	15	32,957,432	2,463,552	2,164,881	163,214	516,483
Black Hawk	4	2,458,093	829,543	201,300	10,280	17,553
Boone	25	65,374,881	356,660	3,100,122	241,356	304,572
Bremer	8	10,452,781	2,569,742	1,597,456	142,795	120,955
Buchanan	5	104,152	3,063,902	911,070	23,709	59,446
Buena Vista	16	24,249,053	2,404,661	2,010,089	147,899	203,229
Butler	5	955,284	6,092,156	2,002,331	13,278	20,652
Calhoun	5	176,133	4,949,683	1,459,148	16,567	5,195
Cass	3		1,865,948	621,448	1,874	47,822
Cedar	3		654,231	906,683	3,753	80,295
Cerro Gordo	6	1,506,922	4,769,307	1,659,476	13,311	140,087
Cherokee	3	4,280	1,269,720	444,373	112,647	15,800
Chickasaw	13	21,969,926	4,287,170	2,243,099	171,161	64,393
Clarke	7	2,925,476	2,694,052	1,002,753	49,346	23,890
Clay	13	13,367,110	7,338,511	2,631,943	76,127	70,519
Clayton	4	1,851,481	3,745,577	1,190,751	10,175	23,196
Clinton	1		3,816,008	954,132		
Crawford	5	8,949,597	2,113,436	1,016,304	15,319	64,827
Dallas	1					
Davies	10	31,731,137	6,752,189	3,588,808	196,110	184,099
Decatur	5	268,706	1,996,031	509,740	20,993	32,737
Delaware	16	10,033,049	11,222,419	4,008,371	88,559	371,806
Dickinson	3	5,415,492	742,882	479,533	33,291	19,971
Dubuque	21	51,253,367	5,013,497	3,748,323	249,450	235,572
Emmet	6	756,100	3,114,170	813,410	47,576	26,778
Fayette	6	1,807,490	3,170,484	1,075,604	35,996	45,837
Floyd	1					
Franklin	1	453,891	240,398	106,127	1,666	4,840
Fremont	8	10,371,395	3,085,366	1,356,213	75,233	30,875
Greene	6	1,241,119	3,697,955	1,141,155	33,986	33,017
Grundy	4	5,247,051	1,662,726	637,628	42,223	14,396

Counties	Number Reporting	Pounds of Milk Received	Pounds of Cream Received	Pounds of Butter Made	Pounds Sold to Patrons	Pounds Sold in Iowa
Hancock	7		3,604,161	1,085,290	38,259	16,886
Hardin	8	1,175,155	4,315,180	1,371,883	64,773	40,589
Harrison						
Henry						
Howard	7	5,305,681	3,847,766	1,208,719	85,110	14,670
Humboldt	7	1,560,355	2,517,292	845,961	40,652	10,074
Ida	1		494,117	157,931	1,379	
Iowa	7	6,218,740	1,383,759	662,589	50,505	70,536
Jackson	11	4,232,053	5,982,934	2,215,644	81,697	88,139
Jasper	2	1,479,984	385,566	156,035	7,368	12,392
Jefferson	2	875,394	840,890	282,202	3,830	242,735
Johnson						
Jones	11	4,249,188	14,058,425	4,246,617	133,188	30,558
Keokuk	1		606,500	152,000		
Kossuth	19	9,050,077	5,589,452	2,098,414	167,719	65,342
Lee	1		2,652,077	962,631		45,090
Linn	11	5,777,402	6,375,546	2,317,557	52,246	499,657
Louisa						
Lucas						
Lyon	3		1,720,062	575,946	9,750	16,000
Madison						
Mahaska	2		1,096,780	274,195	1,000	3,695
Marion	1		590,169	229,227		30,000
Marshall	4	1,776,843	2,128,361	655,807	16,591	93,836
Mills						
Mitchell	9	1,190,188	4,699,846	1,298,013	86,430	30,222
Monona	1		236,724	85,530	203	269
Monroe	1	212,965	312,754	116,475	1,200	34,756
Montgomery						
Muscatine	1	4,096,842		163,873		
O'Brien	5		1,975,142	596,649	13,324	25,313
Osceola	3		1,026,882	291,954	2,993	2,551
Page	1		8,606,604	2,151,651		100,000
Palo Alto	14	17,558,028	2,736,041	1,703,153	169,927	70,752
Plymouth	5		55,492	2,390,465	844,402	20,811
Pocahontas	5		950,461	341,420	14,227	11,621
Polk	5	1,237,500	20,892,380	6,338,220		820,000
Pottawattamie	2	1,912,000	1,406,616	394,154		104,154
Poweshiek	6	12,896	2,721,920	734,036	4,503	17,236
Ringold						
Sac	8	44,019	2,039,041	688,576	19,914	7,830
Scott	2	35,630	1,299,327	415,569	354	205,561
Shelby	7	124,870	1,604,917	587,427	17,843	10,904
Sioux	6	94,242	4,679,494	1,603,086	22,758	28,736
Story	8	5,611,116	2,407,952	1,066,490	91,007	125,789
Tama	3		626,298	196,972	975	13,816
Taylor	2		4,184,744	1,046,185	11,000	21,050
Union	2	65,000	650,000	204,160	4,682	7,264
Van Buren						
Wapello	2	648,311	2,420,073	624,285	2,680	
Warren						
Washington	1		851,300	234,360		
Wayne	1		1,812,855	604,385	3,000	2,800
Webster	1	132,000	2,379,504	669,476	500	50,000
Winnebago	7	14,933,206	2,721,416	1,490,079	105,021	33,585
Winneshiek	11		8,960,784	2,301,041	13,457	71,392
Woodbury	2	300,000	18,100,757	6,524,823	8,000	717,300
Worth	9	2,684,132	3,277,515	1,061,432	64,800	9,937
Wright	5		8,800,839	978,396	31,222	35,774
Total	512	413,797,149	279,436,204	101,907,316	3,513,944	6,866,853

TABLE SHOWING NUMBER OF HAND SEPARATORS, NUMBER OF PATRONS AND NUMBER OF COWS.

Counties	No. of Creamer's Reporting hand Separators	Receive Cream by Rail	Hand Separators Reported	No. of Creamer's Reporting Patrons and Cows	No. of Patrons Reported	No. of Cows Reported
Adair	4	2	1,025	4	1,037	7,212
Allamakee	3		405	3	417	3,395
Allamakee	8		1,519	8	1,748	12,990
Appanoose						
Audubon	9		1,289	9	1,459	11,409
Benton	6	1	792	6	846	5,562
Black Hawk	11	2	742	15	1,708	15,368
Boone	4	2	368	4	454	2,622
Bremer	4		153	25	1,917	18,533
Buchanan	7		612	9	1,422	10,849
Buena Vista	6	1	1,095	6	1,017	7,268
Butler	14		712	16	1,759	13,622
Calhoun	5	3	2,680	5	3,000	21,427
Carroll	5		2,116	5	2,149	15,123
Cass	3	1	584	3	714	4,700
Cedar	3		221	3	227	1,810
Cerro Gordo	6	3	1,780	6	1,898	12,012
Cherokee	3		625	3	694	4,700
Chickasaw	9		942	13	2,017	16,966
Clarke						
Clay	7	3	827	7	1,019	6,830
Clayton	12	3	1,257	13	2,459	17,241
Clinton	4	4	724	4	1,001	5,820
Crawford	1		1,972	1	1,972	13,400
Dallas	4	3	920	5	1,191	10,792
Davis						
Decatur	1	1				
Delaware	13	1	1,920	16	2,828	28,966
Des Moines						
Dickinson	5	2	559	5	674	3,900
Dubuque	16	3	8,405	18	8,971	68,181
Emmet						
Fayette	12	1	1,209	21	2,838	23,859
Floyd	7		761	7	1,085	6,574
Franklin	6	3	1,316	6	1,400	10,730
Fremont						
Greene	1		174	1	196	1,272
Grundy	8	2	900	8	1,249	11,400
Guthrie	6	3	1,037	6	1,198	8,828
Hamilton	4	2	836	4	795	5,539
Hancock	7	2	917	7	929	7,428
Hardin	8	2	1,215	8	1,297	10,284
Harrison						
Henry						
Howard	6		677	7	1,220	8,540
Humboldt	7	1	1,631	7	1,139	9,027
Ida	1		90	1	149	1,240
Iowa	7		454	7	688	5,163
Jackson	11	3	1,092	12	2,369	16,935
Jasper	2		157	2	228	1,614
Jefferson	2	2	278	3	312	1,840
Johnson						
Jones	11	5	2,992	11	4,119	33,410
Keokuk	1	1	190	1	225	1,850
Kossuth	18		1,398	18	1,580	13,150
Lee	1	1	1,800	1	1,600	12,800
Linn	11	3	2,255	11	2,848	22,722
Louisa						
Lucas						
Lyon	3	2	775	3	930	6,050
Madison						
Mahaska	2	2	405	2	470	3,300

Counties	No. of Creamer's Reporting hand Separators	Receive Cream by Rail	Hand Separators Reported	No. of Creamer's Reporting Patrons and Cows	No. of Patrons Reported	No. of Cows Reported
Marion	1	1	300	1	400	1,960
Marshall	3	1	630	4	815	5,178
Mills						
Mitchell	9		858	9	1,690	13,197
Monona	1	1	85	1	85	680
Monroe	1	1	195	1	195	1,025
Montgomery						
Muscatine				1	60	600
O'Brien	5	3	628	5	669	5,554
Osceola	3		268	3	343	2,602
Pago	1	1	4,500	1	6,000	38,600
Palo Alto	14	1	813	14	1,342	10,833
Plymouth	6	2	841	5	869	6,945
Pocahontas	5	1	592	5	606	3,725
Polk	3	3	8,300	3	9,630	55,300
Pottawattamie	2	2	1,500	2	1,700	9,350
Poweshiek	6	2	939	6	1,036	7,105
Ringgold						
Sac	8	2	832	8	974	6,783
Scott	2	1	736	2	938	5,495
Shelby	7	2	967	7	1,019	6,369
Sioux	6	1	1,679	6	1,851	12,334
Story	8	2	842	8	1,083	7,345
Tama	2	2	327	3	348	2,432
Taylor	2	2	1,445	2	1,523	10,722
Union	2	1	350	1	400	2,000
Van Buren						
Wapello						
Warren	2	1	882	2	976	5,950
Washington						
Wayne	1	1	355	1	480	2,460
Webster	1	1	1,700	1	1,700	8,950
Winnebago	1	1	1,050	1	1,225	7,350
Winneshiek	7		775	7	1,232	11,220
Woodbury	11		1,761	11	3,482	17,610
Worth	2	2	8,165	2	8,465	48,990
Wright	9	1	858	9	960	7,254
	5	3	1,069	5	1,151	7,920
Total	451	117	96,349	512	116,750	887,740

TABLE SHOWING NET POUNDS OF BUTTER SHIPPED OUT OF THE STATE, AS REPORTED BY THE RAILROADS, FOR THE YEAR ENDING SEPTEMBER 30, 1909, COMPARED WITH SIMILAR STATEMENTS FOR THE YEAR ENDING SEPTEMBER, 1908.

Counties	1908	1909	Increase	Decrease
Adair	1,363,748	646,557		717,191
Adams	98,639	96,962		1,677
Allamakee	1,618,525	1,425,824		192,701
Appanoose	42,051	17,177		24,874
Audubon	1,475,384	890,933		584,451
Benton	458,297	403,079		55,218
Black Hawk	1,032,444	1,054,548	22,104	
Boone	201,647	123,353		78,294
Bremer	1,960,215	2,706,946	281,835	
Buchanan	1,060,824	1,157,379	96,555	
Buena Vista	2,185,960	1,816,697		369,263
Butler	1,942,105	2,531,834	589,729	
Calhoun	1,749,307	1,214,138		535,169
Cass	540,046	334,541		205,505
Cedar	733,708	468,330		265,378
Cerro Gordo	1,524,285	1,005,717		519,168
Cherokee	298,431	280,340		68,091
Chickasaw	2,105,415	1,873,147		232,268
Clarke	7,895	4,063		3,832
Clay	835,333	773,841		61,492
Clayton	3,078,368	2,650,446		427,922
Clinton	1,782,048	1,175,324		606,724
Crawford	1,195,298	1,062,077		133,221
Dallas	650,532	483,509		167,023
Davis	34,948	7,271		17,677
Decatur	623,566	451,952		171,614
Delaware	2,901,054	2,523,162		377,892
Des Moines	115,920	116,954	1,034	
Dickinson	427,377	583,213	155,836	
Dubuque	2,320,029	3,502,953	1,173,324	
Emmet	570,685	428,389		142,296
Fayette	2,710,102	2,623,304		86,798
Floyd	619,237	549,285		69,952
Franklin	665,668	688,454	22,786	
Fremont	6,309	5,530		779
Greene	167,477	71,259		96,218
Grundy	816,346	818,025	1,179	
Guthrie	992,315	1,114,945	122,630	
Hamilton	1,244,965	848,734		396,231
Hancock	943,241	1,050,451	107,210	
Hardin	1,538,010	1,267,550		270,460
Harrison	28,010	49,646	10,736	
Henry	52,959	26,518		26,441
Howard	1,030,964	916,634		114,330
Humboldt	683,240	581,730		101,510
Ida	240,963	211,621		29,342
Iowa	536,610	560,505	23,895	
Jackson	2,112,726	2,068,985		43,741
Jasper	118,722	130,899	12,177	
Jefferson	146,646	122,134		24,512
Johnson	24,612	2,112		22,500
Jones	5,812,705	4,637,289		1,175,416
Knox	63,563	277,554	183,991	
Kossuth	1,654,657	1,685,084	31,027	
Lee	2,105,978	2,734,822	618,954	
Linn	1,719,480	1,654,605		64,875
Louisa	4,161	14,002	9,841	
Lucas	20,353	5,226		15,127
Lyon	606,610	565,204		41,406
Madison	3,822	3,094		728
Mahaska	286,981	155,833		131,148
Marion	213,589	193,907		19,682
Marshall	463,286	363,582		99,704
Mills	4,082	3,983		99
Mitchell	1,477,609	1,195,317		282,292
Monona	200,508	215,895	14,987	

Counties	1903	1909	Increase	Decrease
Monroe	55,890	5,927	-----	49,963
Montgomery	7,374	2,910	-----	4,464
Muscatine	37,632	35,834	-----	1,798
O'Brien	631,068	325,156	-----	305,882
Osceola	493,690	389,187	-----	104,503
Pago	743,820	637,660	-----	106,160
Palo Alto	1,360,973	1,374,842	-----	116,131
Plymouth	860,310	547,724	-----	312,586
Pocahontas	638,897	349,616	-----	289,281
Polk	4,132,972	4,183,870	60,898	-----
Pottawattamie	949,045	57,442	-----	891,603
Poweshiek	450,283	422,721	-----	27,562
Ringgold	63	-----	-----	63
Sac	704,713	545,450	-----	159,263
Scott	1,004,414	1,849,266	214,852	-----
Shelby	604,018	341,612	-----	262,406
Sioux	1,897,684	1,381,346	-----	516,338
Story	1,233,203	887,668	-----	345,535
Tama	211,248	221,064	9,816	-----
Taylor	1,554,537	449,668	-----	1,104,869
Union	1,411,806	862,030	-----	549,776
Van Buren	16,574	3,213	-----	13,361
Wapello	711,469	619,926	-----	91,543
Warren	987	668	-----	319
Washington	139,360	104,823	-----	34,537
Wayne	732,725	732,227	-----	498
Webster	303,566	617,175	223,609	-----
Winnebago	1,435,261	1,195,281	-----	239,980
Winneshiek	1,631,663	1,631,237	-----	426
Woodbury	6,061,460	5,771,126	-----	290,334
Worth	966,578	777,428	-----	189,150
Wright	1,100,762	679,133	-----	421,629
Totals	98,970,991	87,773,835	4,760,563	15,947,739

CREAMERY LIST

*Receive cream by rail.

†Skim station.

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Adair County--				
1	Adair Co-op. Cry. Co.	M. L. McManus	Adair	W. H. Skitt
2	Arbor Hill Co-op. Cry. Co. (Arbor Hill)	C. C. Pease	Stuart	-----
3	Blue Grass Cry. Co.	Stewart Bros.	Fontanelle	L. R. Stewart
4	Blue Grass Cry. (Bridge-water)	Stewart Bros.	Fontanelle	M. N. Bates
	Greenfield Cry. Co.	Jas. F. Laude	Greenfield	J. D. Main
Adams County--				
5	Fars. Mut. Co-op. Cry.	L. E. Stanley	Prescott	A. H. Ady
6	Nevinville Fars. Co-op. Cry. (Nevinville)	E. J. Oshel	Orient	C. E. Wallace
8	Mt. Etna Co-op. Cry.	-----	-----	A. McCartney
Allamakee County--				
9	Dorchester Fars. Mut. Cry.	R. W. Tartt	Dorchester	L. B. Olson
10	Calhoun Cry. Co.	P. E. O'Donnell	Church Bl.	K. V. Ferris
11	Fars. Co-op. Cry. Co.	J. W. Campbell	Postville	I. D. Hender-
12	Fars. Co-op. Cry. & Comcl. Co.	J. T. Bjerke	-----	shot
13	Ludlow Co-op. Cry. Co.	Wm. F. Goebel	Waterville	F. W. Hessel
14	Arctic Spring Cry. (Quandah)	O. C. Flatberg	Spring Grove, Minn.	W. P. Muth
15	Fars. Co-op. Cry. Co.	J. L. White	Waukon	I. O. Langlie
16	New Albin Co-op. Cry. Co.	R. G. May	New Albin	Fred Flete
				E. Rice
Audubon County--				
17	Sharon Sep. Cry. Co.	C. C. Moller	Audubon RA.	A. Miller
18	Oakfield Twp. Cry. Co.	Hans Nymand	Brayton	Jens C. Nielsen
19	Audubon Twp. Cry. Co.	L. P. Nielsen	Exira R3	N. P. Nielsen
20	West Hamlin Sep. Cry. Co.	Ferd Gjerloff	Exira R2	Johannes
21	Exira Creamery Co.	C. C. Nelson	Exira	Johansen
22	Blue Grass Cry. Co. (Hamlin)	E. W. Mullenger	Exira R5	C. C. Nelson
23	Danish Sep. Co.	Peter Lykke	-----	Peter Jensen
24	Liberty Creamery (Manning)	Geo. Nelson	Kimballton	Peter Thuesen
25	Ross Creamery (Ross)	Frandsen & Olson	Linn Grove	Elias Jessen
				L. R. Winn
Benton County--				
26	Blairstown Creamery	Chas. Hanbold	Blairstown	Chas. Hanbold
27	Norway Creamery	M. B. Hershey	Norway	M. B. Hershey
28	Model Creamery	Gardemann & Junglaus	-----	-----
29	Urbana Creamery	Jas. Romine	Newhall	W. C. Dubbs
30	Fars. Cry. Co.	C. H. Hartung	Urbana	Jas. Romine
31	Shellsburg Creamery	J. A. Moeller	Van Horne	Thos. Daniels
			Shellsburg	Robt. Moeller

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Black Hawk County—				
32	LaPorte Co-op. Cry. Co.	C. B. Gingerich	LaPorte City	Oscar Harvey
33	Crain Creek Cry.	Wm. Meier	Denver R1	Wm. Meier
34	Great Western Cry.	Wm. Widdel	Dewar	J. Tegtmeler
35	Fars. Cry. Assn.	G. S. Kleckner	Dunkerton	O. G. Alexander
36	Eagle Center Dairy Assn.	W. A. Speer	Buckingham	H. C. Koeneke
37	East Lester Cry.	L. B. Duffy	Fairbanks	Frank Bowdish
38	Union Cry. (Finchford)	T. E. Holland	Janesville	J. E. McCaffrey
39	Hudson Co-op. Dairy Assn.	Henry Lafrenz	Hudson	Wm. McFarland
40	Mt. Vernon Cry Co. (Boies)	Geo. H. Moeller	Denver	I. R. Moon
41	Jubilee Co-op. Cry. (Jubilee)	A. J. Widdel	Jesup	A. J. Widdel
42	Gilbertville Dairy Assn. (Gilbertville)	J. B. Kascht	Waterloo 1324 Lafayette St.	Ino. L. Clark R. W. Chadwick
43	Fars. Dairy Assn.	S. Sweitzer	Waterloo	C. W. Alexander
44	Black Hawk Cry. Co.	Erick Petersen	Cedar Falls	Mike Envaldsen
45	Cedar Falls Cry.	Brandeo & Riedel	Cedar Falls	Fr'k Ballantyne
46	Benson Cry. (Benson)	Geo. Mathes	Cedar Falls R2	
Boone County—				
47	Rosendale Co-op. Cry. (Rosendale)	L. C. Peterson	Story City	L. C. Peterson
48	Dodge Fars. Mut. Co-op. Cry. Co.	L. J. Bremsen	Boone R3	L. J. Bremsen
49	*Madrid Cry. Co.	H. G. Clark	Madrid	H. G. Clark
50	*Boone Cry. Co.	F. Westerberg	Boone	August Drucher
Bremer County—				
51	Bremer Cry. (Bremer)	H. L. Kelley	Waverly R6	Wm. Kallenbach
52	Western Douglas Cry. (Waverly)	Carl Oberhen	Plainfield R1	C. H. Wedemeyer
53	Little Valley Cry. Co.	Chas. Krueger	Sumner R7	F. Willis
54	Farrington Cry. (Denver)	F. Garton	Cedar Falls	H. C. Eick
55	*First Maxfield Cry. Co. (Denver)	Henry Matthias	Readlyn	J. W. Wedemeyer
56	Frederika Cry. Assn.	J. H. McDonald	Frederika	C. E. Carr
57	Klinger Cry. (Klinger)	C. H. Rohrsen	Dunkerton R2	C. H. Rohrsen
58	Maxfield Cry. Co.	J. Strottmann	Readlyn R1	F. H. Wehling
59	Climax Cry. Co.	Henry Specht	Sumner R6	L. L. Zbornik
60	Excelsior Cry. Co.	H. E. Wuttke	Sumner	Robert Wagner
61	Sumner Cry. Co.	S. A. Munger	Sumner	Fred M. Zell
62	Fremont Cry.	B. C. Fink	Tripoli R2	H. J. Hankner
63	Potters Siding Cry.	H. Willbrandt	Tripoli	Wm. Ambros
64	Tripoli Cry. Co.	J. C. Kock	Tripoli	F. C. Oltrogge
65	Artesian Cry. (Denver)	C. C. Tretow	Waverly R2	E. H. Hohman
66	LaFayette Cry. Co.	Otto Walther	Waverly R1	Henry Piegors
67	Washington Cry. Co.	E. J. Thies	Waverly R2	D. Botterman
68	Seigel Cry. Co. (Tripoli)	H. F. Moeller	Waverly R2	Wm. Lenius
69	Grove Hill Cry. Co.	J. A. Nell	Fairbank	F. D. Daniels
70	Spring Fountain Cry.	Joe Volker	Sumner	Fred Bremer
71	Readlyn Co-op. Cry. Co.	Rudolph Tiedt	Readlyn	H. A. Griese
72	Janesville Cry. Assn.	H. W. Strine	Janesville	B. O. Squires
73	Waverly Condensed Milk Factory (Waverly)	Mohawk Condensed Milk Co.	Rochester, N. Y.	
74	Dayton Cry. Co.	G. C. Schwake	Sumner	John Wehling
75	Plainfield Cry.	H. C. Ladage	Plainfield	H. C. Ladage
76	Cass Farm Cry.	E. C. Schuknecht	Sumner	E. C. Schuknecht
Buchanan County—				
77	Fairbank Fars. Cry.	A. J. Langley	Fairbank	W. Peterson
78	Hazelton Fars. Cry.	L. Gerstenberger	Hazelton	A. H. Bentz
79	Jesup Cry. Co.	C. L. Bright	Jesup	E. A. Harvey

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Buchanan County—Cont.				
80	Lamont Cry. Co.	J. D. Thompson	Lamont	F. W. Stephenson
81	Stanley Cry.	Adam Eicher	Hazelton	Geo. Coyle
82	Otterville Cry. Co.	Geo. M. Vincent	Independence	C. S. Payne
83	Winthrop Cry. Co.	W. F. Miner	Winthrop	W. F. Miner
84	Wapsie Valley Cry. Co.	I. S. Hutton	Independence	John Soules
85	*Wapsie Valley Cry. Co. (Litheton)	I. S. Hutton	Independence	
Buena Vista County—				
86	Coon River Cry.	E. P. Kruse	Newell	J. F. Sharp
87	Fars. Co-op. Cry.	C. P. Cornelussen	Alta	H. S. Allen
88	Newul Cry. Co.	F. L. Point	Newell	J. E. Lauridsen
89	*Rembrandt Cry. Co.	O. J. Hegna	Rembrandt	N. O. Swenson
90	*Linn Grove Cry.	A. M. Fraudsen	Linn Grove	Chris Olson
Butler County—				
91	B. C. Capper & Co.	E. C. Capper	Dumont	
92	Aplington Cry. Co.	R. Meyer	Aplington	Julius Morek
93	White Rose Cry.	S. Patterson	Austinville	S. Patterson
94	Fars. Co-op. Cry.	E. S. Palmatier	Greene	J. Jacobson
95	Clarksville Cry. Co.	H. M. Crocker	Clarksville	H. M. Crocker
96	*Clarksville Cry. Co. (Packard)	H. M. Crocker	Clarksville	
97	Monroe Central Cry. (Mleanor)	G. A. Palmer	Aplington	G. A. Palmer
98	Kesley Cry.	H. Patterson	Kesley	H. Patterson
99	Beavor Cry. Co.	S. S. Huntley	New Hartford	Alex Graham
100	Parkersburg Cry. Co.	Geo. Johnson	Parkersburg	F. J. Muller
101	Shell Rock Cry. Assn.	M. J. Johnson	Shell Rock	M. J. Johnson
102	Courbat Cry.	O. F. Courbat	Shell Rock	O. F. Courbat
103	Victory Cry.	A. B. Shadbolt	Waverly	E. F. Miller
104	Walkers Cry.	A. B. Walker	Shell Rock	R. C. Tabor
105	Northern West Point Cry.	H. Debuier	Greene R2	F. H. Fisher
106	Albion Co-op. Cry. Co.	E. S. Philo	New Hartford	W. F. Graham
107	New Hartford Fars. Mut. Co-op. Cry. Co.	R. L. Farnsworth	New Hartford	Peter Larson
Calhoun County—				
108	Fars. Co-op. Mut. Cry. Assn.	C. W. Jewell	Lake City	C. W. Jewell
109	Moon Bros. Cry.	Harry A. Moon	Manson	Chas. G. Moon
110	*Andrew Wood Co.	F. H. Allan	Rockwell City	Jens Norsgood
111	*Somers Cry. (Somers)	A. W. Hubbard	Hinckley, Ill.	R. J. Cauller
112	*Pomeroy Cry. Co.	H. A. Albrecht	Pomeroy	Geo. F. Allard
Carroll County—				
114	Coon Rapids Cry.	M. M. Curry	Coon Rapids	Julius Suhr
115	Rose Valley Cry.	C. Kohorst	Carroll R4	C. Kohorst
116	Templeton Cry. Co.	Geo. Bieri	Templeton	Herman Lang
117	Fairmont Cry. Co. (Manning)	E. F. Howe	Omaha, Neb.	Obrist
118	Halbur Cry. Co.	M. J. Wagner	Halbur	M. J. Wagner
119	Willey Cry. Co.	Larsen & Rasmussen	Willey	L. Larsen
Cass County—				
120	Fars. Mut. Co-op. Cry.	P. Pettinger	Cumberland	Albert Heyn
121	Fars. Co-op. Cry.	Ona E. Bourne	Wiota	E. M. Bourne
122	*Fars. Co-op. Cry. (Anita)	Ona E. Bourne	Wiota	
123	*Fars. Co-op. Cry. (Atlantic)	Ona E. Bourne	Wiota	
124	*Atlantic Produce Co.	G. G. Jeck	Atlantic	Carl Hansen
Cedar County—				
125	Golden Star Cry.	W. H. Kroeger	Bennett	W. H. Kroeger
126	Home Cry.	Leo Reinking	Lowden	Leo Reinking
127	West Branch Cry.	Lewis Elliott	West Branch	Lewis Elliott

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Cerro Gordo County—				
128	*J. D. Bickel Produce Co. (McGregor)	W. G. Well	36 State St., Chicago, Ill.	Harry Ambler
129	Sunnyside Cry.	J. C. Mortensen	Thornton	Andrew Tander-gard
130	*B. B. Higley Co.	C. O'Keefe	Mason City	N. H. Knudsen
131	*Fars. Mut. Co-op. Cry.	H. B. Palmer	Clear Lake	Guy Thomas
132	Meservey Cry. Co.	Jas. P. Courtney	Meservey	H. A. Kofoed
133	Plymouth Cry. Co.	Stevens	Plymouth	Albert Knudson
Cherokee County—				
134	White Rose Cry.	C. B. Austin	Marcus	E. F. Lowe
135	*Washta Cry.	Ray & Goodnow	Washta	M. J. Goodnow
136	*Cherokee Cry.	Goeb & Kinsler	Cherokee	Ray Jones
Chickasaw County—				
137	Boyd Cry. Assn. (Boyd)	Wm. Denner	New Hampton, R5	M. J. Donovan
138	Alta Vista Fars. Cry.	A. Tietjen	Alta Vista	H. B. Fortney
139	Devon Fars. Cry. Assn. (Devon)	Geo. B. Lofy	New Hampton, R4	Chas. Zeirath
140	Deerfield Co-op. Cry.	Geo. F. Nash	Alta Vista	Chas. Zell
141	Fredericksburg Butter Factory	C. L. Whitcomb	Fredericksburg	C. L. Mills
142	Ionia Fars. Cry.	H. B. Young	Ionia	F. W. Stickman
143	Lawler Cry Assn. (Lawler)	P. J. Cooney	New Hampton	F. A. Ziegler
144	New Hampton Fars. Cry. Assn.	J. W. Krieger	New Hampton	Chas. Woodworth
145	Fars. Co-op. Cry.	S. W. Blinn	Nashua	E. E. Simpson
146	Williamstown Cry. Assn. (Williamstown)	H. S. Kerssen	Fredericksburg	L. L. Flickinger
147	Jerico Co-op. Cry. (New Hampton)	Thos. Attleson	Lawler R1	Jno. Finnegan
148	Saude Co-op. Cry. (Saude)	C. A. Steensland	Lawler R2	G. F. Langquist
149	Riverside Cry.	J. W. Cagley	Nashua	Ray Smith
Clay County—				
150	Fars. Co-op. Cry.	Jno. J. Lawler	Dickens	A. W. Snyder
151	Postoria Fars. Cry.	Mrs. E. I. Chadwick	Postoria	Edgar Chadwick
152	*Royal Cry. Co.	Ado'h Christensen	Royal	Adolph Christensen
153	Fars. Co-op. Cry. Co.	Jno. Hopkins	Langdon	W. A. Thayer
154	Spencer Cry. Co.	J. W. Cory	Spencer	W. F. Battin
155	Webb Cry.	J. A. Reid	Webb	J. A. Reid
156	Everly Cry. Co.	Wester Eros	Everly	P. W. Johnson
157	*Fars. Cry. Assn.	Chas. S. Rogers	Greenville	Chas. Watson
158	*Fars. Cry. Assn. (Cornell)	Chas. S. Rogers	Greenville	
159	*Fars. Cry. Assn. (Rossie)	Chas. S. Rogers	Greenville	
Clayton County—				
160	Fidelity Cry. (Edgewood)	H. F. Beyer	Edgewood	Royal Firman
161	Elkport Cry.	H. F. Beyer	Edgewood	Walter Rizer
162	Farmersburg Co-op. Cry.	W. F. Voelker	Farmersburg, R1	S. Quist
163	Garnavillo Fars. Cry. Co.	E. C. Wirkler	Garnavillo	J. F. Fisher
164	*Luana Fars. Co-op. Cry.	Hubert Miller	Luana	S. Peterson
165	Littleport Cry.	Frank Sherman	Littleport	Frank Sherman
166	*Western Cry. Co.	F. C. Morse	McGregor	W. K. Pollard
167	*St. Olaf Fars. Cry. Co.	John Christenson	St. Olaf	Jack Frisbie

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Clayton County—Cont.				
168	Strawberry Point Fars. Cry. Assn.	H. A. Axtell	Strawberry Pt.	H. L. Evans
169	*Volga City Fars. Cry.	A. E. Olinger	Volga City	John K. Shick
170	Blue Grass Cry.	John Geraghty	McGregor R1	Wm. T. Foss
171	Millville Cry. Co.	W. J. Barrett	Turkey River	Carl Loomis
172	Fars. Cry. Co.	R. H. Bush	Ostedock	L. H. Fittigel
173	Fars. Cry. Co. (Edgewood)		Edgewood	J. J. Brunner
Clinton County—				
174	*Springbrook Cry. (Welton)	John Newman Co.	Elgin, Ill.	F. G. Irons
175	*Springbrook Cry. (Delmar Jet)	John Newman Co.	Elgin, Ill.	G. S. Wing
176	*Springbrook Cry. (Petersville)	John Newman Co.	Elgin, Ill.	
177	*Springbrook Cry. (Charlotte)	John Newman Co.	Elgin, Ill.	
178	*Springbrook Cry. (Ellwood)	John Newman Co.	Elgin, Ill.	
179	Fars. Co-op. Cry. Co.	Carl Lohmann	Wheatland	A. E. Banta
180	*Fars. Co-op. Cry.	Edw. Hart, Jr.	Toronto	W. L. Sloan
181	*Iowa Cold Storage Co.	H. R. Gray	Clinton	Walter Freed
Crawford County—				
182	*Fairmont Cry. Co. (Denison)	E. E. Howe	Omaha, Neb.	Earl Cavett
Dallas County—				
183	*Fars. Co-op. Cry. Co.	Jas. L. Kenchie	Dexter	Jas. L. Kenchie
184	*Perry Cry.	J. Moody	Perry	W. G. Gomey
185	*Woodward Cry.	H. P. Calonkey	Woodward	Wm. Ackerman
186	DeSota Co-op. Cry.	H. E. Smith	De Soto	A. Cochrane
187	New Camp Packing Co.	D. H. Van Pelt	Perry	
Decatur County—				
188	*Clarinda Poultry, Butter & Egg Co. (Leon)	W. W. Richardson	Clarinda	Will Beckley
Delaware County—				
189	Greeley Fars. Cry. Co.	J. C. Matthews	Greeley	W. R. Crabb
190	Colesburg Cry. Co.	Robt. A. Gull	Colesburg	A. L. Landis
191	Ryan Cry. (Barryville)	Theo. Pohkemp	Ryan	Matt McDowall
192	Hopkinton Cry. Co.	I. T. Wilson	Hopkinton	J. M. Zubrod
193	Bear Grove Cry. Co.	Jno. T. Goedken	Dyersville R20	Jno. M. Woelert
194	Delaware Co-op. Cry. (Delaware)	A. D. Long	Manchester	E. E. Mittlestadt
195	Earlville Cry.	J. M. Dunn	Earlville	J. M. Dunn
196	Manchester Co-op. Cry.	Jos. Bishop	Manchester	W. E. Mittlestadt
197	*Dairy City Cry.	A. J. Andrews	Manchester	W. F. Schultz
198	*Dairy City Cry. (Golden)	A. J. Andrews	Manchester	
199	Masonville Co-op. Cry.	F. S. Harris	Masonville	E. J. Erb
200	Silver Spring Cry. Co.	E. B. Porter	Delhi	H. P. Bancroft
201	Fars. Co-op. Cry. Co. (Thorpe)	M. E. Blair	Manchester	G. Stuessi
202	*Ryan Cry. (Broadway)	Geo. A. Emry	Ryan	Geo. A. Emry
203	*Ryan Cry. (Broadway)	Geo. A. Emry	Ryan	
204	*Ryan Co. (Silver Creek)	Geo. A. Emry	Ryan	
205	Hazel Green Cry. Co. (Ryan)	H. F. McBride	Hopkinton	C. J. Rohde
206	Onelda Cry.	F. M. Burbridge	Onelda	H. Burbridge
207	Spring Branch Cry. Co.	J. B. Higman	Manchester	Harley Everets
Dickinson County—				
207	*Lake Park Co-op. Cry.	J. G. Cheysler	Lake Park	E. E. Starr
208	Millford Fars. Butter & Cheese Assn.	H. H. Shipman	Millford	J. W. Born
209	*Fars. Co-op. Cry.	A. F. Bergman	Spirit Lake	Geo. Williams
210	Terril Co-op. Cry.	T. H. Tvedten	Terril	Martin Peterson
211	Superior Cry. Co.	J. M. Plummer	Superior	M. M. Sorenson

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Dubuque County—				
212	Balltown Co-op. Cry. (Balltown)	G. Steger	Waupeton R36	H. Koehler
213	Cascade Co-op. Cry.	P. J. Conlin	Cascade	C. T. Elliott
214	Hickory Valley (Dyersville)	Jno. Ramm	Farley R17	Geo. Hatter
215	Fars. Golden Star Cry.	Jos. Schindler	Dyersville	J. B. Feldman
216	Fillmore Co-op. Cry. (Fillmore)	Wm. Craft	Cascade	Anton Smith
217	Farley Cry Co.	G. W. Cropp	Farley	Thos. Landis
218	Globe Cry. Co. (Luxenburg)	Geo. Friedmann	N. Buena Vista	Jno. P. Crippes
219	New Vienna Central Cry.	Henry Smith	New Vienna R24	Geo. Landis
220	Farni Cry. (Rickardsville)	J. W. Farni	Durango	J. W. Farni
221	Sherrill Cry. Co. (Sherrill)	J. C. Boleyn	Spechts Ferry	Fred Koeller
222	Worthington Cry.	C. Baehler	Worthington	C. Baehler
223	Hague Cry. Co.	H. S. Hague	Zwingle	Zwingle
224	Holy Cross Cry. Co. (Holy Cross)	Leo. Sweeney	N. Buena Vista	Jas. McCool
225	*Iowa Dairy Co.	A. M. Conzett	Dubuque, 2273 Jackson St.	Ralph Howard
226	O'Neill Cry. (Rickardsville)	C. O'Neill	Waupeton	G. W. Morrison
227	*Beatrice Cry. Co.	A. O. Elvidge	Dubuque	Jake Mayer
Emmet County—				
228	Hoprig Fars. Co-op. Cry.	Jno. C. Bosold	Graettinger	Julius Jensen
229	Wallingford Cry. Co.	O. O. Refsell	Wallingford R1	J. C. Jensen
230	Estherville Cry. Co.	Harry Dalziel	Estherville	W. A. Kerr
Fayette County—				
231	Fars. Cry. Co.	Floyd Finney	Arlington	G. O. Miller
232	Clermont Valley Cry.	F. F. Ferguson	Clermont	Amon Erickson
233	Elgin Fars. Dairy Co.	M. Luchsing	Elgin	Ed Hanson
234	Fayette Cry. Assn.	Peter E. Jubb	Fayette	G. M. Miller
235	Hawkeye Cry.	J. Q. Adams	West Union	Chris Russler
236	Harlan Cry.	J. C. Lewis	Maynard	C. B. Bracy
237	Jefferson Co-op. Cry.	H. H. Meyer	Independence	E. A. Cole
238	Randallia Cry. Co.	L. L. Walker	Randallia	O. H. Buehrer
239	Center Valley Cry.	J. S. Briggs	Fayette R1	E. B. Olds
240	Fars. Co-op. Cry. (St. Lucas)	John J. Mihm	Ft. Atkinson R1	B. H. Kunnea
241	Westgate Co-op. Cry.	F. S. Coleman	Westgate	O. C. Capper
242	*Riverside Cry.	F. J. Schroeder	Wadena	F. J. Schroeder
243	West Union Cry.	Moore	West Union	Moore
244	Waucoma Fars. Cry.	Thos. McEaney	Waucoma	P. J. Kolbet
245	Scott Cry. Assn.	F. A. Sherman	Stanley	W. W. Day
246	Alpha Fars. Cry.	J. T. Gager	Alpha	J. F. Cummings
247	Richfield Cry.	H. C. Schroeder	Hawkeye	C. A. Day
248	Maple Grove Cry. Co.	Thos. Sadler	Hazleton	Thos. Sadler
249	Oelwein Fars. Cry. Co.	W. H. Day	Oelwein	C. M. Ross
250	German Cry. Co.	Wm. Seegers	Sunner R1	W. D. Wenthe
251	Oran Cry. Co.	C. C. Knos	Sunner R7	Bert Bentley
Floyd County—				
252	Rockford Co-op. Dairy Assn.	E. F. Briggs	Rockford	J. C. Farnham
253	Flood Creek Cry.	M. A. Hirsch	Charles City	L. E. Echenrod
254	Niles Cry. (Nilesville)	Frank Brunner	Chas. City R1	Frank Brunner
255	Peterson Cry.	Theo. A. Peterson	Charles City	Theo. Peterson
256	Charles City Cry.	Emil Weiss	Charles City	F. V. Thompson
257	Powersville Cry.	W. H. Miller	Powersville	W. H. Miller
Franklin County—				
258	Hamilton Co-op. Cry. (Coulter)	Geo. Dohrmann	Hampton	Herbert Soballe
259	*Fars. Co-op. Cry.	C. A. Nicholson	Dows R2	F. L. Larson
260	Grant Center Cry.	O. M. Webber	Bradford	H. Brokaw
261	Latimer Co-op. Cry.	A. W. Meyer	Latimer	R. D. Sweet
262	*Gurler-Barth Co. (Hampton)	A. J. Barth	Cedar Rapids	Ed Walker
263	*Ackley Cry.	F. J. Martin	Ackley	R. J. Saveraid

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Greene County—				
264	G. W. Nicholson Co.	W. W. Wertz	Grand Junct.	Ben Frank
Grundy County—				
265	Bucks Grove Cry. Co.	O. Niehus	Aplington	Ed Ellinger
266	Gertman Twp. Cry.	F. J. Martin	Ackley	Henry Schutjer
267	Springbrook Cry. (Dike)	John Newman Co.	Elgin, Ill.	Wm. Bote
268	Fredsville Co-op. Cry. (Freds-ville)	Hans Sansen	Cedar Falls RFD	A. Kindberg
269	Beaver Center Cry.	A. J. Meyer	Stout	T. E. Dilger
270	*Weich's Cry.	R. R. Welch	Reinbeck	Wm. Hammel
271	Fern Cry. Co.	W. H. Henning	Parkersburg	V. T. Soles
272	*Grundy Center Produce Co.	B. R. Churchill	Grundy Center	Guy Harvey
Guthrie County—				
273	Bayard Co-op. Cry. Co.	E. E. Strauser	Bayard	Cr. Rasmussen
274	*Casey Cry. Co.	H. E. Smith	Casey	W. E. Cline
275	Guthrie Center Co-op. Cry.	J. A. McLaughlin	Guthrie Center	A. W. Hanks
276	Menlo Cry. Co.	A. C. Curtis	Stuart	H. H. Colbert
277	*Iowa Dairy Co.	W. H. Hall	Yale	D. C. Balhew
278	North Branch Co-op. Cry. (Guthrie Center)	Floyd Yates	North Branch	Hans Mortensen
Hamilton County—				
279	Ellsworth Co-op. Cry.	S. Stenberg	Ellsworth	Olaf B. Stenberg
280	Ellsworth Co-op. Cry. (Ells-worth)	S. Stenberg		
281	*Jewell Cry. Co.	Morek & Man-sager	Jewell	M. J. Mansager
282	Randall Fars. Cry. Co.	M. G. Olson	Randall	M. G. Olson
283	*Ellingson Mathre & Co.	Ellingson, Mathre & Co.	Webster City	T. C. Ornvig
Hancock County—				
284	*Britt Co-op. Cry.	H. A. Schaper	Britt	E. C. Lamoree
285	Crystal Cry. Co.	L. A. Nelson	Crystal Lake	Hans Jensen
286	Fars. Co-op. Cry.	John Smith	Goodell	K. Hauge
287	*Fars. Co-op. Cry.	G. P. Merten	Garner	C. R. Conway
288	Concord Cry. Co. (Ventura)	H. H. Ollenburg	Garner	Robt. Bless
289	Kanawha Cry. Co.	F. L. Bush	Kanawha	B. O. Brownlee
290	Woden Cry. (Woden)	L. C. Peterson	Hartley	Louis Mortensen
Hardin County—				
291	Alden Cry.	T. E. Huston	Alden	J. W. Sullivan
292	Buckeye Cry.	E. A. Carriel	Buckeye	R. C. Rodgers
293	Eldora Cry.	Jensen & Hadley	Eldora	R. R. Hadley
294	Hubbard Co-op. Cry. Co.	Ernest Hiker	Hubbard	Fred Herzog
295	Iowa Falls Cry.	E. B. Benedict	Iowa Falls	J. R. Jones
296	Concord & Scott Cry.	A. Grondahl	Radcliffe	J. F. Burrettis
297	*Concord & Scott Cry.	A. Grondahl	Radcliffe	
298	*Concord & Scott Cry.	A. Grondahl	Radcliffe	
299	*Concord & Scott Cry. (Garden City)	A. Grondahl	Radcliffe	
300	Steamboat Rock Cry.	F. W. Campbell	Steamb't Rock	Howard Gohb
301	*Cleves Cry.	F. J. Martin	Ackley	A. D. Gimer
Harrison County—				
302	*Waterloo Cry. Co. (Magnolia)	Leroy Corliss	Council Bluffs	

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Howard County—				
303	Maple Leaf Cry. Co.	D. Laue	Elma Rl	A. J. Herman
304	Protivin Cry.	A. J. Mikesch	Protivin	John Bakem
305	Saratoga Co-op. Cry. Assn.	E. A. Watson	Saratoga	Henry Foss
306	Elma Co-op. Cry. Co.	J. P. Whelan	Elma	J. P. Whelan
307	Cresco Cry.	D. A. Palmer	Cresco	D. A. Palmer
308	Schley Cry.	C. A. Fosse	Cresco	C. A. Fosse
309	Fars. Co-op. Cry. Assn.	L. A. Eggerichs	Chester	C. C. Plummer
Humboldt County—				
310	Bradgate Cry. Co.	Hugh McCreary	Bradgate	D. A. O'Neil
311	Bode Cry. Assn.	O. Hoff	Bode	Ivar Thrusen
312	Owinka Cry. Co.	C. M. Clausen	Goldfield	Charley Olson
313	Humboldt Cry. Co.	L. N. Clark	Humboldt	Wm. Gossman
314	Waconusta Cry. Assn.	L. J. Clave	Otosen	O. W. Dubbs
315	Rutland Cry.	U. G. Besett	Rutland	Joe Bogh
316	Clover Cry.	L. Lewis Olson	Thor	P. O. Knutson
Iowa County—				
317	Shimer Cry. Co.	S. H. Stanerson	Conroy	W. I. Dilger
318	Genoa Bluff Cry. Co. (Ladora)	M. W. Kelting	Williamsburg	Geo. P. Byrne
319	Ladora Cry. Co.	Jno. Baltinger	Ladora	Geo. Baltinger
320	Marengo Fars. Mut. Co-op. Cry.	Dennis Sullivan	Marengo	B. S. Wallace
321	Victor Co-op. Cry. Co.	Louis Fuller	Victor	H. F. Lenocher
322	Troy Cry. Co.	Geo. C. House	Williamsburg	W. R. Edwards
323	Troy Cry. (near Williamsburg)	Geo. C. House	Williamsburg	
324	York Cry. Co. (Williamsburg)	H. W. Hundepohl	So. Amans Rl.	G. E. Stefke
Ida County—				
325	Holstein Cry.	A. W. Hubbard	Hinckley, Ill.	W. O. Bradley
Jackson County—				
326	Fulton Co-op. Cry. Co.	John Heide	Fulton	Wm. Kofehl
327	Fars. Union Co-op. Cry.	C. Hinkleman	Maquoketa	J. P. Dawson
328	Sabula Cry.	J. F. Runkle	Sabula	J. F. Runkle
329	Springbrook Cry. (Miles)	John Newman Co.	Elgin, Ill.	A. J. Spohn
330	Preston Cry. Assn.	Samuel McNeil	Preston	John Smith
331	Springbrook Cry. (Preston)	John Newman Co.	Elgin, Ill.	A. J. Negus
332	Springbrook Cry. (Spragueville)	John Newman Co.	Elgin, Ill.	
333	Springbrook Cry. (Union Center)	John Newman Co.	Elgin, Ill.	
334	Stirling Cry.	Hoffman Cry. Co.	Lamotte	John M. Hoffman
335	St. Donatus Cry.	Helmgig & Frantzen	St. Donatus	J. P. Frantzen
336	Hansen Cold Storage Co.	E. D. Hansen	Maquoketa	P. J. Hagerty
337	Springbrook Cry.	John Newman Co.	Elgin, Ill.	J. E. Ducharme
338	Springbrook Cry. (Maquoketa)	John Newman Co.	Elgin, Ill.	G. S. Wing, Jr.
339	Springbrook Cry. (Andrew)	John Newman Co.	Elgin, Ill.	
340	Bellevue Cry. Co.	Herman Ellinghouse	Bellevue	E. M. Patterson
Jasper County—				
341	Baxter Dairy Co.	H. Krampe	Baxter	H. C. Schettler
342	Newburg Cry. Co.	G. D. Alden	Newburg	Jens Jensen
Jefferson County—				
343	Fairfield Cry. Co.	H. V. Downs	Fairfield	Russell Johnson
344	Elmwood Cry.	John McLane	Fairfield	Jno. McLane

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Jones County—				
345	Monmouth Cry.	Mills & Kershaw	Monmouth	F. B. Lucia
346	Fawn Creek Cry.	W. D. Romine	Anamosa	W. D. Romine
347	Center Junction Cry. (Center Junction)	Mills & Kershaw	Monmouth	Frank Nickels
348	Amber Co-op. Cry.	O. T. Ruhe	Amber	
349	Langworthy Co-op. Cry.	Jno. H. Batchelder	Langworthy	Jno. H. Batchelder
350	Martelle Cry.	S. C. Batchelder	Martelle	Guy R. Batchelder
351	Klondike Cry.	R. Bohren	Monticello	Fred Lehman
352	Diamond Cry. Co.	Ivar Thrusen	Monticello	M. E. Boots
353	Topaz Cry.	C. W. Simpson	Oxford Junct.	Geo. Jensen
354	Scotch Grove Co-op. Cry.	H. R. Jacobs	Scotch Grove	J. L. Batchelder
355	Downerville Fars. Cry.	C. R. Wilder	Monticello	C. R. Wilder
Keokuk County—				
356	Geo. M. Griffin Cry. (Sigourney)	R. E. Gould	Sigourney	Will Shaver
Kossuth County—				
357	Algona Co-op. Cry.	J. B. Hoffns	Algona	L. P. Anderson
358	Plum Creek Cry. Co.	Harry J. Bode	Algona	M. J. Bobo
359	Burt Co-op. Cry. Co.	August Dan	Burt	D. L. Golden
360	Bancroft Co-op. Cry. Co.	Chas. P. Hanson	Bancroft	A. J. Doleschal
361	Fenton Cry. Co.	F. C. Newel	Fenton	F. D. Shifflet
362	Germania Co-op. Cry. Co.	M. J. Dyer	Germania	M. J. Dyer
363	Hobart Cry. (Hobart)	L. E. Potter	Hobart	Jos. Bloomster
364	Irvington Co-op. Cry.	J. L. Bedell	Irvington	Walter Anderson
365	Lone Rock Co-op. Cry.	Wm. Dehnert	Lone Rock	J. T. Hannan
366	Fars. Co-op. Cry. Assn.	E. J. Skinner	Ledyard	H. M. Dyer
367	Seneca Co-op. Cry. (Ringsted)	M. Jensen	Fenton	Fred Eriksen
368	Sexton Co-op. Cry.	C. A. Little	Sexton	C. A. Nurell
369	St. Joseph Co-op. Cry. (St. Joseph)	P. Bormann	Livermore	Christ Bogh
370	Swea City Co-op. Cry.	R. H. Walker	Swea City	B. S. Nelson
371	Titonka Cry. (Titonka)	L. C. Peterson	Hartley	Fred Hopman
372	Loftis Creek Co-op. Cry.	H. W. Dreyer	Lone Rock	G. T. Gundknecht
373	Whittemore Co-op. Cry.	Thos. Carmody	Whittemore	A. M. Whitney
374	Wesley Cry.	Wester Bros.	Wesley	J. J. Boland
375	LuVerne Cry. Co.	Wm. Kessler	LuVerne	Wm. Kessler
Lee County—				
376	The S. P. Pond Co.	F. H. George	Keokuk	Albitt Jensen
Linn County—				
377	Birk Cry.	C. L. Perry	Anamosa	C. L. Perry
378	Central City Cry.	P. W. Sawyer	Central City	F. D. Gillilan
379	Valley Farm Cry.	Henderson & Wright	Central City	Elmo Wright
380	Coggon Cry.	J. J. McAreary	Coggon	J. J. McAreary
381	Gurler Barth Co.	A. J. Barth	Cedar Rapids	C. C. McCue
382	Center Point Cry.	Pollock & Webster	Center Point	H. G. Webster
383	Ely & Western Cry.	F. J. Dolezal	Ely	F. Dolezal
384	Springville Cry.	C. B. Batchelder	Springville	E. W. Batchelder
385	Waubeek Cry.	Bates & Hemenway	Waubeek	H. C. Hemenway
386	Walker Cry.	H. J. Nietert	Walker	S. W. Laird
387	Rogers Cry.	Paul R. Muench	Rogers	Hans Hansen
388	Ryan Cry. Co. (Northside)	Geo. A. Emry	Ryan	

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Lyon County—				
389	*Rock Rapids Cry. (Rock Rapids) ----- f	Jas. P. Younger..	40 Dearborn St. Chicago, Ill.	Chas. Cuyler
390	Inwood Cry. ----- f	L. M. Foote.....	Inwood	H. C. Nelson
391	*George Cry. (George) ----- s	A. W. Hubbard..	Hinckley, Ill.	W. J. Becker
Mahaska County—				
392	*New Sharon Produce Co. f	A. R. Hardesty..	New Sharon..	John Roberts
393	*Oskaloosa Cry. s	H. W. Garner....	Oskaloosa ..	A. L. Larson
Marion County—				
394	*Pella Cry. Co. s	G. L. Rysdam....	Pella	T. Smorenburg
Marshall County—				
395	Dunbar Cry. Co. c	O. J. Olson.....	Dunbar	C. C. Bomberger
396	*Liscomb Cry. f	C. N. Hart.....	Liscomb	C. N. Hart
397	State Center Fars. Cry. c	C. Hansen.....	State Center..	G. T. Shaunce
398	*Minerva Valley Cry. Assn. c	A. Brackney....	Clemons	G. R. Jackman
Mitchell County—				
399	David Cry. Assn. c	Mrs. F. M. Griffin	David	Wm. Bomberger
400	Rock Creek Co-op. Cry. (Osage) c	H. L. Johnson..	Rudd	Sig Klemesrud
401	Fars. Co-op. Cry. (Orchard).... c	J. W. Clay.....	Osage	M. M. Blandin
402	Riceville Butter & Cheese Co. s	H. A. Cheney..	Riceville	H. A. Cheney
403	Stacyville Cry. f	Mrs. J. B. Spinsley	Stacyville ..	Chas. Woodwiss
404	St. Ansgar Cry. Co. c	J. M. Gollefson..	St. Ansgar..	H. R. Bullis
405	Osage Co-op. Cry. (Osage).... c	John Torsleff..	Mitchell	Geo. Dushane
406	Little Cedar Cry. f	G. L. Helfter..	Little Cedar..	G. L. Helfter
407	New Haven Cry. f	Julius Brunner..	Osage R4.....	Julius Brunner
Monona County—				
408	*Moorhead Cry. f	P. D. Nelson....	Moorhead	P. D. Nelson
Monroe County—				
409	*Albia Cry. f	W. A. Elder.....	Albia	W. A. Elder
Muscatine County—				
410	Iowa Condensed Milk Co. s	S. G. McFadden..	West Liberty..	Chester Stevens
O'Brien County—				
411	Caledonia Cry. Co. s	Wm. Gehrls....	Paullina	Wm. Gehrls
412	*Hartley Cry. f	L. C. Peterson..	Hartley	F. F. Lockwood
413	*Pringhar Cry. (Pringhar).... s	A. W. Hubbard..	Hinckley, Ill.	Geo. A. Bristol
414	*Sheldon Cry. f	D. A. Miller....	Sheldon	Jos. Vallman
415	Union Cry. Co. s	Wm. Strampe....	Paullina	Wm. Strampe
Osceola County—				
416	Ashton Cry. Co. f	J. A. Kramer....	Ashton	J. A. Kramer
417	Allendorf Cry. f	Jno. Davids....	Allendorf	Jno. Davids
418	Fars. Co-op. Cry. c	Jno. Payrluthner	Ocheyedan ..	C. H. Jennings
Page County—				
419	*Clarinda Poultry, Butter & Egg Co. s	W. W. Richardson	Clarinda	Roy Ewing

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Palo Alto County—				
420	Silver Lake Cry. Co. c	J. J. Martin....	Ayrshire	F. W. Shellman
421	Cylinder Cry. f	E. W. Reid.....	Cylinder	E. W. Reid
422	Bush Lake Cry. c	D. G. Martin....	Curlew	A. W. Finuf
423	Emmetsburg Cry. Co. c	Lewis Stuchmer..	Emmetsburg ..	M. Anderson
424	Fairville Cry. Co. (Fairville) s	Jos. Kiegl.....	Cylinder	W. D. Kuecker
425	Lost Island Cry. Co. (Graetinger) c	Lars Christensen	Emmetsburg ..	M. P. Junker
426	Mallard B. & C. Assn. c	T. C. Truog.....	Mallard	T. R. Wilson
427	Fars. Co-op. Cry. c	F. L. Lambe....	Graettinger R4	R. Nelson
428	Osgood Cry. (Osgood).... c	G. C. Thompson..	Emmetsburg ..	
429	Palo Alto Cry. Co. c	O. S. Helvig....	Emmetsburg ..	Loren Bailey
430	*Ruthven Co-op. Cry. c	W. Laton.....	Graettinger ..	Chas. Sorenson
431	Rodman Co-op. Cry. Co. c	Ruthven	Ruthven	A. L. Remington
432	West Bend Co-op. Cry. c	C. J. Frye.....	Rodman	C. F. Bollig
433	Depew Cry. Co. c	A. L. Frye.....	West Bend	T. A. Clarke
434		R. Buchan.....	Cylinder R4...	H. C. Hansen
Plymouth County—				
434	Paynes Cry. f	R. Payne.....	Kingsley	Carl Lissner
435	Grant Twp. Cry. Co. (Miamen) c	Fred Kusch....	LeMars R4....	Jobe Kennedy
436	*Remsen Cry. (Remsen).... s	A. W. Hubbard..	Hinckley, Ill.	J. E. Clink
437	Akron Cry. f	Aug. Popritz..	Akron	Geo. Popritz
438	*The LeMars Cry. f	K. K. Kennedy..	LeMars	P. E. Hornor
Pocahontas County—				
450	*Laurens Cry. f	J. G. Hinn.....	Laurens	F. W. Johnson
460	Plover Cry. f	H. Fitzgerald..	Plover	H. H. Grove
461	Rolle Cry. f	W. B. Rogers..	Rolle	W. R. Rogers
462	Delaware Center Cry. c	Geo. Siebels..	Palmer	Geo. Siebels
463	Pocahontas Cry. f	W. T. White....	Pocahontas ..	Geo. Webb
Polk County—				
464	*Des Moines Cry. Co. s	B. S. Schermerhorn	Des Moines ..	W. S. Gould
465	*Fars. Co-op. Produce Co. s	L. O. Loizeaux..	Des Moines ..	Wm. E. Blood
466	*Beatrice Cry. Co. (Des Moines) s	G. E. Haskell..	Lincoln, Neb.	Robt. Rae
Pottawattamie County—				
467	*Waterloo Cry. Co. s	Leroy Corliss..	Council Bluffs	Wm. Leuben
468	*Waterloo Cry. Co. (Under wood) s	Leroy Corliss..	Council Bluffs	
469	*Bloomer Ice & Cold Storage Co. s	D. F. Anderson..	Council Bluffs	L. Frederick
Poweshiek County—				
470	Springbrook Cry. (Guernsey) f	John Newman Co.	Elgin, Ill.	O. W. Hicks
471	*Springbrook Cry. (Hartwick) f	John Newman Co.	Elgin, Ill.	
472	Springbrook Cry. (Hartwick) f	John Newman Co.	Elgin, Ill.	J. W. Fisher
473	*Springbrook Cry. (Montezuma) f	John Newman Co.	Elgin, Ill.	John Kane
474	*Grinnell Cry. Ice & Cold Storage Plant. f	J. W. Fowler....	Grinnell	M. J. Powers
476	Deep River Cry. Co. c	C. C. Axtell....	Deep River	H. J. Goebel
477	Sheridan Fars. Mut. Co-op. Cry. Co. (Sheridan).... c	J. F. Shope....	Malcolm R4...	J. H. Neil

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Sac County—				
459	Fars. Co-op. Cry. Co.	C. F. Jackson	Early	L. W. McCreery
460	Herring Cry.	M. R. Wright	Herring	M. E. Wright
461	Lake View Cry.	E. C. Rogers	Lake View	H. M. Rogers
462	Delaware Center Cry.	Clark N. Searle	Nemaha	Frank J. Mable
463	Schaller Cry.	A. W. Hubbard	Hinckley, Ill.	S. P. Peterson
464	Eden Cry. Co.	H. Junkermer	Storm Lake	Carlyle Campbell
465	Wall Lake Cry.	C. W. Davis	Wall Lake	Geo. Clark
466	Hillman Cry.	T. Hillman	Lytton	Fred Hillman
Scott County—				
467	Star Cry.	J. H. Marriott	Long Grove	Jas. Lovestrom
468	The A. Wood Cry.	F. A. Waugh	Davenport	George Ferris
Shelby County—				
469	Corley Cry. Co.	Andrew Dinesen	Avoca R2	Marius Jensen
470	Earling Cry.	J. A. Bruck	Earling	Jacob A. Bruck
471	Center Cry. Co.	Geo. H. Millet	Harlan R2	Chris Jensen
472	Buck Valley Cry. (Harlan)	M. P. Henriksen	Andouan R1	P. Nyman
473	Fars. Mut. Co-op. Cry.	Fred Koenig	Kirkman R1	Nis E. Hansen
474	Portsmouth Cry. Co.	M. Ankersterne	Portsmouth	M. Ankersterne
475	Prairie Rose Cry.	Geo. Hansen	Walnut R2	Peter Hansen
Sioux County—				
477	Mueller Bros. Cry.	C. J. Mueller	Akon	J. F. Vandermeer
478	Hospers Cry.	Wm. Stover	Hospers	Emil Zoer
479	Hawarden Cry.	J. P. Mueller	Hawarden	Peter Peterson
480	Hull Cry.	Ode Roos	Hull	W. Roos
481	Rock Valley Cry.	F. Vander Stoep	Rock Valley	L. E. Backer
482	Sioux Center Cry. (Sioux Center)	Jelgerhuis & Co.	Orange City	J. T. Vethrop
484	Boydén Cry.		Boydén	
Story County—				
485	Gilbert Fars. Cry. Co.	C. P. Lake	Gilbert	C. P. Lake
486	Huxley Fars. Co-op. Cry.	A. H. Sheldahl	Huxley	P. J. Severnald
487	Roland Fars. Cry.	L. T. Olson	Roland	Geo. Wick
488	Story City Cry.	Alex. Henderson	Story City	Sam Severnald
489	Slater Fars. Cry.	O. J. Viland	Slater	C. Clark
490	Zearing Cry. Co.	C. P. Bean	Zearing	C. E. Buffington
491	McCallsburg Fars. Cry.	B. H. Baumgardner	McCallsburg	C. T. Knutson
490	College Cry.	M. Mortensen	Ames	T. E. Culp
Tama County—				
491	Springbrook Cry. (Chelsea)	John Newman Co.	Elgin, Ill.	C. H. Cleveland
492	Springbrook Cry. (Elberon)	John Newman Co.	Elgin, Ill.	Ed. Novak
493	Tama Co-op. Cry.	H. Bissell	Tama	W. H. Graham
494	Gladbrook Cry.	H. F. Beyer	Gladbrook	F. R. Ballantyne
Taylor County—				
495	Springbrook Cry. (Lenox)	John Newman Co.	Elgin, Ill.	A. H. Peacock
496	Bedford Cry.	Frank Dunning	Bedford	Leslie Klapp
Union County—				
498	Fars. Co-op. Cry. Co.	Joseph Koepping	Afton	Joseph Koepping
499	Creston Poultry, Butter & Egg Co.	W. W. Richardson	Clarinda	Leonard Brotherton

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Wapello County—				
500	*Yorkshire Cry. Co.	R. N. Morrel	Ottumwa	J. C. Hall
501	Blakesburg Cry. Co.	J. W. Poland	Blakesburg	J. W. Poland
Washington County—				
502	*Linwood Cry.	Keota Produce Co.	Wellman	Peter Damgaard
Wayne County—				
503	*Old Colony Cry.	James L. Humphrey, Jr.	Humeston	J. L. Cooksley
Webster County—				
504	*Fort Dodge Cry.	A. B. Sayles	Fort Dodge	S. H. Dencker
Winnebago County—				
505	Forest City Co-op. Cry.	John Carson	Forest City	W. C. Frank
506	Lake Mills Cry. Co.	J. A. Horvel	Lake Mills	H. E. Forrester
507	Lincoln Co-op. Cry. Co.	B. Quamme	Rake	P. N. Peterson
508	Scarville Cry. Co.	K. M. Larson	Scarville	Soren Kristensen
509	Vinje Cry. Co.	Ole Strom	Scarville	E. A. Jensen
510	Thompson Co-op. Cry.	T. L. Eggum	Thompson	C. C. Clifton
511	Buffalo Center Cry.	Jno. P. Olsen	Buffalo Center	John P. Olsen
512	Forest City Co-op. Cry. (Mt. Valley Twp.)			
513	Lake Mills Cry. Co. (Dahl's Church)			
514	Lake Mills Cry. Co. (Newton Twp.)			
515	Lake Mills Cry. Co. (Mt. Valley Twp.)			
Winneshek County—				
516	Silver Creek Cry. Co.	J. A. Thompson	Burr Oak	V. V. Johnson
517	Calmar Cry. Co.	A. A. Olson	Calmar	Irer Barlow
518	Ice Cave Cry.	G. N. Kjome	Decorah	E. P. Halsey
519	Festina Cry. Co. (Festina)	W. A. Schrandt	Calmar R1	Mike Hauer
520	Highland Cry.	Bidwe & Akre	Highlandville	Peter J. Bidne
521	Rock Springs Cry. Co. (Highlandville)			
522	Kendallville Cry. (Kendallville)	P. M. Peterson	Spring Grove, Minn.	P. M. Peterson
523	Nordness Cry. (Nordness)	N. H. Nelson & Co.	Calmar	Ed. Hoines
524	Silver Springs Cry. Co.	J. N. Bragestad	Decorah R1	G. H. Thune
525	Ridgeway Cry.	H. P. Nicholson	Ossian	Ole Haug
526	Lincoln Cry. Co.	L. T. Fosse	Ridgeway	S. L. and O. A. Fosse
526	Lincoln Cry. Co.	A. W. Prann	Ridgeway	G. A. Bakken
Woodbury County—				
527	*Hanford Produce Co.	J. H. Whittemore	Sioux City	W. O. Wheelock
528	*Blue Valley Cry. Co.	C. J. Walker	Sioux City	C. L. Smith

CREAMERY LIST—CONTINUED

Office record number	Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Worth County—				
529	Fertile Co-op. Cry. Co..... c	J. A. Johnson.....	Fertile	J. A. Johnson
530	Kensett Cry..... f	Gyllick Bros.....	Kensett	Nils Gyllick
531	Joice Cry..... f	Gyllick Bros.....	Joice	J. T. Gyllick
532	Fars. Co-op. Cry..... c	E. R. Stock.....	Manly	L. O. Knudson
533	Fars. Butter & Cheese Assn... c	M. D. Johnson.....	Northwood	R. S. Bergsather
534	Hartland Dairy Assn. (Silver Lake)..... c	Gust Reyerson.....	Norman	A. M. Hanson
535	Brookfield Cry. Assn..... c	E. A. Tenold.....	Northwood	J. J. Sondergard
536	Tenold Cry. Assn..... c	S. O. Vold.....	Northwood Rl.....	N. O. Dahlen
537	Hanlontown Cry. Co..... c	H. G. Burtness.....	Hanlontown	H. E. Fowler
538	†Lake Mills Cry. Co. (Bristol Twp.)..... c			
Wright County—				
539	*Fountain Cry..... f	W. E. Mann.....	Goldfield	Jno. M. Beck
540	Norway Co-op. Cry..... c	C. J. Baxter.....	Belmond R3.....	H. J. Foss
541	*Clarion Cry. Assn..... c	Wiert Johnson.....	Clarion	Ira O'Neel
542	Rowan Co-op. Cry..... c	Wm. Steffens.....	Rowan	Geo. Goodsell
543	*Fars. Co-op. Cry..... c	G. F. Elder.....	Belmond	C.H.Vanderham

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IOWA CHEESE FACTORY LIST

Name of Factory	Proprietor	Address	Cheesemaker
Bremer County—			
Janesville Cheese Factory.....	Fowler Co.....	Waterloo	John McMurray
Cass County—			
Lewis Cheese Factory.....	Smart & Delean.....	Lewis	M. E. Delean
Crawford County—			
Astor Cheese Factory.....	O. A. Olson.....	Astor	Guy H. Foye
Greene County—			
Dana Mutual Cheese Co.....	A. J. McNurlen.....	Dana	A. J. McNurlen
Keokuk County—			
Clay Cheese Factory.....	E. S. Wolcott.....	Richland	
Lee County—			
Franklin Sta. Cheese Factory.....	Chas. Klingler.....	Donnellson	L. J. Washburn
Mitchell County—			
Riceville B. & Cheese Co.....	H. A. Cheney.....	Riceville	H. A. Cheney
Washington County—			
Dublin Cheese Factory.....	J. S. Mangold.....	Washington R7.....	J. S. Mangold
Wayne County—			
Lineville Cheese Factory.....	Mathew DeHaan.....	Lineville	Mathew DeHaan

TWENTY-FOURTH ANNUAL REPORT

OF THE

STATE DAIRY COMMISSIONER

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE YEAR 1910

W. B. BARNEY
STATE DAIRY COMMISSIONER

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES
EMORY H. ENGLISH, STATE PRINTER
1910

LETTER OF TRANSMITTAL

TO HIS EXCELLENCY, B. F. CARROLL,
Governor of Iowa.

SIR:—In compliance with the law, I have the honor to submit herewith the twenty-fourth annual report of the Food and Dairy Commissioner.

W. B. BARNEY,
Food and Dairy Commissioner.

Des Moines, November 12th, 1910.

OFFICE OF STATE FOOD AND DAIRY COMMISSIONER.

W. B. BARNEY.....Commissioner
 B. C. ILIFF.....Deputy Dairy Commissioner
 J. J. ROSS.....Assistant Dairy Commissioner
 T. A. CLARKE.....Assistant Dairy Commissioner

EXPENSES OF DAIRY DEPARTMENT OF OFFICE OF FOOD AND
 DAIRY COMMISSIONER FOR THE YEAR ENDING NOVEM-
 BER 1, 1910.

Commissioner's salary	\$2,000.00	
Commissioner's expense	513.57	
		\$ 2,513.57
Deputy's salary	\$1,400.00	
Deputy's expense	193.62	
		1,593.62
Assistant Dairy Commissioner's salary.....	\$1,400.00	
Assistant Dairy Commissioner's expense	962.26	
		2,362.26
Assistant Dairy Commissioner's salary.....	\$1,313.40	
Assistant Dairy Commissioner's expense	997.19	
		2,310.59
Clerk hire (Food and Dairy).....	\$ 957.50	
Clerk hire (Food and Dairy).....	899.98	
		1,857.48
Janitor hire (Food and Dairy).....	\$ 780.00	
		780.00
Milk agent's fees	\$1,908.29	
Milk agent's expense	24.39	
Milk agent's special work	14.00	
		1,946.68
Office expenses	172.07	
Express, freight and cartage.....	196.75	
Telegraph and telephone	153.55	
		\$ 13,886.57
Less salaries which are not paid from the Dairy Appropriation	8,750.88	
		\$ 5,135.69

REPORT OF COMMISSIONER

The law creating the office of Dairy Commissioner requires an annual report to the Governor of the state covering the dairy business of the state. Later enactments make this department responsible for the enforcement of the following laws:

PURE FOOD LAW,
 PAINT AND LINSEED OIL LAWS,
 CONCENTRATED FEEDING STUFFS LAW,
 CONDIMENTAL STOCK FOOD LAW,
 AGRICULTURAL SEEDS LAW.

The foregoing statement of expenses of this department includes all the salary and expenses of the commissioner and the deputy, and salaries of clerks, though only a minor portion of their time and services can be devoted to the work or connected with the dairy business. The law authorizing the employment of inspectors under the pure food law and providing for their compensation specifies the duties that they shall perform, their services are authorized for the specific purposes of the food law. On the other hand the dairy assistants could often do valuable work along the other lines but their time is more than occupied with the creameries.

This report going back as it does over six month's occupancy of this office by my predecessor may not be as complete as it should.

In looking back through former reports, we notice that the attention of the legislature has been called to the fact that this department is very short of help. Without heeding this, they have continued to enact legislation which has increased the work of the department without giving the extra help to enforce the new laws. The anti-discrimination law and the law for falsely manipulating the Babeock test were both much needed laws and could be made more effective by the addition of at least two more assistant dairy commissioners at salaries of not less than \$1,600 each. We wish to lay special emphasis on the compensation they shall have as any high class buttermaker is now receiving from \$1,500 to \$2,000 per year.

To properly do the work in the state, four men are barely enough. The two we now have are obliged to spend too great a share of their time on the road, as their services are much in demand and covering so large a territory their trips are necessarily long. One more clerk will have to be added to the office force at not less than \$1,200 per year to keep pace with the increased business of the department.

Permit me to call your attention to the fact that the receipts of this department for the five months from May 1, 1909, to September 30th, inclusive, were \$4,072.44 and for the same period in 1910, \$8,672.26, showing a net increase of \$4,599.82.

Several new laws will be enacted by the incoming legislature which will make the duties of the department still more arduous. It is recommended that future legislation should authorize the employment of a certain number of inspectors for both food and dairy work all to be paid out of the same fund and authorized to do work in either department. If no provision of this kind is made the State Milk Inspector should be transferred to the dairy department as his work is of such a nature as to make this almost a necessity.

Dairying in Iowa has gone by leaps and bounds for the last three years. There are many reasons for this and the work of the Iowa State Dairy Association is chief among them. Two years ago last spring, the campaign to interest the legislature in their behalf was started, and it lasted nearly a year with the result that they were given \$10,000 for the biennial period. We are very sure that it will be an easy matter to show the next legislature that no money was appropriated by the general assembly that has been of more benefit to all the people than has this. The fact that they will be able to properly account for every cent that will be used, and to show that they have collected many hundred dollars to defray the expense of speakers at dairy meetings and pay State Dairy Expert VanPelt his extra salary, should make it comparatively easy to get this appropriation renewed. I would recommend that this be made an annual appropriation of not less than \$7,000 and that the law be amended to make the State Dairy Expert's salary \$2,000. It would be well enough to put the \$1,500 limit on the assistants, but a strictly highclass man like Prof. Van Pelt cannot be secured at less than \$2,000, and it is too much of a tax on our dairy friends to ask them to donate the \$500 a year, as they have been obliged to do for the last two years. Our legislature should remember that the cost of living has materially increased in the last few years,

and that when they go on the market for help they come in competition with commercial institutions that are willing to pay a salary commensurate with the service rendered.

THE VALUE OF DAIRY PRODUCTS.

The public has criticised the dairy farmer on account of the advanced price of dairy products. When the cost of producing a pound of butter or a gallon of milk is compared with the same ten years ago, this criticism is entirely unfounded.

A recent government bulletin gives the cost of maintenance of a cow for a year as a little more than double that of ten years ago. When you take into consideration the value of land, the cost of buildings, labor and the various things that must be counted, we are not surprised at this conclusion. Feed has more than doubled in value. Going a little further back—say twenty or twenty-five years—the best of bran sold for \$4.00 per ton and the finest of clover hay for \$3.50 per ton. Is it not fair to say that if milk sold at five cents per quart at that time, good milk should bring ten cents per quart now. If it were understood by the housewives and the people generally that a quart of four per cent. milk contained more body supporting food than three-fourths of a pound of the best beefsteak and as much as eight average eggs, the sale of milk would be doubled. Beefsteak costs from twenty to twenty-five cents per pound and the dairy people should be more diligent than they have been in educating the public along these lines. Milk is the most nearly perfect of all foods, as it contains in an easily digestible form all the nutritive elements required for the body. The increased cost brings us face to face with another question: "How can we reduce this cost of production?" We may, by the use of a silo, nearly double the value of our corn crop, but there is no way to buy bran, gluten and other feeds at less than market price.

BETTER COWS A NECESSITY.

Recent reports show that a cow that produces four hundred fifty pounds of butter fat per year does so at about half the cost per pound as does the one that only makes two hundred pounds per

year. This means that we must have better cows or make no money. The one hundred and fifty and two hundred pound cow must be replaced as soon as possible with those that will yield two hundred and fifty to three hundred and fifty pounds. An increase of fifty pounds per cow would mean an increased income to Iowa of \$18,750,000. We should not be satisfied with this. One hundred pounds per cow is not an extravagant amount to anticipate. This would give the net increase of \$37,500,000. How insignificant the small appropriations made for this department appear compared with the former figures. The distribution of this money over our state would mean the betterment of the conditions of every man, woman and child. The general business of the state would receive an impetus. Every man from the common laborer to the merchant, banker or professional man would finally come into his share.

YEARLY TESTS.

The Iowa Cow Culture Club and the offering of \$1,000 by W. W. Marsh of Waterloo, Iowa, for yearly tests conducted by the Iowa State College at Ames under the supervision of the club, has done a world of good for the dairy interests of our state. We are glad to know this test will continue another year. Other states are now taking up a work along the same plan as it has become a recognized fact that yearly butter records are much more valuable than those of shorter duration.

DAIRY TRAINS.

The dairy train run over the Chicago, Burlington & Quincy railroad in southern Iowa, by the Iowa State Dairy Association, was the beginning of a new era in that part of the state and the interest in dairy work has been aroused to such an extent that several new creameries have been built and the demand for dairy cows and pure bred dairy sires has increased within a year more than one hundred per cent. No section of our state is better adapted to dairying than the southern part and we must give that territory special attention as the opportunity is here now for development.

NORTH IOWA DAIRY IMPROVEMENT ASSOCIATION.

Last year the Iowa State Dairy Association employed Mr. Patterson as an assistant. He did his work so well that when the North Iowa Dairy Improvement Association was formed, he was induced to accept a place with them. Briefly, the plan of this association is as follows: Ten creameries agree to an assessment of one-tenth of one cent per pound on their output. This fund is used to pay Mr. Patterson's salary and expenses, and he devotes his entire time to them and their patrons. The government has wisely authorized one of their experts, Mr. F. L. Odell, to give this work a part of his time. This is the first association of its kind that has been organized, and although the work is new splendid results are already being shown. The work is being watched by the entire country.

EXPERIMENTAL WORK UNDER GOVERNMENT SUPERVISION.

The work at Algona under the direction of E. B. Heaton, Junior Dairyman, employed by the government, is a new one and the state is most fortunate in securing this aid which is entirely at the expense of the government. The plan is to place Mr. Heaton's services at the command of a community for a term of three or four years. To begin with, he secures all possible data as to their conditions. He is expected to devote his time to teaching the dairymen and farmers how to produce more and better dairy products by breeding up their herds and by the use of more scientific methods of feeding. He is supposed to spend a part of his time with their creamery. This work, as we understand it, is to be under the direction of B. H. Rawl, Chief of the Dairy Division, Washington, D. C. Mr. Rawl has asked the professor in dairying at Ames and the State Food and Dairy Commissioner to co-operate with him in the management of the work and they have consented to do so.

We consider this a work of the greatest importance; the fact that most of the work will be directly with the producer and that the government expert comes in direct contact with the man who owns the cows makes it a most novel and interesting experiment.

THE YOUNG MAN SHOULD STAY ON THE FARM.

Many of us getting into the afternoon of life can easily recall the fact that not more than a score of years ago if there were three or four boys in a family on the farm, it was very generally decided that the one showing the most marked characteristics as to business ability, should be sent to town as most any of them could farm.

Under present conditions we know of no reason why this should be so, as there is no more dignified or respectable calling than that of a successful dairy farmer. There is none other that will put a greater premium on brains. Therefore, the young man or boy who may be anxious to get to the city or town may be overlooking an opportunity to make himself a most useful and influential citizen of our commonwealth by leaving the farm. If you have the elements that go to make up a successful career they may as well be developed in this vocation as any other, and the chances are that a competency for old age is as apt to be accumulated as though you went to the city. We recently learned that about eighty-five per cent of the street car conductors and motormen in a city of 150,000 inhabitants were formerly boys on the farm. We do not refer to this out of any disrespect to these men, but to show that only a small per cent of those leaving the farm find very easy or lucrative positions. Free mail delivery, telephone service, better roads, the automobile and modern conveniences in the farm home, all go to make farm life more attractive.

CITY MILK INSPECTION.

This department we have endeavored to make more efficient by appointing as State Milk Inspector, Dr. O. P. Thompson, to visit at frequent intervals the local city milk inspectors appointed by us in the various cities of the state, and have general supervision over them.

The results of his work during the short time he has been so engaged fully justify this appointment and we hope and expect thereby to increase the efficiency of this department. We are handicapped in this work in that the law authorizing the appointment,

by us, of milk inspectors, in cities of 10,000 or over, was passed nearly twenty years ago and the compensation we are allowed to pay these inspectors was then fixed by law at \$3.00 per day for the time actually employed. I need only to remind you that the price of labor of all kinds has advanced very materially during this time. It has always been inadequate, and should certainly be increased as a number of other cities having passed the 10,000 mark by the census just taken will be demanding local milk inspectors.

Formerly an inspector's principal duty was to collect samples from wagons and stores, take these samples and examine them for adulteration and the use of preservatives, and test them for the percentage of butterfat. Such work was and still is very important and essential, but we realize that to get clean and wholesome milk it is necessary to start with the producer and visit and inspect the cows, barns, utensils and facilities for making pure milk by the dairyman.

To secure an inspector who is capable of doing this work is not an easy task, for he must be a man with tact and judgment, able and willing to give the producer a reason for every requirement he may make. He should be an instructor first and a prosecutor only in cases of wilful and persistent neglect on the part of the dairyman to obey the prescribed rules and regulations.

It is the policy of the department to appoint local milk inspectors in such cities, only, as evince sufficient interest in their milk supply to appoint a city inspector, with the understanding that the same man shall be both city and state inspector. But we emphatically disparage the tendency in some cities to make this a political job, and insist that the appointee be the most efficient man available.

The greatest need that is confronting the public today with reference to the milk question is education both on the part of the consumer and the producer.

Men more conversant with the dairy business as a business should be made members of our Boards of Health.

The law requiring all milk wagons, stores or places where milk is sold to take out a license should be amended so as to include all municipal corporations. The Commissioner should have the right to withhold a license from an applicant whom he may deem unworthy or revoke any license issued by him to an owner who violates the terms thereof.

The adulteration of milk and cream by the addition of any preservative has practically ceased in this state. Most of the prosecu-

tions are based on the sale of milk low in butterfat or on sales of unclean milk. Very few samples of watered milk have been secured and most of the milk found to be low in butterfat is in that condition because a part of the cream has been removed.

Quite a few of the creameries continue to buy milk by the hundred-weight and where this custom prevails there is considerable temptation for the producer to remove a part of the cream before offering the milk for sale. About one-third of the prosecutions for the sale of milk low in butterfat have been made against patrons of creameries buying milk by the hundred-weight. The balance were for the sale of such milk by dealers, mainly in the large cities. Six cases were successfully prosecuted for false manipulation of the Babcock test.

Table showing number of permits issued to city milk dealers for each year from 1903 to 1910. In each case the year ends on July Fourth.

	1903	1904	1905	1906	1907	1908	1909	1910
Number	783	780	827	808	1006	1078	1149	1106

Cities	Population	Inspectors
Boone	10,347	
Burlington	25,741	M. E. Flynn
Cedar Rapids	32,811	Phil Pray
Clinton	25,577	A. A. Sutton
Council Bluffs	29,292	Peter Smith
Davenport	43,028	H. J. High
Des Moines	86,368	J. Howard Sasseen
Dubuque	38,494	Dr. F. J. Kennedy
Fort Dodge	15,543	D. C. Benjamin
Keokuk	14,068	Arthur J. Anderson
Iowa City	10,091	
Mason City	11,290	
Marshalltown	14,000	J. A. Turner
Muscatine	16,178	Dr. C. J. Hackett
Ottumwa	22,012	
Sioux City	47,848	E. C. Pape
Waterloo	26,693	

TUBERCULOSIS IN THE DAIRY COW.

Bovine tuberculosis and its relation as a causative factor in human tuberculosis, is a subject that has engaged the earnest attention of the people, particularly of the cities, as it relates to the city milk supply, and ordinances intended to exclude the milk of tubercular cows were passed by many of the municipal authorities.

These ordinances being submitted to the supreme court were adjudged unconstitutional. It would seem that it is to say the least, unwise for cities to undertake to make laws on this subject until after the state has first made a move in this direction, as it is a question of too large magnitude to be handled by any city, county, or possibly even the state, until after the federal government has taken definite action.

I also believe that there is a tendency to exaggerate the danger to human life from this cause. The statement is often made that cows "rotten with tuberculosis from lungs to liver" are giving milk, when any practical dairyman knows that a cow in this condition gives no milk. If the slaughter of the cow not passing the tuberculine test is to be insisted upon as a public health measure, then the public should bear at least a share of the financial loss incurred thereby, as now practiced in some of our sister states, and if the dairy cow, why not all other cattle, as tuberculosis is an infectious disease and your cow would be in constant danger of contracting the disease from her brother, the steer.

All that the dairyman asks is a square deal. Why should he be required to submit his herd to the tuberculine test and suffer the loss of those that react, when his neighbor is permitted to place untested cattle in an adjoining pasture after he has his herd cleaned up?

In my opinion but little headway can be made in the battle against bovine tuberculosis until the owner of the cow is more willing and anxious than any other man to clean up his herd, and laws passed to which he does not subscribe would be a dead letter. His co-operation may be most readily secured when you can convince him that it is to his own financial advantage to rid his herd of this disease. That it would pay him, we are convinced. The tuberculous cow in a herd renders all other cattle in that herd liable to infection and all hogs following such an animal are pretty sure to contract the disease, and tuberculosis among hogs is a question that the farmers of Iowa should reckon with now before it becomes more widespread.

Iowa is in a large measure indebted to some of the eastern states for the introduction of this disease into our midst. As a number of years since, when this question was being agitated in the east a large number of dairy cows that had reacted to the tuberculine test were shipped into Iowa, particularly in the neighborhood of our cities, and sold to the local dairymen and these cows became the

source of infection to the herds into which they were thus introduced. This in the days before Iowa dairymen had heard anything about tuberculosis in cattle. This agitation has been conducive to much good, in that it has aroused the people as nothing else could have done to the danger of using dirty and unsanitary milk.

LAW MAKING APPROPRIATION FOR THE STATE DAIRY ASSOCIATION.

Section 1. Whenever the organization now existing in the State of Iowa and known as the Iowa State Dairy Association shall have filed with the Secretary of State of the State of Iowa verified proofs of its organization, the names of its president, vice-president, secretary and treasurer, and that it has one hundred (100) bona fide members, such association shall be recognized as the Iowa State Dairy Association of the State of Iowa, and be entitled to the benefits of this act.

Sec. 2. For the purpose of aiding in the promotion and development of the dairy industry of the State of Iowa, such association shall cause to be made such inspection of dairy farms, dairy cattle, dairy barns and other buildings and appliances used in connection therewith, dairy products and methods as they shall deem best and shall arrange to furnish such instruction and general assistance, either by institutes or otherwise, as they may deem proper to advance the general interests of the dairy industry of the State.

Sec. 3. For all the purposes of this act the said association shall act by and through an executive committee of seven (7) members, consisting of the president, vice-president, secretary and treasurer of the Iowa State Dairy Association, the dean of the Iowa State College of Agriculture and Mechanic Arts, and the Professor of dairying at the same institution and the Food and Dairy Commissioner in the State of Iowa.

Sec. 4. They may employ two or more competent persons who shall devote their entire time to such inspection and instruction under the direction of the said executive committee, and who shall hold office at the pleasure of the committee, and who shall each receive a salary of not to exceed fifteen hundred dollars (\$1,500.00) per annum, and actual expenses while engaged in such work.

Sec. 5. The salaries of all persons employed under the provisions of this act shall be paid monthly out of the appropriation herein provided and all travelling expenses and all general expenses incurred by the association in carrying out the purposes of this act shall be paid out of the said appropriation and in the manner provided by sections 170-d, 170-e, and 170-f of the Supplement to the Code, 1907, and upon statements filed with the Executive Council as therein provided; but no such bill shall be paid until after it shall have been audited and approved by the association in such manner as the executive committee shall provide.

Sec. 6. The said association may require such reports from their employes as they shall deem proper, and shall make to the Governor an annual report of their proceedings under this act, which report shall be

published as a part of the proceedings of the annual convention of the Iowa State Dairy Association.

Sec. 7. For the purpose of carrying into effect the provisions of this act and the payment of all expenses connected therewith, there is hereby appropriated out of any funds in the treasury of the State, not otherwise appropriated, the sum of ten thousand dollars (\$10,000.00) or so much thereof as may be necessary to pay the salaries and expenses of the employes appointed under the provisions of this act and the expenses incurred by the Iowa State Dairy Association in developing and promoting the dairy industry of the state as by this act provided.

ANTI-DISCRIMINATION LAW.

CHAPTER 222, ACTS OF THE THIRTY-THIRD GENERAL ASSEMBLY.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That the law as it appears in section five thousand twenty-eight-b (5028-b) of the Supplement to the Code, 1907, be amended by adding after the period at the end of said section the following:

Any person, firm, company, association or corporation, foreign or domestic, doing business in the state of Iowa and engaged in the business of buying milk, cream or butter fat for the purpose of manufacture or of buying poultry, eggs or grain for the purpose of sale or storage, that shall for the purpose of creating a monopoly or destroying the business of a competitor, discriminate between different sections, localities, communities, cities or towns of this state by purchasing such commodity or commodities at a higher price or rate in one section, locality, community, city or town, than is paid for the same commodity by said person, firm, company, association or corporation in another section, locality, community, city or town, after making due allowance for the difference, if any, in the grade or quality, and in the actual cost of transportation from the point of purchase to the point of manufacture, sale or storage, shall be deemed guilty of unfair discrimination which is hereby prohibited and declared to be unlawful; but prices made to meet competition in such locality shall not be in violation of this act, and any person, firm, company, association or corporation or any officer, agent, receiver or member of any such firm, company, association or corporation found guilty of unfair discrimination as defined herein, shall be punished as provided in section five thousand twenty-eight-c (5028-c) of the Supplement to the Code, 1907.

The penalty fixed in section five thousand and twenty-eight-c (5028-c) is a fine of not less than \$500 nor more than \$5,000 or imprisonment in the county jail not to exceed one year or both penalties.

The following letter was written a short time after the passage of the above law and gives the opinion of Attorney General Byers on certain points and will bear a careful reading:

SIR.—I am in receipt of your communication of the 3d inst., requesting an interpretation of chapter 222, acts of the thirty-third general assembly which amends section 5028-b of the supplement to the code 1907, relating to unfair discrimination. You request to be advised specifically:

1. As to whether the act requires a purchaser of cream to pay the same price to all persons throughout the state on the same day.

2. In the case of a cream purchasing agent, buying cream in the locality where there is a local creamery, is the cream purchasing agent permitted to pay a higher price in that locality than is paid by his employer elsewhere, and if so to what extent.

3. If the purchaser raises the test on butter fat above what is actually shown by the test would this constitute a violation of the act?

4. Is the Food and Dairy Department charged with any responsibility in the enforcement of this statute?

1 and 2. Your first and second questions are so closely related that they may be answered jointly.

The purpose of the act was to prohibit any person, firm, company, association or corporation doing business in this state and engaged in the business of buying milk, cream or butter fat for the purpose of manufacture, or of buying poultry, eggs or grain for the purpose of sale or storage from destroying the business of a competitor or creating a monopoly by paying different prices in different parts of the state for the same grade and quality of the articles purchased after making due allowance for the difference in transportation from the point of purchase to the point of manufacture, sale or storage. The thing prohibited by the act is the discrimination in price for an illegal purpose, viz.: For the destroying of competition or the creating of a monopoly. The act itself, however, permits the paying of a different price in one place than is paid generally by the same person at different points throughout the state, provided the change in price is made in good faith to meet competition in a particular locality.

3. The payment of a different price than that generally paid throughout the state for the same article, considering the difference in cost of transportation, by the indirect method of fraudulently reading the butter fat test is as clearly illegal and a violation of the act as though a different price were paid in the regular way, provided that this is done for the purpose of destroying the business of a competitor or creating a monopoly.

4. The enforcement of this act is by section 5028-c of the supplement to the code 1907, especially enjoined upon the county attorney and the attorney general.

I conclude, therefore, that the only duty incumbent upon you in reference to this act is that which necessarily results from the nature of the act and its relation to your department.

Considering that complaints for violations of this act will constantly be presented to your department, I suggest that you refer all such complaints to the county attorney of the county where the law is violated, and also to the department of justice.

H. R. WRIGHT,
State Food and Dairy Commissioner.

H. W. BYERS,
Attorney General.

June, 1909.

Prosecution has been undertaken in two counties of the state for alleged violation of this act and both cases will no doubt come to trial within a few months. The outcome will be watched with much interest and will likely have the effect of making complaints of this character fewer in number.

PRICE OF BUTTER.

The table given herewith shows the average price of extra western creamery butter in the New York market to have been \$.3054 for the past year. This shows an increase of one and one-third cents per pound over the preceding year, and shows that butter has followed the general increase in prices of produce. The average price of butter for the year ending November 1, 1910, is \$.0384 higher than the average for the past eleven years.

Notwithstanding the high price received for butter, the make of butter decreased practically eight million pounds from the previous year. It is not easy to explain the cause of this decrease and it is no doubt due to a number of different causes. The increase in amount of milk necessary to supply the larger cities has no doubt been responsible for a part of the decrease in butter turned out by the creameries. The demand for cream for the manufacture of ice cream has also played a part in bringing about this decrease. Few people realize the rapid growth of the ice cream business during recent years. Five factories in the city of Des Moines alone have a daily output of 1,700 gallons during the ice cream season.

Considerable cream is shipped into this state from outside points by large centralizing creameries located near the border of the state. Large quantities of cream are also shipped from points in Iowa to centralizing creameries located outside of Iowa. It is impossible to determine just what influence this exchange of cream in the manner above mentioned has on the figures given in this report, but it is no doubt responsible for at least a part of the apparent decrease in the amount of creamery butter manufactured in the state.

One of the tables given in this report shows the amount of butter produced in each county in which creameries are located. Since the introduction of the centralizing creamery system these figures have been more or less incorrect as reported herein, due to the fact

that some of the cream reported in a certain county, is produced in another county and in some instances outside of the state. The report given of counties where local creameries only are found, very nearly always represents the amount actually produced.

SHOWING AVERAGE MONTHLY PRICE OF EXTRA WESTERN CREAMERY BUTTER IN NEW YORK MARKET.

Month	Twelve months ending Nov. 1,												
	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	
November	\$.3337	\$.3600	\$.3487	\$.3412	\$.3650	\$.3317	\$.3481	\$.3350	\$.2762	\$.2725	\$.2937	\$.2937	\$.3095
December	.2160	.2720	.2540	.2510	.2920	.2423	.2938	.2480	.2154	.2887	.3131	.3149	.3409
January	.1975	.3650	.2962	.3195	.2762	.2270	.2910	.3950	.3083	.3069	.3152	.3344	
February	.2100	.2500	.2950	.2962	.2900	.2517	.3218	.2709	.3254	.3233	.3009	.2964	
March	.2075	.2550	.2212	.2810	.2880	.2452	.2807	.2700	.3061	.2840	.2958	.3253	
April	.1932	.1900	.2009	.2325	.2725	.2254	.3008	.2188	.3002	.2355	.2708	.3113	
May	.1790	.2012	.1600	.2275	.2300	.2012	.2371	.2017	.2201	.2320	.2958	.2843	
June	.1880	.1950	.1925	.2195	.2160	.1808	.2049	.2022	.2300	.2329	.2381	.2729	
July	.1835	.1950	.1950	.2131	.2013	.1767	.2050	.2022	.2481	.2243	.2623	.2831	
August	.2000	.2100	.2350	.1900	.1940	.1730	.2111	.2377	.2488	.2285	.2719	.2978	
September	.2332	.2150	.2110	.2170	.2075	.1947	.2068	.2462	.2781	.2388	.3013	.2986	
October	.2400	.2190	.2200	.2302	.2100	.2065	.2184	.2611	.2911	.2673	.2964	.2996	
Average val. per lb. per year..	1.2065	\$.2278	\$.2165	\$.2416	\$.2417	\$.2140	\$.2457	\$.2375	\$.2830	.3658	\$.2880	\$.3051	

ADULTERATED BUTTER.

A few Iowa creameries have been called upon to pay a license and fine for the manufacture of adulterated butter since the last report was issued. Agents of the Internal Revenue Department are constantly on the watch for butter containing more than sixteen per cent of moisture and any creamery caught with adulterated butter can have little hope of escaping the assessment. Every manufacturer should know just what kind of a product he is placing on the market and with reasonable care on the part of the one making the tests no trouble will be experienced. No prosecutions have been undertaken by this department even where tests made have shown butter to contain more than sixteen per cent of water. The Iowa law requires that butter shall contain not less than eighty per cent (by weight) of butter fat. With the Internal Revenue Department fixing a limit of sixteen per cent water and the state law requiring not less than eighty per cent of butter fat, butter low in salt may be subject to seizure under the government ruling and yet come well within the limit fixed by the state law.

OLEOMARGARINE.

The amount of oleomargarine manufactured in the United States for the year ending June 30, 1910, was far in excess of any previous year, being 141,862,282 pounds.

This is about fifty-one million pounds more than was produced last year and is sixteen million pounds more than was ever reported in a single year even under the two cent tax. The various manufacturers of oleomargarine have been putting forth great efforts to increase the sale of their product and have advertised their goods in almost every locality.

How well they have succeeded in their purpose is revealed by the figures given above and oleomargarine is now on sale in nearly every town in Iowa. Even in the dairy districts some of the substitute is being sold.

Little trouble has been experienced on account of dealers not complying with the law relating to the handling of oleomargarine although in a few instances inspectors from this department have discovered consignments that had a yellow color in imitation of butter. Prosecution has been started wherever evidence that the law was being violated could be secured and some of these cases have resulted in fines being imposed on the violators. The number of retail licenses issued for the sale of oleomargarine in this state for the year ending June 30, 1909, was 347.

The report shows 1,623 licenses issued for the year ending June 30, 1910, and 1,277 have been issued during the first four months of the present year. This statement gives a fair idea of the growth of the oleomargarine business in the state.

CHEESE.

The last report issued from the Dairy Commissioner's office contained a list of nine cheese factories which were in operation. Only five factories reported for the past year and the amount of cheese given is slightly less than 300,000 pounds.

The cheese factories have never been able to successfully compete with butter-making plants in this state, and the make of cheese has steadily decreased for several years. The extreme care necessary in the handling of milk for the production of cheese, coupled with the fact that the average farmer depends on skim milk as feed for his calves and pigs, is no doubt largely responsible for the lack of interest in cheese production.

TABLE No. II.

TABLE SHOWING NUMBER OF POUNDS OF MILK RECEIVED, NUMBER OF POUNDS OF CREAM RECEIVED, POUNDS OF BUTTER MADE AND POUNDS SOLD TO PATRONS IN IOWA SO FAR AS REPORTED BY THE CREAMERIES.

Counties	Number reporting	Pounds of milk received	Pounds of cream received	Pounds of butter made	Pounds sold to patrons	Pounds sold in Iowa
Adair	5	237,052	1,926,928	730,311	17,394	26,543
Black Hawk	3	512,763	148,259	1,055	1,055	3,013
Adams	8	7,073,599	1,973,070	24,900	82,298	82,298
Appanoose	9	1,102,839	2,675,924	1,141,754	57,223	24,243
Audubon	6	138,198	1,169,233	994,307	8,092	6,888
Benton	14	30,827,319	2,354,562	2,197,300	123,074	488,039
Boone	4	1,278,058	654,080	274,864	17,319	32,323
Bremer	25	70,692,069	387,147	3,150,734	265,995	92,332
Buchanan	8	20,608,800	2,312,931	1,513,579	119,639	63,695
Buena Vista	3	3,248,029	705,888	6,241	5,613	5,613
Butler	14	22,246,702	3,168,233	1,735,443	123,396	49,927
Calhoun	4	783,079	7,509,736	1,488,314	7,218	17,112
Carroll	6	161,334	3,893,202	1,538,133	14,460	25,293
Cass	2	1,241,006	355,683	2,816	2,816	16,911
Cedar	3	545,291	182,332	4,980	101,333	101,333
Cerro Gordo	5	633,245	3,646,178	1,168,186	13,597	76,972
Cherokee	3	650,035	215,461	1,011	75,730	75,730
Chickasaw	13	23,975,950	4,422,679	2,254,556	161,374	63,006
Clarke	7	2,709,012	2,417,323	370,023	36,395	8,450
Clay	14	13,227,634	6,856,940	2,265,928	73,266	82,948
Clayton	4	1,321,300	3,453,980	1,253,595	16,928	106,382
Clinton	1	2,724,400	1,082,007			
Crawford	4					
Dallas	3	5,495,334	1,331,525	616,164	16,946	47,300
Davis	15		1,087,793	296,777	22,190	22,190
Decatur	1	38,305,141	7,395,749	3,728,183	196,205	194,815
Delaware	5	194,643	1,524,224	455,189	17,114	27,068
Des Moines	17	8,327,063	9,203,771	3,192,528	70,476	383,310
Dickinson	4	2,485,809	1,032,051	416,102	24,455	20,992
Dubuque	21	46,513,069	5,183,354	3,719,330	212,544	164,630
Emmet	4	432,009	2,741,334	779,832	112,616	112,616
Fayette	6	970,693	4,634,491	1,270,933	40,127	37,648
Floyd	1					
Franklin	1	247,216	281,927	117,728	2,153	13,344
Fremont	7	5,733,512	3,689,189	1,107,439	52,569	17,717
Greene	5	44,094	2,479,297	831,751	22,771	43,707
Grundy	4	431,878	1,477,529	459,780	9,562	12,009
Hamilton	7		3,353,927	907,435	39,360	19,362
Hancock	7	1,073,232	3,470,113	1,158,838	65,236	45,901
Hardin	1					
Harrison	7	3,338,805	5,237,780	1,333,965	42,700	11,516
Henry	7	1,684,773	2,547,498	804,170	38,549	10,777
Howard	1		425,943	161,626	1,204	5,375
Humboldt	7	4,092,649	1,534,329	638,329	44,464	23,231
Ia	1					
Iowa	1					
Jackson	11	3,630,431	5,942,258	2,018,952	48,900	87,394
Jasper	2	1,185,572	445,942	189,594	8,380	14,744
Jefferson	2	7,530	573,020	285,209	1,767	141,408
Johnson	11	4,050,638	11,152,649	3,622,724	100,528	77,062
Jones	1					

TABLE No. II—CONTINUED.

Counties	Number reporting	Pounds of milk received	Pounds of cream received	Pounds of butter made	Pounds sold to patrons	Pounds sold in Iowa
Keokuk	1		325,000	126,000		
Kossuth	18	5,567,995	5,337,291	1,876,206	152,188	61,834
Lee	1		2,697,494	882,403		50,000
Linn	10	4,915,090	6,968,994	1,926,470	40,340	427,379
Louisa						
Lucas						
Lyon	3		2,588,740	845,274	5,851	34,976
Madison						
Mahaska	2		3,375,000	163,267		5,030
Marion	2		556,740	184,230		53,721
Marshall	3	1,482,060	6,835,954	949,728	21,243	58,974
Mills						
Mitchell	9	1,065,838	4,293,988	1,330,200	91,979	36,910
Monona	1		228,911	79,122	315	637
Monroe	1		290,745	101,228	1,145	33,590
Montgomery						
Muscatine						
O'Brien	5		1,685,954	590,367	15,209	35,498
Osceola	2		330,733	237,258	5,540	10,180
Page	1	524,005	1,285,554	619,322		76,336
Palo Alto	14	10,681,644	1,879,832	1,636,943	156,523	71,844
Plymouth	5	79,181	1,320,493	494,104	11,528	10,721
Pocahontas	4		754,146	250,136	5,986	5,684
Polk	3	895,000	13,825,621	4,137,311		1,306,624
Pottawattamie	2	1,000,000	3,313,202	1,112,012		300,000
Poweshiek	2		1,329,998	420,220	25,524	27,174
Ringgold						
Sac	7	29,480	1,835,512	636,075	20,699	22,555
Scott	2	19,770	1,006,397	583,732		37,772
Shelby	7	2,134	1,730,029	594,221	16,156	14,620
Stout	7	331,243	4,201,283	1,573,054	26,194	40,652
Story	8	4,408,744	2,286,413	905,470	84,431	153,027
Tama	3		662,846	173,018	2,691	12,711
Taylor	1		2,630,246	761,469	11,250	22,160
Union	1		608,000	131,022	6,075	900
Van Buren						
Wapello	1		2,031,481	580,494		
Warren						
Washington	1		403,134	134,378		
Wayne	1		1,994,427	633,879	4,680	9,360
Webster	1		2,514,177	828,059	460	70,000
Winnebago	7	14,108,724	2,956,624	1,568,205	104,078	34,263
Winneshek	11		7,637,200	2,364,551	19,302	83,444
Woodbury	2	300,000	17,711,954	6,933,704	8,500	727,432
Worth	3	1,690,019	3,435,498	1,056,879	62,066	29,644
Wright	6		3,805,623	1,031,327	32,838	76,163
Total	485	365,346,824	432,037,119	93,911,005	3,164,400	6,978,068

TABLE No. III.

TABLE SHOWING NUMBER OF HAND SEPARATORS, NUMBER OF PATRONS
AND NUMBER OF COWS.

Counties	No. of creameries with hand separators	Receive cream by rail	Hand separators reported	No. of creameries using patrons and cows	No. of patrons reported	No. of cows reported
Adair	5	1	893	5	1,031	5,796
Adams	4		254	3	340	2,190
Allamakee	5	1	1,330	8	1,327	15,351
Appanoose						
Audubon	9		1,152	9	1,178	8,675
Beaton	6	1	659	6	692	5,485
Black Hawk	12	3	342	14	1,645	16,324
Bonne	4		428	4	462	2,540
Bremer	2		42	25	1,773	18,590
Buchanan	7		604	8	1,252	11,183
Buena Vista	5	2	350	5	326	6,482
Butler	12		1,024	14	1,778	15,982
Calhoun	4	3	599	4	563	3,329
Carroll	6	1	2,891	6	2,891	18,059
Cass	4		330	2	351	1,756
Cedar	3		364	3	369	1,612
Cerro Gordo	5	8	1,108	5	1,157	9,522
Cherokee	5	1	400	2	450	2,300
Chickasaw	9	1	969	12	1,335	14,995
Clarke						
Clay	7	2	723	7	823	5,508
Clayton	13	1	1,009	14	2,112	15,135
Clinton	4	2	1,551	4	1,650	8,350
Crawford	1	1	2,680	1	2,680	10,900
Dallas	2	2	560	2	915	5,660
Davis						
Decatur	1	1	350	1	390	2,340
Delaware	12	1	2,066	15	2,910	24,121
Des Moines						
Dickinson	5	1	442	6	456	3,850
Dubuque	12	3	1,145	16	2,322	17,603
Emmet	4		251	4	350	2,780
Fayette	14	1	1,401	21	2,322	22,430
Floyd	4		428	4	772	4,288
Franklin	6	3	1,071	6	1,211	7,479
Fremont						
Greene	1		165	1	181	1,267
Grundy	7	2	708	7	916	7,450
Guthrie	5	2	765	5	808	5,140
Hamilton	4	2	616	4	679	2,306
Hancock	7	3	921	7	1,014	7,348
Hardin	7		985	7	1,162	7,630
Harrison						
Henry						
Howard	7		1,028	7	1,292	10,441
Humboldt	7	1	1,159	7	1,196	7,901
Ia						
Iowa	7	1	100	1	160	1,000
Jackson	7		572	7	690	4,422
Jackson	11	2	1,526	11	1,686	14,029
Jasper	2		262	2	320	1,764
Jefferson	2	2	256	2	255	1,555
Johnson						
Jones	11	3	3,015	11	3,289	31,670

TABLE No. III—CONTINUED.

Counties	No. of creameries with hand separators	Receive cream by rail	Hand separators reported	No. of creameries using patrons and cows	No. of patrons reported	No. of cows reported
Keokuk	1	1	120	1	130	970
Kossuth	18		1,415	18	1,641	12,921
Lee	1	1	1,500	1	1,900	14,000
Linn	10	2	2,158	10	2,506	19,274
Louisa						
Lucas						
Lyon	3	2	830	3	860	6,140
Madison						
Manaska	2	2	218	1	220	1,540
Marion	1	1	210	1	210	1,470
Marshall	2	1	395	3	680	3,734
Mills						
Mitchell	9		1,615	9	1,564	12,003
Monona	1	1	96	1	96	725
Monroe	1	1	175	1	179	940
Montgomery						
Muscatine		1				
O'Brien	5	2	1,264	5	1,289	9,670
Osceola	2		275	2	277	2,100
Page	1		590	1	630	3,100
Palo Alto	14	2	927	14	1,329	10,900
Plymouth	6	1	695	5	717	4,974
Pocahontas	4	1	364	4	370	2,375
Polk	3	3	6,360	3	7,878	35,040
Pottawattamie	2	2	1,300	2	1,450	9,890
Poweshiek	7	1	655	7	677	4,885
Ringgold						
Sac	7	1	831	7	965	5,583
Scott	2	2	1,100	2	1,142	9,660
Shelby	7	2	1,062	6	1,032	5,580
Sioux	7	1	1,847	7	1,870	12,382
Story	8	3	893	8	1,000	6,120
Tama	3		185	3	218	1,220
Taylor	1		1,300	1	1,323	7,900
Union	1	1	230	1	245	1,400
Van Buren						
Wapello	1	1	580	1	580	4,060
Warren						
Washington	1	1	120	1	120	1,320
Wayne	1	1	1,000	1	1,000	9,500
Webster	1	1	500	1	600	5,400
Winneshiek	7		950	7	1,393	11,243
Winnebago	10		1,788	11	2,457	17,664
Woodbury	2	2	918	2	948	23,248
Worth	9	1	911	9	987	7,262
Wright	6	4	944	6	962	6,138
Total	420	100	87,141	479	105,121	714,629

CREAMERY LIST.

*Central Churning Plant. †skim Station. e—Co-operative. s—Stock. †—Individual.

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Adair County—			
Adair Co-op. Cry. Co.	M. L. McMannus	Adair	W. H. Skitt
Arbor Hill Co-op. Cry. Co. (Arbor Hill)	J. P. McLaughlin	Stuart	Nels Hansen
Blue Grass Cry.	Stewart Bros.	Fontanelle	L. R. Stewart
Blue Grass Cry. (Bridgewater)	W. P. Stewart	Fontanelle	E. Sickles
Greenfield Cry. Co.	Jas. F. Laude	Greenfield	J. D. Main
Adams County—			
Fars Mut. Co-op. Cry.	Jacob Lahr	Prescott	A. H. Ady
Mt. Etna Cry. (Corning)			
Allamakee County—			
Dorchester Fars Mut. Co-op. Cry.	Jacob Kumpf	Dorchester	Lewis B. Olson
Calhoun Cry. (Lansing)	P. E. O'Donnell	Church	K. V. Ferris
Postville Fars Co-op. Cry.	I. W. Campbell	Postville	I. D. Hender-shott
Fars Co-op. Cry. & Com'l Co.	J. T. Bjerke	Waterville	F. W. Hessel
Ludlow Co-op. Cry. (Ludlow)	Wm. T. Goebel	R. 1, Waukon	W. P. Muth
Arctic Spring Cry. Ass'n (Quandahl)	O. C. Flatberg	Spring Grove, Minnesota	I. O. Langille
Fars Waukon Co-op. Cry.	A. H. Hansmeyer	Waukon	F. A. Fieth
*New Albin Co-op. Cry.	R. G. May	New Albin	E. Rice
Audubon County—			
Sharon Sep. Cry. Co.	Otto Larsen	R. 5, Audubon	A. Miller
Oakfield Twp. Sep. Cry.	Harry Nyman	Brayton	M. Andersen
Audubon Cry. Co.	L. P. Nelsen	R. No. 3 Extra	L. P. Nelsen
West Hamlin Sep. Cry. (Elk Horn)	Ferd Gjerloff	R. No. 2 Extra	Johannes
Extra Cry. Co.	Chris C. Nelsen	Extra	C. C. Nelsen
Blue Grass Sep. Cry. (Hamlin)	R. W. Muehlenger	R. No. 5 Extra	F. D. Shiftlet
Danish Sept. Cry.	Peter Lykke	Kimballton	Peter Thiesen
Liberty Cry.	Jas. Wittrup	R. 1, Manning	E. Jessen
Ross Cry. (Ross)	A. M. Frandsen	Linn Grove	R. D. Ewing
Benton County—			
*Blairstown Cry.	Chas. Hanbold	Blairstown	Chas. Hazbold
Norway Cry.	H. G. Webster	Norway	H. G. Webster
Model Cry.	Gardemann & Junglaus	Newhall	W. C. Dabbs
Urbana Cry.	Jas. Romine	Urbana	Jas. Romine
Fars Cry. Co.	C. H. Hartung	Van Horne	Thos. Daniels
Shellsburg Cry.	J. A. Moeller	Shellsburg	Robt A. Moeller
Belle Plaine Cry.		Belle Plaine	
Black Hawk County—			
*LaPorte Co-op. Cry.	C. B. Gingrich	LaPorte City	Uzelle Harvey
Crain Creek Cry.	Wm. Meler	R. 1, Denver	Wm. Meler
Grant Western Cry. (Dewar)	E. T. Sadler	Waterloo	Claude Miller
Fars Cry. Ass'n	G. S. Kleckner	Dunkerton	O. G. Alexander
East Lester Cry.	L. B. Duffy	Fairbank	F. C. Bowdish
Union Cry. Co. (Finchford)	G. A. Evenson	R. 3 Janesville	J. E. McCaffrey
Hudson Co-op. Dairy Assn.	Henry Lafrenz	Hudson	Wm. McFarland
Mt. Vernon Cry. Co. (Boles)	Geo. H. Moeller	Denver	I. R. Moon
Jubilee Co-op. Cry. (Jubilee)	A. J. Widdel	Jesup	A. J. Widdel

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Black Hawk County—Continued.			
Gilbertville Dairy Ass'n (Gilbertville)	J. B. Kascht	Waterloo, 1324 Lafayette St.	S. Vander Veen
Fars Dairy Ass'n	S. Sweitzer	Waterloo	R. W. Chadwick
*Cedar Falls Cry.	J. H. Braudes	Cedar Falls	Ed. Freese
Benson Dairy Co. (Benson)	Geo. Mathes	R. No. 2 Cedar Falls	Jno. Lorenzen
Waterloo Produce Co.	S. C. Wadley	Waterloo	
Boone County—			
Rosendale Co-op. Cry.	L. C. Peterson	R. No. 4 Story City	L. C. Peterson
Dodge Fars Mut. Co-op. Cry.	L. J. Bremson	Boone	L. J. Bremson
Madrid Cry. Co.	H. G. Clark	Madrid	H. G. Clark
Boone Cry. Co.	F. F. Westerberg	Boone	A. A. Anderson
Bremer County—			
Bremer Cry. (Bremer)	H. L. Kelley	R. No. 4 Waverly	H. C. Bick
Western Douglas Cry. Co. (Waverly)	Carl Oberhen	R. No. 1 Plainfield	C. H. Wedemeyer
Little Valley Cy. Co.	Chas. Krueger	R. No. 7 Sumner	F. Wills
Farrington Cry. (Denver)	F. Garton	Cedar Falls	C. Meier
First Maxfield Cry. Co. (Denver)	Henry Matthias	Reedlyn	J. W. Wedemeyer
Frederika Cry. Ass'n	J. H. McDonald	Frederika	Cecl E. Carr
Klinger Cry. (Klinger)	C. H. Rohrsen	R. No. 2 Dunkerton	C. H. Rohrsen
Maxfield Cry. Co.	J. Stroittmann	R. No. 1 Reedlyn	F. H. Wehling
Climax Cry. Co.	Henry Specht	R. No. 3 Sumner	L. L. Zbornik
Excelstor Cry. Co.	H. E. Wuttke	Sumner	Robt. Wagner
Sumner Cry. Co.	S. A. Munger	Sumner	F. M. Zell
Fremont Cry. Co.	E. C. Fink	R. No. 2 Tripoli	H. J. Hankner
Potters Siding Cry.	H. Willbraudt	Tripoli	Jno. Ambrose
Tripoli Cry. Co.	J. C. Koch	Tripoli	Wm. Ambrose
Artesian Cry. Co. (Denver)	C. C. Truetow	R. No. 2 Waverly	E. H. Hohman
LaFayette Cry. Co.	Otto Walther	R. N. 1 Waverly	Henry Piegora
Washington Cry. Co.	E. J. Thies	Waverly	D. Botterman
Seigel Cry. Co. (Tripoli)	H. F. Moeller	Waverly	E. H. Horms
Grove Hill Cry.	Frank Kano	Fairbank	F. D. Daniels
Spring Fountain Cry.	Wm. Zell	R. No. 6 Sumner	F. W. Bremer
Reedlyn Co-op. Cry.	H. A. Griese	Reedlyn	H. A. Griese
Janesville Cry. Ass'n	H. W. Stine	Janesville	B. O. Squires
Mohawk Condensed Milk Co. (Waverly)	F. B. King	Rochester, N. Y.	
Dayton Cry.	J. H. Kasemeier	R. No. 7 Sumner	John Wehling
Plainfield Cry.	H. C. Ladage	Plainfield	H. C. Ladage
Buchanan County—			
Fairbanks Fars Cry.	A. J. Langley	Fairbank	Walter Peterson
Fars Co-op. Cry. Co.	Jno. W. Busham	Reedlyn	J. E. Sharp
Jesup Cry. Co.	C. L. Bright	Jesup	E. A. Howey
*Fars Co-op. Cry. Ass'n (Aurora)	Geo. Jellings	Stanley	
Rowley Cry.	L. Schmittler & Co	Rowley	
LaMont Cry. Co.	J. D. Thompson	LaMont	F. W. Stephenson

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Buchanan County—Continued.			
Stanley Cry. (Stanley).....	Adam Kiefer	Hazleton	Geo. L. Coyte
Otterville Cry. Co. (Otterville).....	Richard Keane	Independence	C. S. Payne
Winthrop Cry. Co. (Winthrop).....	W. F. Miner	Winthrop	W. F. Miner
Wapsie Valley Cry. Co. (Wapsie Valley).....	I. S. Hutton	Independence	W. F. Hammel
Wapsie Valley Cry. Co. (Littleton).....	I. S. Hutton	Independence	
Buena Vista County—			
Fars Co-op. Cry. Co. (Buena Vista).....	C. P. Cornelussen	Alta	H. S. Allen
Linn Grove Cry. Co. (Linn Grove).....	A. M. Frandsen	Linn Grove	H. C. Thompson
Buena Vista Cry. Co. (Storm Lake).....	Harry Dalziel	Storm Lake	Spooner
Fars Cry. and Produce Co. (Storm Lake).....	E. F. Kruse	Newell	N. C. Olsen
Butler County—			
Dumont Cry. Co. (Dumont).....	E. C. Capper	Dumont	E. C. Capper
White Rose Cry. Co. (White Rose).....	S. L. Patterson	Austinville	S. L. Patterson
Fars Co-op. Cry. Co. (Fars).....	Ed S. Palmatier	Greene	J. Jacobsen
Clarksville Cry. Co. (Clarksville).....	H. M. Crocker	Clarksville	H. M. Crocker
Monroe Central Cry. (Eleanor).....	Ben Oldenburger	Aplington	Jess. Copeland
Kesley Cry. Co. (Kesley).....	H. Patterson	Kesley	H. Patterson
Beaver Co-op. Cry. Co. (Beaver).....	J. J. Bergmann	New Hartford	Alex. Graham
Shell Rock Cry. Assn. (Shell Rock).....	M. J. Johnson	Shell Rock	M. J. Johnson
Courbat Cry. Co. (Courbat).....	O. F. Courbat	Shell Rock	O. F. Courbat
Victory Cry. Co. (Victory).....	A. B. Shadbolt	Waverly	E. F. Miller
Walkers Cry. Co. (Walkers).....	A. B. Walker	Shell Rock	A. E. Church
Northern West Point Cry. (Allison).....	T. J. O'Brien	Greene	W. H. Sampson
Allison Co-op. Cry. (Parkersburg).....	E. S. Philo	New Hartford	W. F. Graham
New Hartford Fars Mut. Co-op. Cry. (New Hartford).....	R. L. Farnsworth	New Hartford	Peter Larson
Calhoun County—			
Moon Bros. Cry. Co. (Moon Bros.).....	Harry A. Moon	Manson	Chas. G. Moon
Rockwell City Cry. Co. (Rockwell City).....	Andrew Wood	Rockwell City	A. Kindberg
Somers Cry. (Somers).....	H. H. Hopkins	Rockford, Ill.	W. H. Graham
Pomeroy Cry. Co. (Pomeroy).....	H. A. Albrecht	R. No. 1 Pomeroy	Geo. F. Allard
Carroll County—			
Coon Rapids Cry. Co. (Coon Rapids).....	M. M. Curry	Coon Rapids	Julius Sahr
Rose Valley Cry. (Roselle).....	C. Kohorst	Carroll, R. 4	C. Kohorst
Templeton Cry. Co. (Templeton).....	Geo. Bieri	Templeton	Herman Lang
Fairmont Cry. Co. (Manning).....	E. F. Howe	Omaha, Neb.	H. S. Obrist
Halbur Cry. Co. (Halbur).....	M. J. Wagner	Halbur	M. J. Wagner
Willey Cry. Co. (Willey).....	L. Larsen	R. No. 5 Carroll	L. Larsen
Cass County—			
Fars Cry. Co. (Cumberland).....	E. Euken	Wiona	Albert Heyn
*Atlantic Produce Co. (Atlantic).....	A. E. McClure	Atlantic	Carl Hansen
Cedar County—			
Golden Star Cry. Co. (Golden Star).....	W. H. Kroeger	Bennett	W. H. Kroeger
Home Cry. Co. (Home).....	Leo Reinking	Lowden	Leo Reinking
West Branch Cry. Co. (West Branch).....	Lewis Elliott	West Branch	Lewis Elliott
Cerro Gordo County—			
Sunnyside Creamery (Sunnyside).....	J. C. Mortensen	Thornton	Ralph Jansen
*E. B. Higley Co. (Higley).....	O. Koefke	Mason City	N. H. Knudsen
Fars Mut. Co-op. Cry. Co. (Fars).....	H. E. Palmeter	Clear Lake	Guy Thomas
Meservey Cry. Co. (Meservey).....	Geo. M. Lulek	Meservey	Hans Kofas
Plymouth Co-op. Cry. Co. (Plymouth).....	J. L. Stevens	Plymouth	C. N. Hart
Rockwell Cry. Co. (Rockwell).....		Rockwell	

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Cherokee County—			
White Rose Cry. (Marcus).....	Glendell Dairy Co.	Sioux City	C. D. Veien
*Cherokee Cry. Co. (Cherokee).....	John H. Goeb	Cherokee	Carl J. Goeb
Chickasaw County—			
Boyd Co-op. Fars Cry. Ass'n (Boyd).....	J. DeBettigmes	R. No. 2 New Hampton	
Alta Vista Fars Cry. Co. (Alta Vista).....	Albert Tietjen	Alta Vista	H. B. Fortney
Deertell Cry. Co. (Deertell).....	J. W. Kane	Alta Vista	C. H. Cummings
Fredericksburg Butter Factory (Fredericksburg).....	C. L. Whitcomb	Fredericksburg	C. L. Mills
Ionia Fars Cry. Ass'n (Ionia).....	H. B. Young	Ionia	F. W. Stickman
Lawler Cry. Ass'n (Lawler).....	P. J. Cooney	New Hampton	F. A. Ziegler
New Hampton Fars Cry. Co. (New Hampton).....	J. W. Krieger	New Hampton	W. T. Kepler
Fars Co-op. Cry. Co. (Fars).....	S. W. Blinn	Nashua	W. D. Wenthe
Williamstown Cry. Ass'n (Williamstown).....	Luther McGee	Fredericksburg	L. L. Flickinger
Jerico Cry. Co. (Jerico).....	Thos. Atlason	R. No. 1 Lawler	J. W. Finnegan
Saulte Co-op. Cry. Ass'n (Saulte).....	C. A. Steensland	Saute	A. W. Snyder
Riverside Cry. Co. (Riverside).....	J. W. Cagley	Nashua	H. R. Smith
Clay County—			
Fars Co-op. Cry. Co. (Fars).....	Jno. J. Lawler	Dickens	W. A. Thayer
Fars Creamery Co. (Fars).....	O. Hofstad	Postoria	Edgar Chadwick
*Royal Cry. Co. (Royal).....	G. L. McKay	Royal	C. H. Matrone
Langdon Mut. Cry. Co. (Langdon).....	N. C. Nielsen	Langdon	N. C. Nielsen
Fars Cry. & Produce Co. (Fars).....	B. A. Reid	Webb	J. A. Reid
Everly Cry. Co. (Everly).....	P. W. Johnson	Everly	P. W. Johnson
Gillett Cry. Ass'n (Gillett).....	Chas. S. Rogers	Greenville	Chas. Watson
Fars Co-op. Cry. Co. (Gillett Grove).....	E. P. Conway	Gillett Grove	Gillett Grove
Clayton County—			
Fidelity Cry. Co. (Fidelity).....	H. F. Beyer	Edgewood	Royal Farman
Elkport Cry. (Elkport).....	H. F. Beyer	Edgewood	Walter Rizer
Garnaville Fars Cry. Co. (Garnaville).....	E. C. Wirkler	Garnaville	J. F. Fisher
Luana Fars Co-op. Cry. Co. (Luana).....	Hubert Miller	Luana	S. Peterson
Littleport Cry. Co. (Littleport).....	Frank Sherman	Littleport	Frank Sherman
*Western Cry. Co. (Western).....	F. S. Morse	McGregor	W. K. Pollard
St. Olaf Co-op. Cry. Co. (St. Olaf).....	Imp. Christenson	St. Olaf	Jack Frisbie
Strawberry Pt. Fars Cry. Ass'n (Strawberry Pt.).....	H. A. Axtell	Strawberry Pt.	J. J. Bruner
Volga City Fars Cry. Co. (Volga City).....	A. E. Ollinger	Volga City	A. F. Matson
Blue Grass Cry. (Watson).....	Jno. Geraghty	R. No. 1 McGregor	Gregor
Millville Cry. Ass'n (Millville).....	Fred Mueller	R. No. 2 Guttenberg	Carl L. Loomis
Fars Cry. Co. (Fars).....	R. H. Hush	Osterlock	Louis Pohle
Edgewood Fars Co-op. Cry. Co. (Edgewood).....	W. A. Robinson	Edgewood	W. A. Rizer
Elkader Cry. Co. (Elkader).....	Fritz & Gunderson	Elkader	Elkader
Clinton County—			
Springbrook Cry. (Welton).....	John Newman Co.	Elgin, Ill.	F. G. Irons
Springbrook Cry. (Delmar Jet).....	John Newman Co.	Elgin, Ill.	L. C. Reynolds
*Springbrook Cry. (Petersville).....	Carl Lehman	Wheatland	A. E. Banta
Fars Co-op. Cry. Co. (Fars).....	Edw. Hart, Jr.	Toronto	W. L. Sloan
*Iowa Cold Storage (Iowa).....	H. R. Gray	Clinton	Walter Freed
Crawford County—			
*Fairmont Cry. Co. (Denison).....	E. F. Howe	Omaha, Neb.	Earl Cavitt
Dallas County—			
*Fars Co-op. Cry. Ass'n (Fars).....	Jas. L. Keachie	Dexter	Jas. L. Keachie
*Woodward Cry. Co. (Woodward).....	H. P. Kalonkey & Son	Woodward	Wm. Ackerman

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Dallas County—Continued.			
Van Camp Packing Company Milk Condensory (Perry)	Frank Van Camp	Indianapolis	
Decatur County—			
*Clarinda Poultry, Butter & Egg Co. (Leon)	F. H. George	Clarinda	W. B. Beckley
Delaware County—			
Greeley Fars Co-op. Cry. Co.	J. C. Matthews	Greeley	W. R. Crabb
Colesburg Cry.	Robt. A. Gull	Colesburg	A. L. Landis
Barryville Cry.	Fred Traver	Ryan	Matt M. Dowall
Hopkinton Co-op. Cry. Co.	I. T. Wilson	Hopkinton	J. M. Zubrod
Bear Grove Cry.	Jno. T. Goedken	R. N. 20 Dyersville	Elmer Reed
Delaware Co-op. Cry. Co. (Delaware)			
Earlville Cry.	A. D. Long	Manchester	E. E. Mittlestadt
Manchester Co-op. Cry.	J. M. Dunn	Earlville	W. M. Dunn
*Dairy City Cry. Co.	Jas. Bishop	Manchester	W. Middlestadt
Masonville Co-op. Cry. Co.	L. Andrews	Manchester	O. B. Bengston
Silver Spring Cry.	F. S. Harris	Masonville	R. J. Erb
Fars Co-op. Cry. (Thorpe)	E. E. Porter	Delhi	H. P. Bancroft
Ryan Cry. Co.	M. E. Blair	Manchester	G. Steussl
Hazel Green Cry. (Ryan)	Geo. A. Emry	Ryan	Geo. A. Emry
Spring Branch Cry.	Daniel King	Delhi	C. J. Rohle
Howa Dairy Co. (Onaida)	J. B. Hagan	Manchester	Harley Ewert
	A. M. Conzett	Dubuque	
Dickinson County—			
*Lake Park Co-op. Cry. Co.	J. G. Chrysler	Lake Park	E. E. Starr
Milford Fars Butter & Cheese Assn.	H. H. Shipman	Milford	Fred W. Born
Terrill Co-op. Cry. Ass'n	T. H. Tvedten	Terrill	M. C. Peterson
Superior Cry. Co.		Superior	M. M. Sorenson
Dubuque County—			
Balltown Cry. Co. (Balltown)	G. Steger	R. 23 Waupeton	E. J. Peterson
Cascade Co-op. Cry.	P. J. Conlin	Cascade	C. T. Elliott
Hickory Valley Cry. (Dyersville)	Jno. Kamm	R. 17 Farley	Peter Goetzinger
Fars Golden Star Cry.	Jos. Schindler	Dyersville	J. B. Feldman
Fillmore Co-op. Cry. (Fillmore)	R. E. Caroe	R. 29 Bernard	Wm. Craft, Jr.
Farley Cry. Co.	G. W. Cropp	Farley	Thos. Landis
Globe Cry. Co. (Luxemburg)	Geo. Friedmann	R. 2 N. Buena Vista	Jno. P. Crippes
New Vienna Central Cry.	Henry F. Smith	Geo. Landis	Geo. Landis
Farnl Cry. (Rickardsville)	J. W. Farnl	Durango	J. W. Farnl
Sherrill Cry. (Sherrill)	J. C. Boelgn	Specht's Ferry	Fred Koeller
		R. 9	C. Baehler
Worthington Cry.	C. Baehler	Worthington	H. S. Hagne
*Hague Cry. Co.	H. S. Hagne	Zwingle	N. Buena Vista
Holy Cross Cry. (Holy Cross)	Leo Sweeney	Leo Sweeney	W. P. Schroeder
*Iowa Dairy Co.	A. M. Conzett	Dubuque	G. W. Morrison
O'Neill Cry. (O'Neill)	C. O'Neill	Waupeton	
*Beatrice Cry. Co.	A. O. Elvidge	Dubuque	B. L. Kearns
		17 Cardiff St	
Emmet County—			
Hoprig Fars Co-op. Cry.	Jno. C. Bosold	Graettinger	Julius Jensen
Wallingford Cry. Co.	O. O. Refsel	Wallingford	J. C. Jensen
Estherville Cry. Co.	W. Ak-n	Estherville	M. K. Kerr
Fars Cry. Co.	W. C. Richmond	Armstrong	J. J. Boland
Fayette County—			
Fars Cry. Co.	Floyd Finney	Arlington	G. O. Miller
Clermont Valley Cry.	P. F. Ferguson	Clermont	Amon Erickson

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Fayette County—Continued.			
Elgin Fars Dairy Co.	Melchoir Luchsinger	Elgin	Ed. Hanson
Fayette Cry. Ass'n	Peter E. Jubb	Fayette	G. M. Miller
Hawkeye Cry.	J. O. Adams	West Union	Chris. Russler
Harlan Cry. Co.	J. C. Lewis	Maynard	C. B. Bracy
Jefferson Co-op. Cry. (Oelwein)	H. H. Meyer	Independence	Erve A. Cole
Randallia Cry. Co.	E. W. Taylor	Randallia	Chas. Zierath
Center Valley Cry. Co. (Summer)	J. S. Briggs	Fayette R 1	B. R. Olds
Fars Co-op. Cry. Co.	G. H. Hackman	St. Lucas	Ben H. Knennen
Westgate Cry. Co.	P. S. Coleman	Westgate	O. C. Capper
*Riverside Cry.	P. J. Schroeder	Wadena	F. J. Schroeder
West Union Cry. Co.	Ed. O. Moore	West Union	Ed. O. Moore
Waucoma Fars Co-op. Cry.	Thos. McEmney	Waucoma	W. A. Elshel
Fars Co-op. Cry. Ass'n	Geo. Jellings	Stanley	W. W. Day
Alpha Fars Cry.	J. T. Guger	Alpha	J. F. Cummings
Richfield Cry. Co. (Summer)	F. G. Niemann	Richfield	Chas. A. Day
Maple Grove Cry. Co. (Oelwein)	Thos. E. Sadler	Oelwein	Thos. E. Sadler
Oelwein Fars Cry. Co.	W. H. Day	Oelwein	O. H. Buehrer
German Cry. Co. (Westgate)	Wm. Seegers	Summer R 1	L. C. Barnes
Oran Cry. Co.	J. N. Getz	Oran	B. F. Bentley
Floyd County—			
Rockford Co-op. Dairy Ass'n	E. F. Briggs	Rockford	J. C. Farnham
Niles Cry.	Frank Bruner	Charles City	Frank Bruner
Theo. Peterson Cry.	Theo. Peterson	Charles City	Theo. Peterson
Charles City Cry.	Emil Weiss	Charles City	F. V. Thompson
Nora Springs Cry.	Elmer Mack	N. Springs	F. W. Miner
Franklin County—			
Hamilton Co-op. Cry. (Couler)	Geo. Dohrmann	Hampton	Herbert Soballe
*Fars Co-op. Cry.	H. J. Iverson	Dows	F. L. Larson
Grant Center Cry. Co.	O. M. Webber	Bradford	Herbert Brokaw
Latimer Co-op. Cry.	Chas. Briggs	Latimer	B. D. Sweet
*Hampton Cry. Co. (Hampton)	A. J. Barth	Cedar Rapids	O. E. Wichmann
*Ackley Cry.	F. J. Martin	Ackley	R. H. Severald
Greene County—			
G. W. Nicholson Co.	W. W. Wertz	Grand Jet	Ben Frank
Grundy County—			
Buck Grove Cry. (Parkersburg)	O. Niehus	Aplington	Ed. Ellinger
German Typ. Cry.	F. J. Martin	Ackley	H. Schutler
Fredsville Co-op. Cry.	Geo. W. Boyson	R. 1 Dike	A. F. Schultz
Beaver Center Cry.	Andrew J. Meyer	Stout	T. E. Dilger
*Reinbeck Cry.	R. R. Welch	Reinbeck	Theo. Meyers
Fenn Cry. Co.	W. H. Hennig	Parkersburg	B. H. Solbert
*Grundy Center Produce Co.	B. R. Churchill	Grundy Center	B. R. Churchill
Guthrie County—			
Bayard Co-op. Cry.	E. E. Strawser	Bayard	Cr. Rasmussen
Casey Cry. Co.	Harlie E. Smith	Casey	Waren E. Cline
Guthrie Center Co-op. Cry.	J. A. McLaughlin	Guthrie Center	A. W. Hanks
Menlo Cry. Co. (Menlo)	V. H. Curtis	Stuart	H. H. Colbert
North Branch Co-op. Cry. Co.	O. Schrant	Adair R 2	Hans Mortensen
Iowa Dairy Co.	Grant Morrow	Yale	D. C. Balllow
Hamilton County—			
Ellsworth Co-op. Cry.	S. Stenberg	Ellsworth	O. B. Stenberg
*Jewell Cry. Co.	Morek & Mansager	Jewell	R. P. Nelson
Randall Fars Cry. Co.	M. G. Olson	Randall	M. G. Olson
*Ellingson-Mathre Co.	Ellingson, Mathre & Co.	Webster City	T. C. Oravig

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Hancock County—			
Britt Co-op. Cry. Co.	H. A. Schaper	Britt	Geo. G. Kolthoff
Crystal Cry. Co.	L. A. Nelson	Crystal Lake	Hans Jensen
*Fars Co-op. Cry. Co.	Jno. Smith	Goodell	K. Hague
*Fars Co-op. Cry. Co.	J. Klesel	Garner	C. R. Conway
Concord Cry. Co. (Ventura)	H. H. Ollenbourg	Garner	Robt. Bless
*Fars Co-op. Cry. Co.	F. L. Bush	Kanawha	B. O. Brownlee
Woden Cry. Co.	Louis Mortensen	Woden	Frank Weltz
Hardin County—			
Alden Cry. Co.	T. E. Huston	Alden	Jno. S. Smith
Eldora Cry. Co.	Jensen & Hadley	Eldora	R. R. Hadley
Hubbard Co-op. Cry. Co.	Ernest Hilkner	Hubbard	F. Herzog
Iowa Falls Cry. Co.	E. E. Benedict	Iowa Falls	J. R. Jones
Concord & Scott Cry. Co.	A. Gronsdahl	Radcliffe	J. F. Burrettis
Harrison County—			
Waterloo Cry. Co. (Magnolia)	Leroy Corliss	Omaha, Neb.	
Howard County—			
Maple Leaf Cry. (Maple Leaf)	D. Laue	Elma R 1	A. J. Herman
Protovin Cry. Ass'n	Edw. Lukes	Protovin	Gas. Kaderobek
Saratoga Co-op. Cry. Co.	E. A. Watson	Saratoga	Henry Foss
Elma Co-op. Cry. Co.	H. P. Whelan	Elma	F. P. Whelan
Cresco Cry. Co.	Palmer & Nelson	Cresco	D. A. Palmer
Schley Cry. Co.	C. A. Fosse	Cresco	C. A. Fosse
*Fars Co-op. Cry. Ass'n	L. A. Eggerichs	Chester	C. C. Plummer
Humboldt County—			
Bradgate Cry. Co.	D. A. O'Neill	Bradgate	D. A. O'Neill
Bodie Cry. Ass'n	H. C. Olson	Bodie	Iver Thrusen
Owlake Cry. Co.	C. M. Clausen	Goldfield	W. J. Anderson
*Humboldt Cry. Co.	L. N. Clark	Humboldt	O. Bengston
Vacosta Cry. Co.	I. J. Clave	Ottosen	O. W. Dubbs
Rutland Cry. Ass'n	Jas. Osla	Rutland	Joe Bogh
Clover Cry. Co.	Lewis Olson	Thor	P. O. Knutson
H. I. Dodge Cry (Luverne)	A. R. Loomis	Ft. Dodge	
Iowa County—			
Shimer Cry. Co.	S. H. Stanerson	Conroy	W. I. Dilger
Genoa Bluffs Cry. Co. (Genoa Bluffs)	M. W. Keltling	Williamsburg R 4	
Ladora Cry. Co.	Jno. Baltzner	Ladora	Geo. P. Byrne
Marengo Fars Mut. Co-op. Cry. Co.	Bennis Sullivan	Marengo	I. O. Erstrand
Victor Co-op. Cry. Co.	Louis Feller	Victor	H. F. Lenocher
Troy Cry. Co.	Geo. C. House	Williamsburg	W. R. Edwards
*Troy Cry. (near Williamsburg)	Geo. C. House	Williamsburg	
York Cry. Co. (Williamsburg)	H. W. Hudepohl	So. Amans R 1	G. E. Steinke
Ida County—			
*Holstein Cry. (Holstein)	H. H. Hopkins	Rockford, Ill.	W. O. Bradley
Jackson County—			
Fulton Co-op. Cry. Co.	Jno. Helde	Fulton	Harry Johnson
Fars Union Co-op. Cry. Co.	Carl Hinkelman	Maquoketa	J. F. Dawson
Sabula Cry. Co.	J. F. Runkle	Sabula	J. F. Runkle
Springbrook Cry. (Miles)	Jno. Newman Co.	Elgin, Ill.	C. R. Crawford
*Springbrook Cry. (Teeds Grove)	Jno. Newman Co.	Elgin, Ill.	
Preston Cry. Ass'n	Sam'l McNell	Preston	J. A. Gordon
Springbrook Cry. (Preston)	Jno. Newman Co.	Elgin, Ill.	A. J. Negus
*Springbrook Cry. (Browns)	Jno. Newman Co.	Elgin, Ill.	
*Springbrook Cry. (Union Center)	Jno. Newman Co.	Elgin, Ill.	

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Jackson County—Continued.			
Springbrook Cry. (Spragueville)	Jno. Newman Co.	Elgin, Ill.	
*Sterling Cry. Co.	Hoffman Cry. Co.	Lamotte	Jno. M. Hoffman
St. Donatus Cry. Co.	Hendy & Frenzen	St. Donatus	P. Prutzon
*Hansen Cold Storage Co.	E. D. Hansen	Maquoketa	P. J. Huzarty
Springbrook Cry. (Springbrook)	Jno. Newman Co.	Elgin, Ill.	J. E. Ducharme
Bellevue Cry. Co.	H. Ellinghouse	Bellevue	Geo. Ellinghouse
Jasper County—			
Baxter Dairy Co.	Jno. H. Krampe	Baxter	G. W. Peterson
Newburg Cry. Co.	G. D. Alden	Newburg	Jens Jensen
Jefferson County—			
*Fairfield Cry. Co.	A. E. Labagh	Fairfield	F. S. Kelley
*Elmwood Cry. Co.	Jno. McLane	Fairfield	Lloyd McLane
Jones County—			
Monmouth Cry. Co.	Mills & Kershaw	Monmouth	Herman Mundt
Fawn Creek Cry. Co.	W. D. Romine	Amamosa	W. D. Romine
Center Jct. Cry. Co.	Mills & Kershaw	Center Jct.	Harry Johnson
*Amber Co-op. Cry. Co.	O. T. Ruhe	Amber	F. S. Nickels
Langworthy Co-op. Cry. Co.	J. H. Batchelder	Langworthy	J. H. Batchelder
Marielle Cry. Co.	S. C. Batchelder	Marielle	S. C. Batchelder
Klondike Cry. Co.	R. Bohren	Monticello	F. Lehman
*Diamond Cry. Co.	W. J. Purchas	Monticello	C. H. Cleveland
*Topaz Cry. Co.	G. W. Simpson & Co.	Oxford Jct.	A. E. Robertson
Scotch Grove Co-op. Cry. Co.	H. R. Jacobs	Scotch Grove	J. L. Batchelder
Downerville Fars Cry. Co.	C. R. Wilder	Monticello	C. R. Wilder
Keokuk County—			
*Geo. M. Griffin Cry. Co.	R. E. Gould	Sigourney	F. L. Bulkeley
Kossuth County—			
Algona Co-op. Cry. Co.	J. B. Hoffins	Algona	L. P. Anderson
Plain Creek Co-op. Cry. Co.	H. J. Bode	Algona	M. J. Bode
Burt Co-op. Cry. Co.	M. E. Warner	Burt	D. L. Godden
Bancroft Co-op. Cry. Co.	Chas. P. Hanson	Bancroft	A. J. Doleschal
Fenton Cry. Co.	C. F. C. Lange	Fenton R 2	C. F. Bollig
Germania Co-op. Cry. Co.	M. J. Dyer	Germania	M. J. Dyer
*Fars Co-op. Cry. (Hobart)	A. E. Clayton	Algona	Joel Bloomster
Irvington Co-op. Cry. Co.	J. L. Bedell	Irvington	Walter Anderson
Lone Rock Co-op. Cry. Co.	Wm. Dehnert	Lone Rock	G. Gunder
Fars Co-op. Cry. Ass'n	E. J. Skinner	Ledyard	Henry M. Dyer
Seneca Co-op. Cry. Co.	M. Jensen	Fenton	Fred Erickson
Sexton Co-op. Cry. Co.	C. A. Little	Sexton	Percy Van Alstine
St. Joseph Co-op. Cry. (St. Joseph)	Nicholas Gale	Rode R 1	M. J. Donovan
Swea City Co-op. Cry. Co.	R. H. Walker	Swea City	B. S. Nelson
Titonka Cry. (Titonka)	L. C. Peterson	Spencer	Fred Hopman
Lotts Creek Co-op. Cry. Co.	Jno. Markgraf	Lotts Creek	Wm. Kessler
Whittemore Cry. Co.	E. J. Skinner	Ledyard	Henry M. Dyer
Wesley Cry. Co.	Wester Bros.	Wesley	F. M. Whitney
Rahn Bros. Cry. Co.	E. F. Rahn	St. Benedict	Frank J. Do-mayer
Lee County—			
*The S. P. Pond Co.	E. W. Cox	Keokuk	Ed. Kane
Linn County—			
Central City Cry. Co.	E. E. Henderson	Central City	F. D. Gillian
Valley Farm Cry. Co.	T. G. Henderson	Central City	St. Elmo Wright
*Gurley-Barth Co.	A. J. Barth	Cedar Rapids	Ed Walker

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Linn County—Continued.			
Center Point Cry.	C. N. Pollock	Center Point	
Ely & Western Cry.	F. J. Dolzal	Ely	F. Dolzal
Springville Cry.	C. E. Batchelder	Springville	B. W. Batchelder
Walker Cry.	H. J. Nietert	Walker	S. W. Laird
Rogers Cry.	Paul R. Muench	Rogers	Ole Jensen
Iowa Dairy Co.'s Cry. (Prairieburg)	Iowa Dairy Co.	Dubuque	D. Jensen
Louisa Co.—			
Oakville Co-op. Cry.	Geo. Graham	Oakville	Wm. Boyle
Lyon County—			
*Rock Rapids Cry. (Rock Rapids) ..	Jas. P. Younger	Chicago, Ill.	J. J. McClelland
Inwood Cry.	L. M. Foote	Inwood	H. C. Nelson
*George Cry. (George)	H. H. Hopkins	Rockford Ill.	W. J. Becker
Maahaska County—			
*New Sharon Produce Co.	A. R. Hardesty	New Sharon	Jno. Roberts
*Oskaloosa Cry. Co.	Phillip Hoffman	Oskaloosa	Harry Martin
Marion County—			
*Pella Cry.	D. Rhynsburger	Pella	T. Smorenburg
Marshall County—			
Dunbar Cry. Co.	O. J. Olson	Dunbar	T. L. Floden
State Center Fars Cry.	E. L. Hansen	State Center	G. T. Shaunce
Minerva Valley Cry. Ass'n	A. Brackney	Clemons	A. C. Jackman
Mitchell County—			
Road Co-op. Cry.	Mrs. D. E. McLaughlin	David	Wm. Bomberger
Rock Creek Co-op. Cry. Ass'n (Osage)	H. L. Johnson	Rudd	F. E. Foy
Fars Co-op. Cry. Co.	E. O. Clapper	Orchard	M. M. Blandin
Riceville Butter & Cheese Co.	D. V. Perry	Riceville	H. A. Cheney
Stacyville Cry.	Mrs. J. Spensley	Stacyville	Chas. Woodriffs
St. Ansgar Cry. Co.	J. M. Tollefson	St. Ansgar	H. R. Bullis
Osage Co-op. Cry. Ass'n	Jno. Torsleff	Osage	G. Dusbane
Little Cedar Cry.	G. L. Helfter	Little Cedar	G. L. Helfter
New Haven Cry. (New Haven)	Julius Brunner	Osage R 4	Julius Brunner
Monona County—			
*Moorhead Cry.	P. D. Nelson	Moorhead	P. D. Nelson
Monroe County—			
*Albia Cry. Co.	Sam Jones	Albia	W. A. Elder
Muscatine County—			
West Liberty Condensed Milk Co. ..	S. G. McFadden	West Liberty	
*Muscatine Produce & Pure Ice Co. ..	Thos. D. Watson	Muscatine	W. J. Kerr
O'Brien County—			
Caledonia Cry. Co.	G. Harris	Paullina	Wm. Gehrls
Hartley Cry.	L. C. Peterson	Hartley	Fred Hoopman
*Pringhar Cry. (Pringhar)	H. H. Hopkins	Rockford, Ill.	Geo. A. Bristol
*Sheldon Cry.	D. A. Miller	Sheldon	Jos. Vollman
Union Cry. Co.	Wm. Strampe	Paullina	Carl Kruse

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Osceola County—			
Ashton Cry. Co.	B. Kramer & Son	Ashton	J. A. Kramer
Fars Co-op. Cry.	Jno. Parpluthner	Ocheyedan	C. H. Jennings
Melvin Co-op. Cry.	Fred J. Bauman	Melvin	Geo. W. Wheeler
Page County—			
*Clarinda Poul, Butter & Egg Co. ..	F. H. George	Clarinda	N. H. Trimble
Palo Alto County—			
Silver Lake Cry. Co.	J. J. Martin	Ayrshire	F. W. Shellman
*Cylinder Cry.	E. W. Reid	Cylinder	E. W. Reid
Rush Lake Cry.	D. Z. Martin	Carlew	A. W. Flumf
Emmetsburg Cry. Co.	C. Lewis Stehmer	Emmetsburg	M. Anderson
Fairville Cry. Co. (Fairville)	Jos. Kleigl	Cylinder	W. D. Kueker
Lost Island Cry. (Graettinger)	L. C. Christensen	Emmetsburg	M. P. Junker
Mallard B. & C. Ass'n	L. C. Truog	Mallard	T. R. Nelson
Fars Co-op. Cry. Co.	E. L. Lambe	Graettinger	C. R. Wilson
Osgood Cry. Co. (Osgood)	G. C. Thompson	Emmetsburg	A. L. Remington
*Fars Co-op. Cry. Co.	P. E. Iverson	Graettinger R 1	Chr. Christensen
Rodman Cry. Cry. Co.	Chas. B. Young	Rodman	C. B. Gogh
West Bend Co-op. Cry. Co.	C. J. Frye	West Bend	C. B. Gogh
Depew Cry. Co.	R. Buchan	Cylinder R 1	H. C. Hansen
Plymouth County—			
Paynes Cry.	Paynes Bank	Kingsley	Carl Lissner
Grant Twp. Cry. Co. (Mammen)	Fred Kusch	LeMars R 4	Jobe Kennedy
*Remsen Cry. Co.	H. H. Hopkins	Rockford, Ill.	Jas. Lovestrom
Akron Cry.	Aug. Popritz	Akron	Aug. Popritz
LeMars Cry. Co. (LeMars)	W. R. Hutchinson	Sioux City	P. E. Horner
Pocahontas County—			
Laurens Cry.	J. G. Hinn	Laurens	F. W. Johnson
Plover Cry.	H. Fitzgerald	Plover	J. G. Heathman
Rolfe Cry.	W. R. Rogers	Rolfe	W. B. Rogers
Palmer Cry.	Geo. Siebels	Palmer	W. F. Schuelke
Polk County—			
*Des Moines Cry. Co.	Shermerhorn-Shotwell Co.	Des Moines	W. S. Gouid
*Fars Co-op. Produce Co.	L. O. Loizenaux	Des Moines	W. B. Blood
*Beatrice Cry. Co. (Des Moines)	G. E. Haskell	Lincoln, Nebr.	R. O. Rae
Pottawattamie County—			
*Waterloo Cry. Co. (Co. Bluffs)	Leroy Corliss	Omaha, Nebr.	Wm. Leuben
*Waterloo Cry. Co. (Underwood)	Leroy Corliss	Omaha, Nebr.	
*Wild Rose Cry.	Bloomer Ice & Cold Storage Co.	Council Bluffs	L. Frederick
Poweshiek County—			
Springbrook Cry. (Guernsey)	Jno. Newman Co.	Elgin, Ill.	J. W. Fischer
Springbrook Cry. (Montezuma)	Jno. Newman Co.	Elgin, Ill.	Jno. Kane
*Grinnell Cry., Ice & Cold Storage Co.	J. W. Fowler	Grinnell	M. J. Powers
Deep River Cry. Co.	Henry J. Goebel	Deep River	H. J. Goebel
Sheridan Fars Mut. Co-op. Cry. Co. (Sheridan)	J. F. Shope	Malcolm	J. H. Neil
Fars Co-op. Cry. Co.	Andrew Tone	Jacobs	W. F. Reid
Ewart Co-op. Cry. Co.	Wm. McCormick	Ewart	E. G. Herring
Sac County—			
Fars Co-op. Cry. Co.	L. W. McCreery	Early	L. W. McCreery
Lake View Cry.	H. M. Rogers	Lake View	H. M. Rogers

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Sac County—Continued			
Delaware Center Cry. c	Clark N. Searle	Nemaha	F. J. Mabie
Schaller Cry. (Schaller)..... s	H. H. Hopkins	Rockford, Ill.	S. P. Peterson
Eden Cry. s	Geo. Angier	Schaller	Elmer Wise
*Wall Lake Cry. i	W. L. Davis	Wall Lake	G. W. Clark
Hillman Cry. i	I. Hillman	Lytton	Fred Hillman
Scott County—			
*Star Cry. s	Henry Gathja	Long Grove	Guy Mathias
*The A. Wood Cry. Co. s	F. A. Waugh	Davenport	Geo. Ferris
Shelby County—			
*Earling Cry. Co. i	J. A. Brack	Earling	R. J. Hessler
Center Cry. Co. c	D. J. Carmichael	Harlan R 4	L. C. Langens
Buck Valley Cry. Co. (Kimballton) c	Paul Bjorn	Harlan R 2	Peter Nyman
Fars Mt. Co-op. Cry. Co. c	Fred Koenig	Kirkman	Nis E. Hansen
*Portsmouth Cry. Co. i	M. Ankersterne	Portsmouth	M. Ankersterne
Prairie Rose Cry. (Prairie Rose) c	Geo. Hansen	Walnut R 2	Chris Back
†Waterloo Cry Co. (Shelby)..... s	Leroy Corliss	Omaha, Neb.	
Sioux County—			
Alton Cry. Co. i	C. J. Mueller	Alton	Emil Zorr
Hospers Cry. i	Stover & Botern'n	Hospers	Harry Hansen
Hawarden Cry. i	Mueller Bros.	Hawarden	J. P. Mueller
Hull Cry. i	Ode Roos	Hull	J. DeRoos
*Rock Valley Cry. i	F. Vander Stoep	Rock Valley	L. E. Backer
Sioux Center Cry. i	Jelgerhuis Co.	Sioux Center	J. T. Vethrop
Boyden Cry. i	R. P. Dethmers	Boyden	E. DenHerder
Story County—			
Gilbert Fars Cry. c	C. P. Lake	Gilbert	C. P. Lake
*Huxley Fars Co-op. Cry. c	Sam Maland	Huxley	P. J. Saverald
Roland Fars Cry. c	L. T. Olson	Roland	Geo. Wick
Story City Cry. Co. c	Alex. Henderson	Story City	Sam Severelde
Slater Fars Cry. Co. c	Chas. Skortman	Slater	Clarence Clark
Zearing Cry. Co. s	C. P. Bean	Zearing	C. E. Buffington
*College Cry. state	M. Mortensen	Ames	H. J. Evans
McCallsburg Fars Cry. c	B. Baumgardner	McCallsburg	C. T. Knutson
Tama County—			
Springbrook Cry Co. (Elberon).... i	Jno. Newman Co.	Elgin, Ill	Ed Novak
Tama Co-op. Cry. Co. c	H. Bissell	Tama	W. H. Graham
Gladbrook Cry. i	H. F. Beyer	Edgewood	F. R. Ballantyne
Taylor County—			
Bedford Cry. i	Frank Dunning	Bedford	Leslie Klopp
Union County—			
Fars Co-op. Cry. Co. c	Jos. Koeppling	Afton	Jos. Koeppling
*Clarinda Poultry Butter & Egg Co. (Creston) s	F. H. George	Clarinda	A. C. Zimmerman
Wapello County—			
*Yorkshire Cry. Co. s	R. N. Morrell	Ottumwa	J. C. Hall
Washington County—			
*Linwood Cry. (Wellman)..... s	Keota Produce Co	Keota	F. C. Lucia
Wayne County—			
*Old Colony Cry. i	J. L. Humphrey, Jr.	Humeston	Frank Wyr

CREAMERY LIST—CONTINUED

Name of Creamery	Name of Proprietor, Secretary or Manager	P. O. Address of Proprietor, Secretary or Manager	Name of Buttermaker
Webster County—			
Ft. Dodge Cry. i	A. R. Loomis	Ft. Dodge	Jake Mayer
Winnebago County—			
Forest City Co-op. Cry. c	Jno. Carson	Forest City	A. E. Jensen
†Forest City Co-op. Cry. c	Jno. Carson	Forest City	
Lake Mills Cry. Co. c	J. A. Horvel	Lake Mills	H. E. Forrester
†Lake Mills Cry. Co. (Dahl's Ch.) c	J. A. Horvel	Lake Mills	
†Lake Mills Cry. Co. (Newton Twp.) c	J. A. Horvel	Lake Mills	
†Lake Mills Cry. Co. (Mt. Valley Twp.) c	J. A. Horvel	Lake Mills	
Lincoln Cry. Co. c	P. N. Peterson	Rake	O. A. Jarshaw
Scarville Cry. Ass'n c	K. M. Larson	Scarville	Soren Kristensen
Vinje Cry. Ass'n c	Ole Strom	Scarville R 1	Martin Thorger-son
Thompson Co-op. Cry. Ass'n c	M. M. Tapager	Thompson	C. C. Clifton
Buffalo Center Cry. i	L. C. Sutherland	Buffalo Center	Theo. Erickson
Winneshiek County—			
Silver Creek Cry. Co. c	J. A. Thompson	Burr Oak	Jno. T. Foss
Calmar Cry. Co. i	A. A. Olson	Calmar	Iver Barlow
Ice Cave Cry. i	G. N. Kjome	Decorah	E. T. Halsey
Festina Cry. Co. (Festina)..... c	W. A. Schrandt	Calmar R 1	Mike Hauer
Highland Cry. i	Bidne & Akre	Highlandville	P. J. Bidne
Rock Springs Cry. Co. (Highlandville) s	P. M. Peterson	Spring Grove, Minn.	P. M. Peterson
Kendallville Cry. (Kendallville).... i	N. H. Nelson	Calmar	Ed. Hines
Nordness Cry. Co. (Nordness) s	J. N. Bragestad	Decorah R 1	V. V. Johnson
Silver Spring Cry. Co. s	Ole Hauge	Ossian	Ole Hauge
Ridgeway Cry. i	O. A. Fosse	Ridgeway	O. A. Fosse
Lincoln Cry. Co. c	O. O. Rue	Ridgeway	J. H. Bakken
Woodbury County—			
*Hanford Produce Co. s	J. H. Whittemore	Sioux City	M. O. Wheelock
*Blue Valley Cry. Co. s	C. J. Walker	Sioux City	C. L. Smith
Worth County—			
Fertile Co-op. Dairy Co. c	J. A. Johnson	Fertile	J. A. Johnson
Kensett Cry. Co. i	Gyllick Bros.	Kensett	N. J. Gyllick
Joice Cry. i	Gyllick Bros.	Joice	Jno. Gyllick
Fars Butter & Cheese Ass'n c	M. D. Johnson	Northwood	R. S. Bergsather
Fars Co-op. Cry. c	E. R. Stock	Manly	L. O. Knudson
Hartland Dairy Ass'n (Northwood) c	Gust Reverson	Emmons, Minn	A. M. Hanson
Brookfield Cry. c	J. J. Sondergaard	Northwood	J. J. Sondergaard
Tenold Co-op. Cry. Ass'n c	S. O. Vold	Northwood	N. O. Dalben
*Hauloutown Cry. Co. c	H. E. Fowler	Hauloutown	H. E. Fowler
†Lake Mills Cry. Co. (Bristol Twp) c	J. A. Horvel	Lake Mills	
Wright County—			
*Fountain Cry. i	W. E. Mann	Goldfield	J. M. Beck
Norway Co-op. Cry. Co. c	C. J. Baxter	Belmond R 3	H. J. Foss
*Clarion Cry. Ass'n c	Wiert Johnson	Clarion	Ira O'Neil
Rowan Co-op. Cry. Co. c	A. C. Rietz	Rowan	A. E. Pelly
*Fars Co-op. Cry. Co. c	G. F. Elder	Belmond	C. H. Vanderham
*Eagle Grave Cry. Co. i	Pyburn & Olson	Eagle Grove	E. T. Pyburn

CHEESE FACTORY LIST.

Name of Factory	Name of Proprietor, Secretary or Manager	Post Office	Name of Cheesemaker
Cass County—			
1 Lewis Cheese Factory.....	M. E. Delean....	Lewis	M. E. Delean.
Greene County—			
2 Dana Mutual Co-op. Cry. Co....	A. J. McNurlen..	Dana	A. J. McNurlen.
Lee County—			
3 Franklin Station Cheese Factory	Michael Anton....	Donelson	L. J. Washburn
Mitchell County—		R. D ₄ No. 1.	
4 Riceville Butter & Cheese Co....	O. V. Perry.....	Riceville	O. V. Perry.
Wayne County—			
5 Lineville Cheese Factory.....	Matthew DeHaan..	Lineville	Matthew DeHaan

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U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

IN CO-OPERATION WITH THE

Iowa Weather and Crop Service

ANNUAL REPORT FOR 1909

GEO. M. CHAPPEL, Director.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES
EMORY H. ENGLISH, STATE PRINTER
1910

ANNUAL REPORT, 1909.

This report has been compiled from the monthly and weekly bulletins of the Iowa Weather and Crop Service, the purpose being to present in a condensed form the principal climatic features of the year, together with the tabulated statistics of the staple soil products of the state, for future reference.

The equipment of the co-operative meteorological stations has been kept up to a high standard through the generous co-operation of the Hon. Chief U. S. Weather Bureau. Self-registering maximum and minimum thermometers, rain gages and instrument shelters have been issued whenever necessary to improve the records.

Meteorological reports were received regularly each month from 122 stations in charge of co-operative observers, and also from the U. S. Weather Bureau stations at Des Moines, Davenport, Dubuque, Charles City, Keokuk, Sioux City and Omaha, Nebraska.

During the six crop months of 1909, this office distributed about 42,500 copies of the weekly weather crop bulletin and during the year 22,000 copies of the Monthly Climatological Report of the Weather and Crop Service.

The distribution of the daily weather forecasts, by mail, rural telephone and rural mail service has been maintained with very little variation in the number distributed as compared with the number issued in 1908. About one hundred thousand rural telephone subscribers and nearly seven thousand patrons of the rural mail routes receive the forecasts daily and special warnings of the approach of cold waves and heavy snows whenever issued.

The tabulation of the precipitation data for the several drainage basins of the state has been completed, and the tables are being printed by the Chief U. S. Weather Bureau.

CLIMATOLOGY OF THE YEAR 1909.

The mean temperature was very nearly normal, there being an excess of only 0.1°; but the average snowfall was considerably above the normal of the past twenty years. The average snowfall was greater than ever before recorded since state-wide observations began in 1890, and the

LETTER OF TRANSMITTAL

January 26, 1910.

To His Excellency, B. F. CARROLL, Governor of Iowa:

SIR.—In accordance with the requirements of the law, I have the honor to submit herewith the twentieth annual report of the Iowa Weather and Crop Service for the year, 1909.

I am, sir, very respectfully,

Your obedient servant,

GEO. M. CHAPPEL,

Director.

average precipitation has been exceeded only once, in 1901, during that time. January, February, June and November gave an excess of temperature and precipitation. There was a deficiency of both temperature and precipitation during March, May and October, while April, July, September and December gave a deficiency of temperature and an excess of precipitation. August gave an excess of temperature and a deficiency of precipitation, and both the temperature and precipitation were below normal in October. The spring and early summer months were cool and wet; but August was hot and dry. The most notable characteristics of the weather during 1909 were the continuously cold weather during the fore part of the planting season; the excessive rains in June and the first half of July; the droughty conditions in August; the high temperature and excessive precipitation in November; and the severe cold and abnormally heavy snowfall in December.

BAROMETER.—The mean pressure of the atmosphere for the year 1909 was 30.02 inches. The highest observed pressure was 30.71 inches, at Dubuque, Dubuque county, on January 7th, and at Sioux City, Woodbury county, on January 30th. The lowest pressure observed was 29.06 inches, at Davenport, Scott county, on January 29th. The range for the State was 1.65 inches.

TEMPERATURE.—The mean temperature for the State was 47.6°, which is 0.1° above the normal for the State. The highest temperature reported was 103°, at Bloomfield, Davis county, on August 15th, and at Baxter, Jasper county, on August 16th. The lowest temperature reported was -26°, at Inwood, Lyon county, on February 15th and December 29th. The range for the State was 129°.

PRECIPITATION.—The average amount of rain and melted snow for the year as shown by complete records of 97 stations, was 40.01 inches, which is 7.36 inches above the normal, and 4.75 inches above the average amount in 1908. The greatest amount recorded at any station for the year was 53.48 inches, at Perry, Dallas county. The least amount recorded was 27.20 inches, at Buckingham, Tama county. The greatest monthly rainfall was 13.30 inches, at Afton, Union county, in June. The least monthly precipitation was a trace, at Fairfield, Jefferson county, in August. The greatest amount in any 24 consecutive hours was 6.50 inches, at Allerton, Wayne county, on July 6th. The average amount of snowfall was 46.8 inches. The greatest amount of snowfall, unmelted, at any station during the year was 90.8 inches, at Algona, Kossuth county. The greatest monthly snowfall was 32.0 inches, at Perry, Dallas county, and the greatest 24-hour snowfall was 20.0 inches, at Humboldt, Humboldt county, on March 7th. Measurable precipitation occurred on an average of 104 days.

WIND.—The prevailing direction of the wind was south. The highest velocity reported was at Sioux City, Woodbury county, 72 miles per hour, from the northwest, on January 29th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 152; partly cloudy, 92, and cloudy, 121, as against 176 clear days; 96 partly cloudy; and 94 cloudy days in 1908. The duration of sunshine was below normal in all but the summer months when it was slightly above the seasonal average.

MONTHLY SUMMARIES

JANUARY

The average temperature for the month was considerably above the normal, altho seasonable temperature for January prevailed during the first half and the last three days of the month. The coldest periods of the month were between the 5th and 12th, and the 29th and 31st, when the minimum temperatures were near or below zero. The coldest day was on the 6th when the minimum temperature ranged from 10 degrees below zero in the southern counties to 25 degrees below zero in several of the northern counties. From the 13th to the 28th the weather was unseasonably warm, especially on the 23d, when the highest temperature ever recorded in January occurred at several stations in the southeastern part of the State. The last three days of the month were cold with minimum temperatures generally below zero. There was considerably more precipitation than usual, notwithstanding the fact that but little moisture fell prior to the 28th. Small amounts of snow fell between the 4th and 7th, and on the 15th and 16th. Light rain fell between the 18th and 23d with an excessive amount of foggy weather. Light rain began on the 28th increasing to heavy rain in the evening and turning to snow during the night. This storm was attended by extremely high northwest winds which continued from the night of the 28th to the morning of the 30th, making it one of the worst blizzards experienced in this section for many years. The high winds caused the snow to drift badly, and blew down hundreds of windmills and thousands of telegraph and telephone poles. All street car and railroad train service was practically abandoned, and many head of live stock perished from the cold and exposure. The storm was so fierce that live stock would not face the wind and flying snow to seek shelter. The wind, during the storm, attained a maximum velocity of 72 miles per hour at Sioux City; 66 miles at Omaha, Nebr.; 44 miles at Des Moines; 37 miles at Keokuk; 36 miles at Davenport; and 31 miles at Dubuque.

There was some plowing done between the 24th and 27th in the southeastern counties, but the alternating thawing and freezing weather was not favorable to fall grain.

TEMPERATURES.—The monthly mean temperature for the State, as shown by the records of 113 stations, was 21.2°, which is 1.9° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 17.8°, which is 1.6° above the normal; Central section, 21.3°, which is 2.1° above the normal; Southern section, 24.4°, which is 2.0° above the normal. The highest monthly mean was 28.4° at Ottumwa, Wapello county, and the lowest monthly mean 13.2° at Rock Rapids, Lyon county. The

highest temperature reported was 72° at Keokuk, Lee county, on the 23d; the lowest temperature reported was 25° below zero at Grand Meadow in Clayton, Northwood in Worth, and Ridgeway in Winneshiek counties, on the 6th. The average monthly maximum was 55.1°, and the average monthly minimum was 17.9° below zero. The greatest daily range was 50° at Ames, Story county. The average of the greatest daily ranges was 38.8°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 119 stations, was 1.66 inches, which is 0.61 inch above the normal. By sections the averages were as follows: Northern section, 1.61 inches, which is 0.79 inch above the normal; Central section, 1.77 inches, which is 0.67 inch above the normal; Southern section, 1.60 inches, which is 0.36 inch above the normal. The greatest amount, 3.74 inches, occurred at Ridgeway, Winneshiek county, and the least, 0.41 inch, at Le Mars, Plymouth county. The greatest amount in twenty-four hours, 2.10 inches, occurred at Lacona, Warren county, on the 28th. Measurable precipitation occurred on an average of 6 days.

The average snowfall, unmelted, was 7.8 inches. By sections, the averages were as follows: Northern section, 9.3 inches; Central section, 8.2 inches; Southern section, 5.8 inches. The greatest monthly snowfall, 20.0 inches, occurred at Elkader, Clayton county, and the greatest amount in twenty-four hours, 8.0 inches, at Northwood, Worth county, on the 15th, and at Iowa Falls, Hardin county, on the 29th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 9; partly cloudy, 6; cloudy, 16. The duration of sunshine was below the normal, the percentage of the possible amount being 29 at Davenport; 28 at Des Moines; 30 at Dubuque; 34 at Keokuk, and 35 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 72 miles per hour from the northwest, at Sioux City, Woodbury county, on the 29th.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenoweth*. The weather was dry and cloudy up to the 28th when rain began, turning to snow and a severe blizzard on the 29th with the temperature below zero on the 30th and 31st.

ALTA.—*David E. Hadden*. The worst blizzard experienced here in 21 years occurred between the evening of the 28th and the morning of the 30th.

ALTON.—*W. S. Stagle*. The ice harvest was discontinued on the 21st on account of the warm weather. There was considerable cloudy and misty weather during the latter part of the month with changeable wind. On the 29th the high wind together with three inches of snow on the ground made a bad blizzard.

AMANA.—*C. Schadt*. With the exception of some very cold days between the 5th and 13th and the 30th and 31st the month was generally mild and the soil absorbed the rain which fell on the 28th. The blizzard on the 29th was very severe.

ATLANTIC.—*Thos. H. Whitney*. The storm of the 28th and 29th was the most severe we have had in many years and caused considerable damage to buildings and great loss to live stock from exposure.

AUDUBON.—*Geo. E. Kellogg*. The worst storm in the history of Audubon county occurred on the 28th and 29th. The temperature dropped from 40° to 8 degrees below zero in 24 hours with high wind, sleet and snow. Many cattle and sheep perished during the night of the 28th.

BAXTER.—*W. R. Vandike*. A terrific blizzard occurred on the 29th. It was the most disastrous to live stock of any storm I have experienced during 53 years' residence in Iowa. Stock would not face the storm to seek shelter and many perished. One man lost 27 head of cattle.

BEDFORD.—*E. E. Healy*. The storm on the 29th was the most severe ever known here.

BONAPARTE.—*Hon. B. R. Vale*. The maximum temperature on the 23d was 70 degrees, which is the highest recorded in January or February during the past 18 years. On six days the temperature was down to zero or below, but on the whole the month was very pleasant and dry.

BOONE.—*Carl Fritz Henning*. On the 28th rain began about 5 a. m. and continued to drizzle at intervals until 9 p. m. when heavy rain began, turning to snow during the night with rapidly falling temperature and high winds. The maximum velocity of wind occurred between 6 a. m. and 8 a. m. of the 29th when windmills, telegraph and telephone poles were blown down, buildings and trees were damaged, street car service suspended, railroad trains seriously delayed and many head of live stock, chickens and birds perished.

BRITT.—*Geo. P. Hardwick*. There was an excessive amount of cloudiness during the month. The rain of the 28th turned to snow with a gale of wind at 4 a. m. of the 29th, during which much live stock perished and many windmills were blown down. It was the worst blizzard in many years.

CHARITON.—*C. C. Burr*. The month was unusually pleasant with almost no precipitation until the 28th when we had as bad a storm as has visited this country in recent years.

CLARINDA.—*A. S. Van Sandt*. The wind velocity on the 29th was estimated to be 65 miles per hour. Many windmills and chimneys were blown down and evergreen trees uprooted. A great deal of damage was also done to window glass.

CLEAR LAKE.—*Oscar Stevens*. The worst blizzard we have had in many years occurred on the 29th.

CORYDON.—*Mrs. Clara Miller*. A large number of cattle are reported to have perished during the storm of the 28th.

DENISON.—*W. C. Van Ness*. After the rain and a little thunder and lightning on the 28th a fearful blizzard came in the evening. The high wind did much minor damage.

DOWS.—*G. R. Flett*. The blizzard on the 29th continued for 24 hours.

ELKADER.—*Chas. Reinecke*. The ice went out of the Turkey river during the 23d.

ELLIOTT.—*Henry Barnes*. January was a fairly good month for farm and feeding purposes, except the last few days when the worst blizzard experienced for 30 years prevailed on the night of the 28th and the 29th.

GRAND MEADOW (Postville P. O.)—*F. L. Williams*. The month was generally very favorable for all kinds of stock, but there were ten days on

which the temperature was zero or below, and the storm of the 28th and the 29th was the worst of the winter.

GREENE.—*J. L. Cole*. The storm on the 29th was the worst we have had in years. Telegraph poles were blown down and broken and the electric light and telephone wires were down and out of service. There were 75 windmills blown down in this vicinity.

HOPEVILLE.—*M. T. Ashley*. Many windmills were blown down during the storm of the 29th and some live stock perished.

INWOOD.—*F. B. Hanson*. The weather has been quite variable but the mean temperature was 2 degrees above normal and the precipitation was .32 inches above normal. The storm on the 28th to 30th was the worst blizzard we have had in 21 years and if there had been more snow it would have equaled the storm of Jan. 12, 1888.

KEOSAUQUA.—*J. H. Landes*. The weather was generally cloudy, but a maximum temperature of 70° was recorded on the 23d, which is the highest temperature on record for January. There was some plowing done. The blizzard on the 29th, which lasted all day and all night, was the most severe this vicinity has had for a long time.

KNOXVILLE.—*Casey & Belville*. The worst blizzard we have had in years occurred on the 29th. High winds prevailed all day. All train service was abandoned, small buildings were blown over and plate glass windows were broken. Considerable stock perished.

LAMONT.—*T. J. Fitzpatrick*. Rain began at 1:30 p. m. on the 28th and continued with slight intermissions until about 11 p. m. when the wind shifted to the northwest and a blizzard came with snow, continuing all day and night of the 29th.

LARRABEE.—*H. B. Strever*. A blizzard struck here about 7 p. m. of the 28th and continued nearly 24 hours. The storm was very severe during the night and the high wind wrecked many windmills and did slight damage to buildings.

MT. PLEASANT.—*J. W. Edwards*. The high wind on the 29th drifted the snow badly.

NEW HAMPTON.—*A. F. Kemman*. The worst blizzard on record occurred on the 29th.

PERRY.—*Hon. J. A. Harvey*. Rain fell all day on the 28th, turning to snow about 10 p. m. with high northerly wind which increased to the worst blizzard I have seen in Iowa since Dec. 1, 1856.

POCAHONTAS.—*F. E. Hronek*. The worst blizzard we have had since the "Dakota Blizzard" of Jan. 12, 1888, occurred on the 29th. The wind velocity was estimated to be 50 miles per hour.

ROCK RAPIDS.—*W. C. Wyckoff*. All telephone and telegraph lines were put out of commission during the blizzard of the 28th and 29th.

SHELDON.—*A. W. Beach*. The first half of the month gave seasonable winter weather, but most of the latter half was mild and the roads were sloppy. The blizzard on the night of the 28th and the 29th was the worst winter storm we have had in many years and the high wind did much damage to buildings.

STOCKPORT.—*C. L. Beswick*. Normal January temperature prevailed until the 14th, after which it was extremely warm until the 29th. Con-

siderable plowing was done between the 24th and 27th. Snow and extremely high wind prevailed on the 29th.

THURMAN.—*C. R. Paul*. The worst storm experienced here for many years struck the town on the evening of the 28th, following rain and a temperature of 55°.

WASHINGTON.—*Wm. A. Cook*. A very high wind with snow prevailed on the 29th.

WASHTA.—*H. L. Fetter*. The blizzard on the night of the 28th and 29th did much damage to telephone lines and large glass windows.

WAUKEE.—*A. H. Blackmore*. The storm of the 20th was the worst ever known here.

WAVERLY.—*H. S. Hooper*. The worst blizzard we have had for years prevailed from 3 a. m. of the 29th to 7 a. m. of the 30th.

WEST BEND.—*Phil. Dorweiler*. The weather during January was seasonable, but the snowstorm on the 29th was the worst we have had in 15 years.

WINTERS.—*Robt. S. Cooper*. Lightning was observed during the snowstorm on the 29th which was the most severe storm ever known here.

WOODBURN.—*C. B. McDonough*. The worst storm we have had in years occurred on the 29th. Snow fell from midnight of the 28th to 2 p. m. of the 29th with extremely high northwest wind.

FEBRUARY.

The average temperature for the State for the month of February was much above the normal, and has been exceeded but twice in the past 20 years. In February, 1892, the average was 1.9° higher, and in February, 1896, it was 1.2° higher than the average for the past month. The lowest average temperature for February during the past 20 years was 12.2° in 1899, or 14° per day lower than for February, 1909. Over the larger part of the State the month was comparatively mild and at numerous stations in the southern and southeastern and at a few stations in the central counties the minimum temperature for the month was above zero. It is the first time in 27 years that sub-zero temperatures have not been recorded during February at Des Moines and Dubuque. On the other hand, reports indicate that the month was very severe in the northwestern counties where the temperature was below zero on several days, and the monthly minimum ranged from 18° to 26° below zero. The weather was remarkably warm from the 1st to the 9th, and moderately warm from the 16th to the 23d, and from the 26th to the close of the month. The highest temperature was recorded at most stations on the 4th. The coldest period was between the 9th and 16th, the lowest temperature being recorded on the 15th. Another cold period occurred on the 24th and 25th.

The average precipitation was generally above the normal, there being only 29 out of 106 stations that reported a deficiency. For the State as a whole, the daily amounts of precipitation were not very large, but rain or snow was frequent. There were but two days between the 5th and 27th on which rain or snow did not fall at some station in the State. The worst storm of the month was on the 9th, when the second severe blizzard

of the winter occurred. This storm was especially severe in the northwestern counties where the snowfall was heavy and the wind velocity was over 50 miles per hour. The snow drifted badly and caused a complete suspension of all railroad and street car traffic. Many deep snow drifts, caused by this storm, were still visible in the northern counties at the close of the month.

Another storm with blizzard characteristics occurred on the 14th but was not heavy enough to cause much damage except to again fill up the narrow cuts which had been shoveled through the drifts caused by the previous storm. Some damage has been done to fall grains, clover and alfalfa by the alternating thawing and freezing weather.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 114 stations, was 26.2°, which is 7.0° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 21.8°, which is 5.6° above the normal; Central section, 26.8°, which is 7.2° above the normal; Southern section, 30.0°, which is 8.2° above the normal. The highest monthly mean was 34.2°, at Keokuk, Lee county, and the lowest monthly mean 17.4°, at Sibley, Osceola county. The highest temperature reported was 62°, at Burlington, Fairfield, Keokuk, and Ottumwa, in Des Moines, Jefferson, Lee and Wapello counties, on the 4th; the lowest temperature reported was 26° below zero, at Inwood, Lyon county, on the 15th. The average monthly maximum was 54.4°, and the average monthly minimum was 4.1° below zero. The greatest daily range was 61°, at Creston, Union county. The average of the greatest daily ranges was 38.2°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 120 stations, was 1.54 inches, which is 0.48 inch above the normal. By sections the averages were as follows: Northern section, 1.42 inches, which is 0.48 inch above the normal; Central section, 1.60 inches, which is 0.52 inch above the normal; Southern section, 1.59 inches, which is 0.44 inch above the normal. The greatest amount, 4.72 inches, occurred at Perry, Dallas county, and the least, 0.30 inch, at Lenox, Taylor county. The greatest amount in twenty-four hours, 1.50 inches, occurred at Fairfield, Jefferson county, on the 7th.

The average snowfall, unmelted, was 7.7 inches, the average for the three sections being as follows: Northern section, 11.9 inches; Central section, 7.1 inches; Southern section, 4.1 inches. The greatest monthly snowfall, 25.0 inches, occurred at Rockwell City, Calhoun county, and the greatest 24-hour amount, 12.0 inches, occurred at Rockwell City on the 10th.

Measurable precipitation occurred on an average of 5 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 11; partly cloudy, 6; cloudy, 11. The duration of sunshine was below the normal, the percentage of the possible amount being 55 at Charles City; 47 at Davenport; 48 at Des Moines; 37 at Dubuque; 52 at Keokuk, and 44 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 53 miles per hour from the northwest, at Sioux City, Woodbury county.

OBSERVERS' REMARKS.

ALTA.—*David E. Hadden.* A fierce blizzard raged all day of the 9th, and the snow drifted badly. A heavy snow and sleet storm prevailed on the 22d, doing great damage to telephone and telegraph wires.

ALTON.—*W. S. Slagle.* There was snow on the ground on the 1st and 2d and from the 8th to the end of the month. The first robin was seen on the 27th. The second crop of ice was harvested during the month.

AMANA.—*C. Schadt.* Frequent precipitation and frost made muddy and rough roads.

BONAPARTE.—*B. R. Vale.* The weather was variable with frequent storms but not cold. An electrical storm occurred on the night of the 22d.

BOONE.—*Carl Fritz Henning.* The weather was very pleasant on the morning of the 6th but had become cloudy by noon and a light mist of rain began at 5 p. m., which gradually turned to snow and heavy snow was falling by 6:30 p. m. During the storm hundreds of Lapland Longspur (*Calcarius Lapponicus*) passed over the city and many of them becoming exhausted fell or fluttered to the ground and many of them were found dead on the morning following.

CHARITON.—*C. C. Burr.* The temperature was above zero during the entire month with a maximum of 58° on the 4th.

ELLIOTT.—*Henry Barnes.* February was a bad month for business on account of muddy roads and feed lots. There was a great loss of live stock during the blizzards of January 29th and February 9th.

DAVENPORT.—*J. M. Sherier.* No very abnormally cold weather occurred during the month, the minimum temperature being 6° on the 10th, on which date the mean was but 8° below the average. Notably warm periods extended from the 1st to the 9th, and from the 18th to the 23d. The maximum temperature of the month, 59°, occurred on the 4th, and the excess for that date amounted to 26°. While no heavy precipitation was noted, rain or snow was of frequent occurrence, there being 13 days with 0.01 inch or more.

DUBUQUE.—*James H. Spencer.* The month has been warm and cloudy. The minimum temperature for the month, 3°, is the highest for February in 27 years at this station. It is the first time in 27 years that sub-zero temperatures have not been recorded during February. The storms of the month have not been severe at this station.

GRAND MEADOW (Postville P. O.).—*F. L. Williams.* The month was marked by frequent storms but none of them gave much snow, but the snow drifted badly during each storm. The condition of live stock is generally unfavorable.

HARLAN.—*C. A. Reynolds.* Thunder was heard at 3 p. m. on the 22d, during a snow storm.

INWOOD.—*F. B. Hanson.* According to the estimates of old pioneers February, 1909, was the most severe winter month since 1888. There were three separate storm periods and all of them were accompanied by heavy snow and high wind which drifted the snow so that highways and railroads have been blockaded for days at a time.

KEOKUK.—*Fred Z. Gosewisch.* The month has been mild as a rule, with only one cold wave. But one storm with heavy snow occurred during the

month, and the ground was covered only from the 14th to the 19th. There was a heavy fall of sleet on the 14th, and high winds prevailed on the 9th, 10th and 24th. At the close of the month there is very little frost in the ground, and the roads are very heavy.

KEOSAUQUA.—*J. H. Landes.* The month of February was mild and moist with the minimum temperature 8° above zero.

POCAHONTAS.—*F. E. Hronek.* The weather has been decidedly variable, changing within 24 to 48 hours from balmy spring to severe winter storms. There is a great deal of grain to be shipped but on account of the poor conditions of the roads it has been impossible to deliver it to the elevators.

RIDGEWAY.—*Arthur Betts.* The past month has been warm for February, but there has been plenty of snow. The second severe blizzard of the winter occurred on the 9th. During the winter the temperature was below zero on 16 days and the total snowfall amounted to 30.9 inches.

STOUCRY.—*C. D. Reed.* The total precipitation for February was 2.24 inches or 1.69 inches above the normal, which is the heaviest in 20 Februaries. It occurred mainly in two heavy snow storms on the 8th-9th and the 22d-23d. The storm on the 8th-9th was the worst from the standpoint of suspension of business and railway traffic, since the station was established, and probably since the historic storm of January 12, 1888. On the 9th all business houses closed, no trains entered or left the city, there was no street car service and many business men who went down town in the morning were obliged to sleep in their offices. The suspension of business continued on the 10th and the schools did not resume sessions until the 12th. The maximum wind velocity during the storm was 53 miles per hour from the northwest on the 9th.

STOCKPORT.—*C. L. Beswick.* The precipitation was .69 inch above the average for the past eight Februaries and the ground was wet most of the month and the frost was about all out by the end of the month. Stock is generally in good condition.

THE WINTER OF 1908-1909.

The mean temperature for the three winter months was 24.9°, which is 4.2° above the normal for the State. The highest temperature reported was 72° at Keokuk, Lee county, on January 23d. The lowest temperature reported was 26° below zero at Inwood, Lyon county, on February 15th. The average monthly precipitation for the state was 1.26 inches and the average total precipitation was 3.77 inches, or 0.47 inch above the winter normal. The average total snowfall, unmelted, was 19.3 inches, or one inch more than for the winter of 1907-1908. The average number of days on which .01 inch or more of precipitation was reported was 14, or one more than the average for the winter of 1907-1908. The coldest periods of the winter were from January 5th to 13th; January 29th to 31st, and from February 5th to 16th, but the severe cold of the last period was confined to the northwestern counties. The winter was 1.1° colder than the winter of 1907-1908, and 1.8° warmer than the winter of 1906-1907. The average number of clear days was 35; partly cloudy, 20; cloudy, 35, as compared

with 39 clear, 21 partly cloudy, and 31 cloudy days during the winter of 1907-1908.

MARCH.

March, 1909, will go on record as furnishing an unusual variety of weather conditions. The first six days of the month were mild and pleasant but most of the remainder of the month was cold with frequent snow and rain storms, accompanied by thunder and lightning and brisk to high winds. The snowfall in the central and northern counties was exceptionally heavy, and exceeded all previous records for March at several stations. The low temperatures also broke all former records for the second decade of the month in the north central counties and the severity of the thunder during the snow storm on the 9th was phenomenal. The average temperature for the month was slightly below the normal, yet at the central station there was an average daily deficiency of six degrees during the last 23 days. The only days between the 8th and 31st on which there was an excess were the 22d, 23d and 24th. The 23d was the warmest day of the month when the maximum temperatures ranged from 45° in the northern to 71° in the southern counties. The lowest temperature for the month at all stations was recorded on the 17th and was generally below zero in the northern districts, the lowest being 15 below zero.

The average precipitation for the state was slightly below the normal for March, but the average snowfall was considerably above the normal and was excessive in many localities. Reports indicate that there was good sleighing from five to ten days in northern districts, which is unusual for the time of the year. Notwithstanding the fact that there was a deficiency in precipitation, there was less than the usual amount of sunshine. Reports vary as to the condition of clover and winter grains; some indicate that the alternating freezing and thawing weather has had an injurious effect and others that the plants are still in good condition, but the majority show that there has not been sufficient spring growth to permit an accurate estimate. All reports, however, agree that the continued cold nights have been favorable for fruit.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 116 stations, was 32.5°, which is 1.5° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 29.6°, which is 1.6° below the normal; Central section, 32.4°, which is 1.8° below the normal; Southern section, 35.6°, which is 1.1° below the normal. The highest monthly mean was 40.0° at Ottumwa, Wapello county, and the lowest monthly mean was 28.2° at Charles City and Fort Dodge, in Floyd and Webster counties. The highest temperature reported was 71°, at St. Charles, Madison county, on the 23d; the lowest temperature reported was —15°, at Iowa Falls, Webster City and Zearing, in Hardin, Hamilton and Story counties, on the 17th. The average monthly maximum was 59.6° and the average monthly minimum was 0.5°. The greatest daily range was 48° at Carroll, Carroll county. The average of the greatest daily ranges was 33.4°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 120 stations, was 1.53 inches, which is 0.39 inch below the

normal. By sections the averages were as follows: Northern section, 1.48 inches, which is 0.25 inch below the normal; Central section 1.48 inches, which is 0.50 inch below the normal; Southern section, 1.64 inches, which is 0.41 inch below the normal. The greatest amount, 5.00 inches, occurred at Perry, Dallas county, and the least, 0.28 inch, at Denison, Crawford county. The greatest amount in any twenty-four hours, 2.00 inches, occurred at Humboldt, Humboldt county, on the 7th. The average snowfall, unmelted, was 9.8 inches, the average for the three sections being as follows: Northern section, 13.5 inches; Central section, 9.5 inches; Southern section, 6.3 inches. The greatest monthly snowfall, 32.0 inches, occurred at Perry, Dallas county, and the greatest twenty-four hour amount, 20.0 inches, occurred at Humboldt on the 7th.

Measurable precipitation occurred on an average of 6 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 12; partly cloudy, 12; cloudy, 9. The duration of sunshine was below the normal, the percentage of the possible amount being 56 at Davenport; 49 at Des Moines; 45 at Dubuque; 59 at Keokuk; and 55 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 48 miles per hour from the northwest at Sioux City, Woodbury county, on the 13th.

OBSERVERS' REMARKS.

ALLERTON.—*Mrs. Geo. Shriver*. Not much progress made in farm work but some oats have been sown.

ALFA.—*David E. Hadden*. The average temperature was 2.3° below the 19 years' normal and the precipitation was .46 inch below the average for the same period. Eight inches of snow fell on the 7th and 8th but it had all melted by the end of the following week. Frost was nearly all out of the ground at the end of the month.

ALTON.—*W. S. Slagle*. The season, at the end of March, is about 10 days later than it was last year. The ground has been very wet. There has been no field work nor seeding done.

AMANA.—*Conrad Schadt*. The weather conditions were too cold and wet to permit much farm work being done. There was, however, some plowing done on the 27th and some wheat sown on the 30th.

AUDUBON.—*Geo. E. Kellogg*. There was some plowing done during the first week of the month but the roads have been almost impassable during the whole of the month.

BAXTER.—*W. R. Vandike*. There was a heavy snow storm on the 8th and 9th, accompanied by thunder, lightning and sleet. Sleighting was good for about 10 days after the storm.

BONAPARTE.—*Hon. B. R. Vale*. Some sod plowing and a very little seeding was done during the last 10 days of the month although there was 0.5 inch of snow fell on the 29th.

BOONE.—*Carl Fritz Henning*. Twelve inches of snow fell on the 8th and 9th.

CHARITON.—*C. C. Burr*. The temperature has been about normal with more than the usual amount of wind. Some oats have been sown.

CHARLES CITY.—*E. W. McGann*. The minimum temperature on the 17th, 12° below zero, was the lowest recorded during the second decade of March for the past 18 years and the total snowfall, 23.9 inches, is the greatest on record for the past 19 years.

CORNING.—*Jerome Smith*. The roads have been in better condition than usual for March and the continued low night temperatures have kept the fruit buds back. Some plowing has been done, but that work has not yet become general and no seeding has been done although the ground is in good condition to work and to receive seed as soon as it gets a little warmer. There is about two inches of wet snow on the ground this morning, April 1st.

EARLIAM.—*Geo. Phillips*. The month closed with no farm work done and the grass has not yet started to grow.

ELLIOTT.—*Henry Barnes*. It has been impossible to do any farm work except during the last week of the month on account of snow, rain and bad roads.

ELMA.—*H. A. Moore*. The snow is all gone except in a very few places. Most of the frost is out of the ground and all roads are passable.

FOREST CITY.—*J. A. Peters*. Fourteen inches of snow fell between the 8th and 10th, accompanied by a severe blizzard on the 9th, and there were a few snowdrifts left at the close of the month. Robins came on the 22d. No field work done.

GRAND MEADOW (Postville P. O.).—*F. L. Williams*. The month was stormy and disagreeable. Hay is very scarce and price is high. The spring pig crop is starting.

GRINNELL.—*D. W. Brainard*. Country roads were in bad condition except during the last week of the month. No seeding has been done but considerable sod ground has been plowed during the past few days. Stubble ground is still too wet to work and there is some frost yet in the ground.

HARLAN.—*C. A. Reynolds*. The alternating freezing and thawing weather and the rain and snow have made it impossible to do much work in the fields. There has practically been no seeding done and but little plowing but the conditions are becoming better and the outlook for fruit is fine.

INDIANOLA.—*Prof. John L. Tilton*. Thunder was heard on the 9th while snow was falling.

INWOOD.—*F. B. Hanson*. The temperature and precipitation were below and the snowfall above normal. The ground was almost in condition for spring work at the close of the month but snow began falling thus further delaying seeding.

IOWA FALLS.—*J. B. Parmelee*. No seeding or field work done yet. Only one day with zero temperature but that broke the record for low temperature, —15° for March.

KEOKUK.—*Fred Z. Gosewisch*. The month has been mild with only one day of severe cold. The heaviest rainfall was on the 7th and 8th and snow has occurred only in light flurries. The soil has been too moist for tillage and oats have been sown only in a few favored localities.

KEOSAUQUA.—*J. H. Landes.* The weather has been good for March. Oats sowing began this week. Clover is said to be killed but other prospects are good.

LE MARS.—*G. A. C. Clark.* Snow began to fall at 8 p. m. March 31st.

LEON.—*Morris Gardner.* No seeding of any kind done as the ground has been too wet. Fruit buds have not started yet but grass shows a little green in favored spots. Hay is very scarce at \$13.00 per ton. The last two months have been hard on stock and feeders and many spring foals are being lost.

LITTLE SIOUX.—*Geo. H. Gibson.* Cloudy weather prevailed during the greater part of the month. Five inches of snow fell during the 8th, 9th and 12th. The cool weather is considered to be beneficial to fruit trees as the buds have made no material progress. Wheat seeding began on the 29th and some plowing has been done.

MASSENA.—*C. E. Smeltzer.* Field work is fully two weeks later than in average seasons.

NORTHWOOD.—*Chas. H. Dwelle.* Snow and ice are in evidence under trees and on the north side of buildings at the close of the month.

OLIN.—*C. M. Miles.* The ground is in fair condition for seeding and oats seeding began on the last day of the month.

ONAWA.—*C. G. Perkins.* The precipitation has been below the normal. Farmers are all ready to sow wheat and some was sown this week but the heavy snow on the night of the 31st will delay seeding. Winter wheat is looking well.

PELLA.—*John H. VerSteeg.* The weather has been mild for March with but little moisture but the roads have been in an impassable condition. Some wheat was sown on the 31st but the ground is wet and cold.

PLOVER.—*J. S. Smith.* Ducks, geese, robins and blackbirds were going north on the 1st and 2d, but were driven back by the storm on the 7th. The temperature was 10° below zero on St. Patrick's day. There has been no grain sown yet.

POCAHONTAS.—*F. E. Hronek.* Some grain was sown on the 30th and if the weather continues favorable for three or four days seeding will be general.

RIDGEWAY.—*Arthur Betts.* During the past 11 years, March, 1899, 1900, and 1906 were colder than the past month. 14.5 inches of snow fell on the 8th and 9th.

SHELDON.—*Dr. A. W. Beach.* No farm work has been done and the roads were almost impassable until the last week of the month.

STOCKPORT.—*C. L. Beswick.* March was a fine month. Stock is in good condition and feed is plentiful. Spring plowing progressing during the last two weeks and oats sowing has been pushed the last three days. Clover and winter grain generally in good condition but peaches are mostly killed.

STORM LAKE.—*S. B. Fracker.* March was remarkable, both for the beautiful days in the first and last weeks and for the heavy snow from the 7th to the 18th.

THURMAN.—*C. R. Paul.* The month was cold and wet and no farm work of any importance has been done. The heavy snow on the 9th has made the season very backward.

WASHTA.—*H. L. Felter.* There was no seeding or plowing done at any time during the month of March. There are some snow banks yet, in places, and considerable frost remains in the ground. The roads have been very bad on account of snow in cuts and shaded places.

WAVERLY.—*H. S. Hoover.* The month of March was very cloudy and cold with much more snow than in any of the winter months and the rains were heavier and colder than the average of March for some years. There has been no plowing nor seeding done.

APRIL.

The month was abnormally cold and cloudy with an excessive amount of precipitation in all but the extreme western counties where there was a slight deficiency. Freezing temperatures occurred in all districts every week during April, and the month closed with the temperature at freezing or below in all parts of the state. The average temperature was 2.3° higher than the average for April, 1907, which was the coldest April on record since state-wide observations have been taken and the only one colder than the past month.

The precipitation, like the cold, was almost continuous, there being very few warm or clear days. At least a trace of rain or snow fell in some part of the state on every day during the month and the average amount of snowfall was greater than the average of any preceding April since 1896. Thunder storms accompanied by hail and wind squalls were frequent, and, in many cases, were quite destructive to property. Under such adverse conditions, field work has been retarded and was, at the close of the month, about two weeks behind the average of former years. In the east central and northeast districts, where rain or snow fell almost daily from the 12th to the 30th, farm work is especially backward, and the seeding of oats in those districts was only about three-fourths finished at the close of the month. A large acreage intended for oats has been abandoned in all parts of the state, thereby reducing the acreage of that crop from 10% to 15% below the acreage of last year. The acreage of wheat has, however, been increased and there will be a decided increase in the acreage of corn if favorable weather prevails during May. Wheat and early sown oats are up and in most cases show a good stand, but there is a probability that oats, just beginning to sprout, were injured by the hard freeze which occurred on the night of the last day of the month. The continued cold weather has kept the fruit buds dormant and no blossoms have appeared except in the extreme southern counties, and the indications are thereby very favorable for a good crop.

Clover and all grasses, while making slow growth, are in good condition and reports indicate that there was very little damage done by the alternating freezing and thawing weather during the winter, and the excessive precipitation during April assures another good hay crop.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 117 stations, was 43.8°, which is 4.7° below the normal for Iowa. By sections the mean temperatures were as follows: Northern

section, 40.7°, which is 6.1° below the normal; Central section, 44.1°, which is 4.4° below the normal; Southern section 46.7°, which is 3.6° below the normal. The highest monthly mean was 50.6°, at Keokuk, Lee county, and the lowest monthly mean 37.0°, at Rock Rapids, Lyon county. The highest temperature reported was 86°, at Burlington, Des Moines county, on the 29th; the lowest temperature reported was 14°, at Elma, Howard county, and Fayette, Fayette county, on the 10th. The average monthly maximum was 76°, and the average monthly minimum was 20°. The greatest daily range was 52°, at Hancock, Pottawattamie county, and Storm Lake, Buena Vista county. The average of the greatest daily ranges was 39°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 119 stations, was 4.58 inches, which is 1.75 inches above the normal. By sections the averages were as follows: Northern section, 4.18 inches, which is 1.71 inches above the normal; Central section, 4.95 inches, which is 2.08 inches above the normal; Southern section, 4.60 inches, which is 1.46 inches above the normal. The greatest amount, 9.43 inches, occurred at New Hampton, Chickasaw county, and the least, 0.83 inch, at Hancock, Pottawattamie county. The greatest amount in any twenty-four hours, 4.60 inches, occurred at New Hampton, Chickasaw county, on the 18th. Measurable precipitation occurred on an average of 12 days.

The average amount of unmelted snowfall for the state was 3.1 inches; the greatest amount, 20.8 inches, occurred at Northwood, Worth county.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 9; partly cloudy, 9; cloudy, 12. The duration of sunshine was below the normal, the percentage of the possible amount being 58 at Charles City; 49 at Davenport; 47 at Des Moines; 41 at Dubuque; 59 at Keokuk, and 47 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 56 miles per hour from the northwest, at Sioux City, Woodbury county, on the 28th.

OBSERVERS' REMARKS.

AFTON.—*Hon. N. W. Rowell.* There is not a green leaf visible at the close of the month.

ALBIA.—*J. I. Chenoweth.* April was a cold, backward month with 17 rainy days. There was only about one-half of the intended acreage of small grain seeded. No fruit trees in bloom at the close of the month.

ALGONA.—*Dr. F. T. Seeley.* April closed with snow falling and on the whole the month was cold, damp and disagreeable.

ALTA.—*David E. Hadden.* The month of April was very cold; the mean temperature being about 7° below the nineteen-year normal. A tornado-like wind squall occurred shortly after midnight of the 28th which did a good deal of minor damage. Several barns in town were completely destroyed and one horse was killed. The storm was very unusual for the time of day and year and the prevailing cold weather at the time of its occurrence.

ALLERTON.—*Mrs. Geo. Shriver.* The month was cold and wet and farm work is two weeks behind the average.

ALTON.—*W. S. Stagle.* Frost occurred nearly every night and all vegetation is about three weeks later than usual. The acreage of small grain is less than usual.

AMANA.—*Conrad Schadt.* The weather was cold, cloudy, wet and unseasonable throughout the month and the small grain was sown under adverse conditions.

AMES.—*J. H. Criswell.* The month was cold and wet and the spring work is much behind the average. About 75% of the oats are seeded. Fruit buds not opened and are still safe.

ATLANTIC.—*Thos. H. Whitney.* Unfavorable weather retarded plowing and planting and reduced the product of spring farrowing. The soil has been wet and heavy notwithstanding that the precipitation was but a little above the normal.

BONAPARTE.—*B. R. Vale.* Small grains all sown prior to the 12th when the rainy weather began. Grass is starting very slowly. No corn has been planted but the plowing is all done.

BRITT.—*Geo. P. Hardwick.* Excessive cloudiness and low temperatures have prevailed and frost is not yet all out of the ground. Only about one-half of the oats and barley has been seeded. Trees do not show a green leaf or any bloom.

CHARITON.—*C. C. Burr.* The season is 14 days late. Quite a large portion of the acreage intended for oats will not be sown as the soil is too wet for field work, but the early sown oats are coming up. The prospects for a fruit crop are fairly good.

CLINTON.—*Luke Roberts.* The mean temperature was about 2.5° below the normal and the rainfall, 7.72 inches, was 3.2 inches more than the previous highest April record for the past 31 years. In April, 1882, the total rainfall was 7.40 inches.

CORYDON.—*Clara Miller.* There have been two or three spring-like days during the month and the ground is very cold and wet. Farm work is fully three weeks late and some oats are still being sown. The early sown oats show a good stand.

CRESTON.—*Edgar Stovall.* Continued cold and wet weather has retarded all farm work. The acreage of oats will be about 50% less than last year.

DAVENPORT.—*J. M. Sherier.* The total precipitation for the month was 2.67 inches above the normal. A trace, or more, of rain fell on 20 days. A severe hailstorm occurred on the evening of the 5th, many of the hailstones measuring an inch in diameter and hundreds of square feet of glass in greenhouses were broken in this vicinity. A number of windows were blown in and some signs were broken by a wind that attained a velocity of 41 miles per hour, from the south, on the afternoon of the 6th.

DECORAH.—*F. H. Baker.* One-half of the month has been stormy and some farmers have not yet sown any small grain.

DELAWARE.—*Wm. Ball.* A hailstorm on the 29th did some damage to fruit buds.

DUBUQUE.—*James H. Spencer.* No April, at this station, during the past 36 years has been so cold and wet. There was slightly more rain during

April, 1896, but it was a warm month, while April, 1907, was colder but the rainfall was comparatively light. High winds occurred on the 6th, 7th, 11th, 28th and 29th; plate glass windows were broken and other minor damage done. There were six days with thunder storms, and on the night of the 28th-29th a residence was struck by lightning and burned to the ground. Vegetation has grown very slowly and the ground has been too wet to work throughout the month. Very little seeding has been done, and there is much complaint of the backward spring.

ELLIOTT—*Henry Barnes*. Too cold for the growth of vegetation. Small grain is all in and up with a good stand.

FAIRFIELD—*Prof. R. M. McKenzie*. The month has been cold and wet and crops and foliage on trees are backward. Heavy windstorms occurred on the 11th-12th and 28th-30th and light snow flurries occurred on the 8th, 12th and 30th.

FAYETTE—*R. Z. Latimer*. More rain and snow fell during the month than during any April for the past 20 years.

GRAND MEADOW—*F. L. Williams*. The month has been cold and wet. Seeding began on the 16th but not over one-third of it is finished.

GREENE—*J. L. Cole*. Mourning doves appeared on the 10th and wrens on the 22d. A high wind on the 29th blew down windmills and did some slight damage to buildings.

GRINNELL—*D. W. Brainard*. No fruit blossoms of any kind appeared during the month.

HANCOCK—*G. C. Rogers*. Oats are just coming through the ground.

HOPEVILLE—*M. T. Ashley*. The storm on the 28th was destructive, washing out fills and approaches to bridges. One man near here in Decatur county lost four horses and two mules by lightning and there was some stock drowned. Rural mail carriers have not made their rounds since the storm.

INWOOD—*F. B. Hanson*. This has been the coldest and most backward April for many years and spring work is two to three weeks late. Seeding is barely finished and plowing for corn just started. The month closed cold with a snowstorm.

KEOSAUQUA—*J. H. Landes*. The month has been cold and damp. Oats are looking fairly well but on account of bad weather and high price of seed probably only 80% of the average acreage was seeded. Corn planting will begin May 1st.

LENOX—*J. L. Hurlley*. Considerable damage was done to window glass by the hailstorm on the 29th.

MASSENA—*C. E. Smeltzer*. The wet weather has caused a reduction in the acreage of small grain.

NORTHWOOD—*Chas. H. Dwyelle*. Seeding is about half done and grass and foliage have not yet started.

OLIN—*C. M. Miles*. The month has been very cold and wet but the oats are all sown and there is sufficient grass in pastures for stock.

OSKALOOSA—*Jos. Boyd*. About 25% of the acreage intended for small grain was not seeded on account of wet weather.

PACIFIC JUNCTION—*H. H. McCartney*. This has been the coldest and cloudiest April I can recall since 1869. The month closed with a storm

and cold wave as did April, 1903. On the night of April 30th-May 1st the minimum temperature was 25°—just 2° lower than in 1903.

PELLA—*John H. VerSteeg*. The month was cold and wet with but little sunshine. Seeding was not finished at the close of the month. This has been the most backward spring since 1881. Grass is short and trees and shrubs do not show any leaves yet. There was a severe hailstorm on the 28th and a snow storm on the 30th.

PLOVER—*J. S. Smith*. There was a regular blizzard on the morning of the 30th with two inches of snow. The temperature was down to 24° on May 1st. Hay is scarce and grass will be later than in 1881. Season is 20 days late.

RIDGEWAY—*Arthur Betts*. April, 1909, breaks the April record for the past 11 years for the number of days with snow, the number of days with hail, high winds, the amount of rainfall, and the amount of snowfall, and has had the least amount of sunshine but it was not as cold as April, 1907.

ROCK RAPIDS—*W. C. Wyckoff*. On the 30th we had a regular blizzard and at times the snow was very dense, then in a few minutes it would almost cease.

SAC CITY—*E. N. Bailey*. The month has been cold with frequent storms and snow flurries but the small grain is all sown. Blue-grass is well started and timothy and clover sown last year is promising.

STOCKPORT—*C. L. Beswick*. Oats show a good stand and clover and timothy promise a good crop of hay.

WEST BEND—*Phil Dorweiler*. The weather has been unseasonable and farm work is backward. On the night of the 28th-29th there was a thunderstorm with hail and high wind that did considerable damage to property.

MAY.

The average temperature for the month was considerably below the normal and was the lowest for May, with one exception, 1907, since April, 1893. The cool wave that spread over the state at the close of April, continued during the first three days of May and caused freezing temperatures on one or more of those days in all parts of the state and was attended, on the first by snow flurries over the central and northern counties. The night temperatures continued below normal most of the time until the 29th but there were several days when the temperatures were unusually high, especially the fifth when the maximum was 90° or above in all but the extreme southeastern counties.

The precipitation for the state at large was slightly below the normal but there was a slight excess over the district comprising the three northern tiers of counties. The average for the state was four inches less than the average for May, 1908. From the 3d to the 11th and from the 16th to the 23d the weather was generally dry but showers were frequent during the remainder of the month with an occasional heavy downpour, accompanied in several localities by hail and wind squalls which did some damage. On the whole the month was favorable for farm operations and good progress was made in field work. Corn was

practically all planted by the close of the month except on low and wet ground and cultivation was general. The stand, color and vitality of corn is exceptionally good. Grass and small grain made rapid growth during the latter half of the month and was reported to be nearly up to the average for the last of May. The continued cold weather during April and the fore part of May kept the fruit buds dormant until near the middle of the month thereby escaping any material damage by the late frosts. The average date for all kinds of fruit trees to be in full bloom at Des Moines is about May 5th, but they were not in full blossom this year until May 16th.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 111 stations, was 57.9°, which is 2.2° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 56.3°, which is 2.2° below the normal; Central section, 58.0°, which is 2.2° below the normal; Southern section, 59.3°, which is 2.3° below the normal. The highest monthly mean was 61.0°, at Keokuk, Lee county, and the lowest monthly mean was 54.2°, at Dows, Wright county, and Sibley, Osceola county. The highest temperature recorded was 97°, at Onawa, Monona county, on the 5th; the lowest temperature reported was 18°, at Inwood, Lyon county, on the 2d, and at Washta, Cherokee county, on the 3d. The average monthly maximum was 92.0°, and the average monthly minimum was 24.1°. The greatest daily range was 63°, at Fort Dodge, Webster county. The average of the greatest daily ranges was 45.7°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 121 stations, was 4.34 inches, which is 0.16 below the normal. By sections the averages were as follows: Northern section, 4.59 inches, which is 0.04 inch above the normal; Central section, 4.09 inches, which is 0.38 inch below the normal; Southern section, 4.34 inches, which is 0.13 inch below the normal. The greatest amount, 7.85 inches, occurred at Rockwell City, Calhoun county, and the least, 1.86 inches, at Waterloo, Black Hawk county. The greatest amount in 24 hours, 3.95 inches, occurred at Rockwell City, Calhoun county, on the 14th and 15th. Measurable precipitation occurred on an average of 9 days. The average amount of unmelted snowfall for the state was 0.1 inch; the greatest amount, 2.5 inches, occurred at Grand Meadow, Clayton county.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 12; partly cloudy, 12; cloudy, 7. The duration of sunshine was slightly above the normal, the percentage of the possible amount being 70 at Charles City; 65 at Davenport; 66 at Des Moines; 59 at Dubuque; 75 at Keokuk, and 53 at Sioux City.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenoweth.* There was 5.38 inches of rain as compared with 10.49 inches in May, 1908. Farm work is further advanced than it was at the close of May, last year. The last damaging frost occurred on the 10th, which reduced the small fruit prospects 50 per cent.

ALGONA.—*Dr. F. T. Seeley.* There is considerable corn yet to plant on low ground owing to frequent and heavy rains during the latter part of the month.

ALBERTON.—*Mrs. Geo. Shriver.* Rains during the last decade of the month delayed farm work and there is some corn to be planted. Oats and grass are growing rapidly.

ALTA.—*David E. Hadden.* May 1909 was generally cloudy and wet.

ALTON.—*W. S. Slagle.* The fore part of the month was very cold but the latter half was favorable for all crops. All fruits, except cherries, give promise of abundant yields. Corn, grass and small grains are in fine shape and are doing well.

AMANA.—*Conrad Schadt.* The last severe frost occurred on the 3d but as the season was late, no damage was done. Fruit trees bloomed profusely and the stand of all crops is very good.

BEDFORD.—*E. E. Healy.* Ice, three-fourths of an inch thick, formed on May 1st.

BONAPARTE.—*B. R. Vale.* The total rainfall was 4.13 inches as compared with 11.07 for May, 1908. Good weather for farming up to the 25th but since that date there has been too much rain. The season is two weeks later than the average. Locust trees are in full bloom.

BURLINGTON.—*M. E. Poppe, Jr.* A slight earthquake shock of short duration was felt at 8:45 a. m. of the 26th.

BRITT.—*Geo. P. Hardwick.* There was an excessive amount of cloudiness and high winds. A local hail storm on the last day of the month did considerable damage to young fruit. More than the usual area yet to seed to "catch" crops. Prospects for oats not encouraging.

CHARITON.—*C. C. Burr.* There is some corn to plant yet but the early planted is up and shows a good stand on high ground. Soil is wet and the season is 14 days late. Oats small and uneven; grass good and fruit prospects are average.

CLINTON.—*Luke Roberts.* The mean temperature was about normal. The coldest day was the 1st, which gave a mean of 35.7 degrees or 9.3 degrees below normal and was the coldest "May day" during the last 31 years. It was not only cold but squally and extremely disagreeable.

CORYDON.—*Clara Miller.* The wind storm on the 29th did some damage to trees, flues and a few buildings.

CRESTON.—*E. Stovall.* Corn planting, which had been retarded by wet weather was almost completed at the close of the month.

ELKADER.—*Chas. Reinecke.* A slight earthquake was felt about 9 a. m. of the 26th.

ELLIOTT.—*Henry Barnes.* A very good growing month and at its close all vegetation was in a healthy condition. Corn shows a good stand and grass and fruit are doing well.

FOREST CITY.—*J. A. Peters.* Plum trees were in bloom on the 19th. Corn planting was finished at the close of the month and the first planting was up but no cultivating had been done.

GRAND MEADOW (Postville P. O.).—*F. L. Williams.* On May 1st there were, in many places, snow drifts two feet deep but they were all gone on the 5th. Pastures and small grain were very backward until the end of the month.

GREENE.—*J. L. Cole.* A maximum temperature of 95° was recorded on the 5th. It was the highest on record for May during the past 13 years.

INWOOD.—*F. B. Hanson.* The first half of the month was dry, the latter half wet and interfered with field work. Corn planting is, however, about finished. Fruit trees are through blooming and promise large yields.

KEOSAUQUA.—*J. H. Landes.* May was a fairly good month for putting in corn and it was nearly all planted by the 20th. The acreage is large, the stand is good and cultivation is now in progress. The late rains came in time to help out the oats and hay crops.

OLIN.—*C. M. Miles.* On the whole May has been a fine month. All vegetation is in good condition and much ahead of last year at this time in growth.

PELLA.—*John H. Ver Steeg.* The month closed with warm growing weather. Corn is all planted except on low lands and is germinating vigorously. Small grain is doing well and the prospects are encouraging. A severe wind storm on the 30th damaged windmills and outbuildings.

PLOVER.—*J. S. Smith.* The first three weeks of the month were ideal for all kinds of farm work and the soil was in good condition for planting corn.

POCAHONTAS.—*F. E. Hronek.* The weather during the first half of May was fine for farm work but there was an excess of rain and cloudy weather during the latter half, which made the low ground too wet to plow. Corn is two weeks ahead of last year and shows a good stand.

RIDGEWAY.—*Arthur Betts.* The past month was colder than any May during the past eleven years except May, 1907, which was 5.5° colder than this month. On the 5th the maximum temperature was 95°, which is the highest on record for May. The last frost occurred on the 4th.

SHELDON.—*A. W. Beach.* Corn is all in and most of the rows were visible by the 31st. Everything is nearly up to the average.

STOCKPORT.—*C. L. Beswick.* Corn is all planted and prospects are generally good for all kinds of crops. The soil is well supplied with moisture at the close of the month.

THURMAN.—*C. R. Paul.* A heavy hail storm at 7:30 p. m. on the 12th with .65 inch of rain in about 15 minutes did much damage to fruit trees and garden truck.

WAVERLY.—*H. S. Hoover.* There was very little growth in plant life during the first 10 days of the month, although a maximum temperature of 90° was recorded on the 5th. The mornings were remarkably cool until the 29th.

WHITTEN.—*Dr. F. P. Butler.* Cherries started to bloom on the 14th.

JUNE.

The average temperature for the month was only a fraction of a degree above the normal but the rainfall was considerably above the average for June. The first week was moderately warm, there being a daily excess of about three degrees, but on the 8th the temperature was much lower and it remained below normal until the 19th. The lowest temperature occurred generally on the 15th but no frost was reported from the northern stations as there was on June 15, 1908. From the 20th to the close of

the month the temperature was considerably above the normal, the maximum occurring at many stations on the 30th.

There was an excess of rainfall in all districts of the State but there were a few comparatively small areas where a slight deficiency was reported, the most notable one being along the Mississippi river from Scott county southward to Des Moines county. The heaviest rainfall was over Union and the adjacent counties where the monthly amounts ranged from 8.00 inches to over 13.00 inches. It was also heavy over the Missouri divide and the extreme northwestern county. Showers occurred at some station in the State on every day of the month except the 19th. And yet there were on an average, 12 clear days. Thunder and lightning accompanied most of the showers but wind squalls and severe hail storms were not as frequent as usual. The frequent and excessive rains caused high water in all rivers and creeks, especially in the western districts. The flat and bottom lands were flooded two or three times and a large acreage of corn was finally abandoned after being replanted once or twice. The surplus moisture also interfered with the cultivation of corn on ground not thoroughly drained and many fields are quite foul. With all the adverse conditions corn on uplands and well drained fields, and these comprise nearly 90 per cent of the total acreage, has made very satisfactory progress considering its late start and much of it is up to the standard for this season of the year and the fields were generally clean. Where the fields have not received proper cultivation the corn is short and uneven and it depends on future weather as to whether or not it matures. The condition of small grain, grass, potatoes and garden truck has improved during the month, but there has been a decline in the condition of fruit.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 111 stations, was 69.1°, which is 0.3° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 67.6°, which is 0.2° above the normal; Central section 69.3°, which is 0.3° above the normal; Southern section 70.3°, which is 0.3° above the normal. The highest monthly mean was 72.8° at Keokuk, Lee county, and Keosauqua, Van Buren county, and the lowest monthly mean 64.8°, at Dows, Wright county. The highest temperature reported was 96°, at Keosauqua, Van Buren county, on the 26th; the lowest temperature reported was 40°, at Elma, Howard county, on the 15th. The average monthly maximum was 90°, and the average monthly minimum was 48°. The greatest daily range was 43° at Dows, Wright county. The average of the greatest daily ranges was 32°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 120 stations, was 6.41 inches, which is 1.89 inches above the normal. By sections the averages were as follows: Northern section, 6.00 inches, which is 1.43 inches above the normal; Central section, 6.15 inches, which is 1.78 inches above the normal; Southern section, 6.41 inches, which is 1.89 inches above the normal. The greatest amount, 13.30 inches, occurred at Afton, Union county, and the least, 2.80 inches, occurred at Davenport, Scott county. The greatest amount in twenty-four hours, 6.00 inches, occurred at Perry, Dallas county, on the 25th. measurable precipitation occurred on an average of 13 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 12; partly cloudy, 10; cloudy, 8. The duration of sunshine was about normal, the percentage of the possible amount being 74 at Charles City; 57 at Davenport; 62 at Des Moines; 75 at Keokuk, and 51 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 48 miles per hour from the Southwest, at Sioux City, Woodbury county, on the 20th.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell*. The rainfall was heavier during the last month than in any June in the last fifteen years. The normal rainfall for the month is 4.54 inches, and the total for the past month was 13.30 inches. There were ten storms with lightning.

ALBIA.—*J. I. Chenoweth*. Rain fell on 15 days during the month and the total amount was 7.06 inches, or 4.77 inches more than for June, 1908. The sunshine was, however, fully up to the normal, but the excessive rain interfered with cultivation and the corn fields are weedy.

ALGONA.—*F. T. Seeley*. Although we have had rain or a trace of rain on 15 days of the month, farm work is as far advanced at the close of the month as it was at the close of June, 1908.

ALLERTON.—*Mrs. Geo. Shriver*. Excessive rainfall has hindered corn cultivation and some fields are very weedy. Grass and oats have also been damaged.

ALTA.—*D. E. Hadden*. The temperature was 0.8° below the nineteen year normal, and 2.3° warmer than June, 1908. The total rainfall was 2.36 inches less than June of last year.

ALTON.—*W. S. Slagle*. There has been very little thunder during June and on the whole the month has been fine for all crops. Notwithstanding its late start, corn is nearly up to the normal and the third plowing is in progress. Barley headed nicely.

AMANA.—*C. Schadt*. Rain fell on 13 days and the latter part of the month was hot and very sultry. Seven head of cattle were killed by lightning on the 24th.

AMES.—*J. H. Criswell*. A splendid month for growth of corn which is in very fine condition except on some of the low ground, which was inundated by heavy rain on the 26th. Alfalfa hay was cut and put up in good condition. Winter wheat and oats lodged badly by the wind and rain of the 26th and 29th, and there is some rust on wheat.

AUDUBON.—*Geo. E. Kellogg*. Crops over a small area around Audubon were destroyed by hail on the night of the 12th. The excessive rains during the latter part of the month flooded low lands and destroyed much of the corn.

BAXTER.—*W. R. Vandike*. A good deal of rain fell, mostly at night during the latter part of the month, but the days were fairly clear, and corn made rapid growth.

BELLE PLAINE.—*S. P. VanDike*. A severe electric storm occurred on the night of the 24th.

BONAPARTE.—*Hon. B. R. Vale*. The first half of the month was wet but the latter half was seasonable. Fall grain is ripening early and 50 per cent of the corn will be laid by prior to the fourth.

BRITT.—*Geo. P. Hardwick*. Vegetation started later last spring than ever before known, but made the most rapid growth in June ever observed.

CHARLTON.—*C. C. Burr*. The month has been unfavorable for the corn crop which is now very uneven, and the soil is too wet for cultivation.

CLINTON.—*Luke Roberts*. The temperature during the first and second decades of the month was below the normal, but there was an average daily excess of 4.5° during the third decade. Crops, and especially corn, made rapid advancement.

CRESTON.—*Edgar Stovall*. An excessive rain and electric storm on the 9th caused considerable damage.

DUBUQUE.—*C. H. Spencer*. The heaviest rainfall was on the 24th, when 1.46 inches fell in an hour. Streets were flooded and damaged in some localities; also crops on low lands. The damage was slight, however, compared with the beneficial effects of the rainfall. There were several severe electrical storms, but there was no serious damage by lightning in this vicinity.

ELLIOTT.—*Henry Barnes*. A splendid growing month, which closed with crops of all kinds in fine condition.

FOREST CITY.—*J. A. Peters*. Corn is about as far advanced as usual at the close of June.

GRAND MEADOW.—(Postville P. O.)—*F. L. Williams*. The month was favorable for all farm crops and corn is clean and up to the normal in size.

GRINNELL.—*D. W. Brainard*. All crops are in splendid condition at the close of the month.

GUTHRIE CENTER.—*D. G. Beardsley*. A good month for all crops.

INWOOD.—*F. B. Hanson*. The month has been notable for frequent rains, measurable precipitation having fallen on 16 days. Farm work has been much retarded thereby. Some corn was replanted early in the month. The season is now nearly up to the normal.

KEOKUK.—*Fred Z. Gosewisch*. Heavy rains of the 7th and 9th flooded a large tract of river bottoms planted with corn. The weather was cool and dry from the 9th to 20th; the floods receded and the bottom lands were replanted to a great extent. Corn has made good growth and is clean on well drained lands.

KEOSAUQUA.—*J. H. Landes*. In the main June was a good crop month; the result being that crops of all kinds look well, except where corn had to be replanted on account of ravages of worms. Wheat harvest beginning last month.

LAMONI.—*Prof. T. J. Fitzpatrick*. There was much lightning during the month and considerable loss of stock is reported. Grass is quite good but corn is in poor condition.

LE MARS.—*G. A. C. Clark*. On the night of the 26th over 2 inches of rain fell in one and a half hours, with almost continuous lightning and thunder.

NORTHWOOD.—*Chas. H. Dwelle*. Corn is in better condition than it has been at the close of June for several years.

PELLA.—*John H. VerSteeg*. The month closed with high temperatures and more drying weather, but as a whole it has been unfavorable for cleaning the corn fields and about 30 per cent of the corn is still very weedy.

PERRY.—*Hon. J. A. Harvey.* At 7 P. M. of the 24th excessive rain began, accompanied by much thunder and lightning, which continued for an hour and a half. At midnight another heavy rainstorm began and continued from one and a half to two hours. Six inches of rain fell during the two storms.

PLOVER.—*J. S. Smith.* Rain fell and thunder occurred on 18 days during the month, and while there was 6.21 inches more rain in June, 1908, there is more moisture now in the soil than there was at this time last year. Corn is much better than last year.

RIDGEWAY.—*Arthur Betts.* The records of the past eleven years show that June was a normal month as to temperature and precipitation. The last decade was especially warm and crops are looking well.

SHELDON.—*Dr. A. W. Beach.* There has been too much rain; streams have been out of their banks and low lands have been under water a good share of the month. All crops have suffered more or less damage.

STOCKPORT.—*C. L. Beswick.* There has been a deficiency of precipitation and an excess of temperature. Corn is growing rapidly at close of month but is little below the average for the end of June.

WAUKEE.—*S. F. Foft.* The weather was close and sultry during the latter part of month. Corn is two to three feet in height and fully up to the average. Small grain, pastures and meadows look well.

WAVERLY.—*H. S. Hoover.* Extremely heavy rain, thunder, lightning and wind occurred on the 6th between 7:30 P. M. and 8:00 P. M. Corn and all crops as well as weeds are growing very rapidly.

WEST BEND.—*Jos. Dorweiler.* Corn made rapid growth the last week, but the soil is too wet for cultivating.

JULY.

Showers were heavy and frequent from the 3d to the 12th, and the temperature was unusually low from the 3d to the 7th; but, as a whole, July was one of the best harvest months on record. The latter half of the month was characterized by moderately warm weather, light and widely scattered showers, a high percentage of sunshine, and the rarity of thunderstorms and wind squalls. The rainfall was especially heavy over the southern, central and western districts during the first decade, and caused high water in all creeks and rivers within the area of heavy rainfall. Bottom lands were flooded for the third time this season and many thousands of acres of corn had to be abandoned. The heavy rains also prevented haying, and, in the southern districts where the small grain was ready for the harvester, the ground was too wet and soft to run machinery; but after the 12th the weather changed suddenly from wet and cool to comparatively dry and warm. During the second decade much of the belated corn was given some cultivation, but, owing to its rapid growth due to the higher temperature, the stalks soon became too high to permit further cultivation, and many fields were laid by in a weedy condition. The third decade was the warmest part of the month, the 29th being the warmest day, when the maximum temperature ranged generally from 90 to over 100 degrees. During this period the showers continued light and scattered; the 26th was the only day on which the showers were

at all general, and, as in the first and second decades, the heaviest rainfall was over the western half of the state. At the close of the month the surface of the ground was dry over the larger part of the state, and the crops in the eastern districts were beginning to feel the effect of the drouth. Exceptionally rapid progress was made during the latter half of the month in haying and harvesting, and most of the hay and grain crops were secured in excellent condition. Corn made remarkably rapid advancement and nearly all the early planted fields were in full tassel and earing nicely at the close of the month. The belated corn was doing its best, but most of it got too late a start to mature unless frost occurs much later than usual. There was some threshing done before the close of the month, and the early reports indicate a good yield of wheat of very fine quality. Oats straw is short but the yield will be fair and the quality is better than for the past two years. Barley is generally poor. Pastures and potatoes were still in good condition at the close of the month, but they, as well as corn, were needing more rain.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 117 stations, was 72.3°, which is 1.1° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section 71.2°, which is 0.9° below the normal; Central section, 72.1°, which is 1.6° below the normal; Southern section 73.5°, which is 1.0° below the normal. The highest monthly mean was 75.8° at Thurman, Fremont county, and the lowest monthly mean, 69.3°, at Sibley, Osceola county. The highest temperature reported was 102° at Elkader, Clayton county, and Ridgeway, Winneshiek county, on the 29th; the lowest temperature reported was 46° at Washta, Cherokee county, on the 24th. The average monthly maximum was 95°, and the average monthly minimum was 52°. The greatest daily range was 42°, at Decorah, Winneshiek county. The average of the greatest daily ranges was 31°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 126 stations, was 4.77 inches, which is 0.33 inch above the normal. By sections the averages were as follows: Northern section, 4.08 inches, which is 0.20 inch below the normal; Central section, 4.25 inches, which is 0.26 inch below the normal; Southern section 5.99 inches, which is 1.45 inches above the normal. The greatest amount, 12.20 inches, occurred at Mount Ayr, Ringgold county, and the least, 1.20 inches, at Waterloo, Black Hawk county. The greatest amount in twenty-four hours, 6.50 inches, occurred at Allerton, Wayne county, on the 6th. Measurable precipitation occurred on an average of 10 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 8; cloudy, 8. The duration of sunshine was below the normal, the percentage of the possible amount being 80 at Charles City; 63 at Davenport; 63 at Des Moines; 65 at Dubuque; 64 at Keokuk, and 55 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 38 miles per hour from the north, at Sioux City, Woodbury county, on the 30th.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenoweth.* The total rainfall for the month was 6.42 inches, or 2.53 inches more than in July, 1908. After the 8th the weather was very favorable with showers at night, which did not delay harvesting and hay making.

ALLERTON.—*Mrs. George Shriver.* Corn is growing rapidly. The yield of oats is light, but the quality is good. The hay crop is very heavy and the greater part of it has been harvested in excellent condition.

ALTA.—*David E. Hadden.* July, 1909, was warm and showery, although the temperature was about 1.5 degrees below the 19-year normal.

ALTON.—*W. S. Slagle.* The small grain harvest is progressing rapidly. The straw is, however, very short. Barley is yielding about ten bushels per acre, and is a poor crop. Oats are of good weight and quality, and are yielding about twenty bushels per acre. Much of the hay was damaged by rains. Corn is extra fine.

AMANA.—*C. Schadt.* During the first decade, heavy rains caused high stages of water in all rivers and creeks, and did some damage to crops. The rainfall during the remainder of the month was timely and beneficial. Small grain and hay crops are harvested and are very good. The weather during the second and third decades of the month was favorable for corn which promises to become one of the best crops.

ATLANTIC.—*Thos. H. Whitney.* Although no unusual temperatures were recorded, prevailing high relative humidity caused much distress. On the 30th 2.40 inches of rain fell in one hour within a radius of five miles from this station only, and was not accompanied by the usual lightning or wind.

AUDUBON.—*Geo. E. Kellogg.* July was not a good month for haying and harvesting, as showers were too frequent. The yield of barley is very light, but corn is doing well, although quite weedy.

BAXTER.—*W. R. Vandike.* The latter half of the month was dry until the 31st, when .75 inch of rain fell, which was beneficial to corn and late potatoes.

BLOOMFIELD.—*C. R. Davis.* The rains from the 4th to the 7th did great damage to crops on low lands. Wheat, oats and hay were gathered in good condition.

BONAPARTE.—*B. R. Vale.* The first half of the month was exceedingly wet but the latter half was seasonable and very warm at the close of the month. Rain is much needed.

BRITT.—*Geo. P. Hardwick.* The excessive cloudiness during the first half of the month prevented evaporation and as a result the ground was too wet to cultivate corn, which was "laid by" very weedy. The yield of oats is poor but the quality is fair. The yield of wheat is good but the acreage is short.

CHARITON.—*C. C. Burr.* Normal weather conditions prevailed during the latter half of the month and good progress has been made with all harvest work. The hay crop was immense and was saved in good condition. Corn is in all stages of growth and pasturage is fine.

CLINTON.—*Luke Roberts.* The mean temperature was a little below normal while the rainfall was 0.5 inch above the normal. The weather

was unusually fine for securing the matured crops, which were good in eastern Iowa.

CORYDON.—*Mrs. Clara Miller.* One remarkable feature of the month was the absence of thunder storms. No storms of any consequence occurred at this station, although distant thunder was heard several times.

DAVENPORT.—*J. M. Sherier.* With the exception of the 1st, 2d, 9th, 10th, 15th, 28th and 29th the temperature was below the normal throughout the month. The weather was unusually cool from the 3d to 7th inclusive, and also on the 26th. Rain fell at an excessive rate on the 10th, 1.98 inches being recorded in three hours and 35 minutes on that date. Hail ranging in size from 0.2 to 0.7 inch in diameter, fell from 10:38 to 10:45 P. M. of the 14th.

DECORAH.—*F. H. Baker.* The ground is very dry and pasturage is short, but the weather was all right for the harvest.

DUBUQUE.—*J. H. Spencer.* The temperature was below normal from the 3d to 27th inclusive, except on three days and July 4th was the coolest Fourth of July since this station was established, 1874. This has been the driest July since 1894. There have been no severe storms during the month and the maximum wind velocity was only 24 miles per hour on the 22d.

ELLIOTT.—*Henry Barnes.* As a whole July was a fine month for farm work and the growth of vegetation, closing with fine crop prospects. The hay and grain harvest is nearly completed with good yields and corn was never better.

FOREST CITY.—*J. A. Peters.* Corn was silking at the close of the month and the tame hay harvest was finished. About one-third of the small grain is in shock. An ideal month for all crops.

GRAND MEADOW—(Postville P. O.)—*F. L. Williams.* The month was dry and favorable for all crops. Hay went into the barns in perfect condition.

GRINNELL.—*D. W. Brainard.* The month of July, 1909, will be recorded as one of the best harvest months on record.

INWOOD.—*F. B. Hanson.* The first decade of the month was rainy, which delayed the hay harvest. The remainder of the month has been fine and a vast amount of hay has been put up in good condition, although some was cut too late to be of the best quality. Harvest is nearly finished.

KEOSAUQUA.—*J. H. Landes.* There was a decided earthquake shock felt here at 10:30 P. M. of July 18th. With the exception of wet weather during the first seven days the month was fine for the harvest and the grain was taken care of in good order. Corn looks well.

LAMONI.—*T. J. Fitzpatrick.* The first quarter of the month was very wet, there having been over ten inches of rainfall in four days. The middle of the month was dry and sultry. Corn crop prospects are poor but hay and grain were good and well secured.

LARRABEE.—*H. B. Strever.* The heavy rainfall in the fore part of the month interfered considerably with corn tillage and haying.

LEON.—*Morris Gardner.* The month was remarkable for so little wind and so much rain. It was the wettest month since this station was established in 1902.

MASSENA.—*C. E. Smeltzer*. There were several prostrations from heat on the 29th. We have never had better prospects for corn but rain is needed.

Mt. Ayr.—*A. F. Beard*. The total rainfall was 12.20 inches, which is .41 inch more than ever before recorded at this station in one month.

PELLA.—*John H. Ver Steeg*. The weather has been favorable since July 8th for finishing cultivation of corn, haying and harvesting. Corn has made good growth and some fields are silking and potatoes are promising.

RIDGEWAY.—*Arthur Betts*. This has been the driest July on record. The 29th was the warmest day since 1901, but the 3d to 6th were phenomenally cool. Only one thunder storm during the month.

SHELDON.—*Dr. A. W. Beach*. A splendid month for maturing crops. Hay was secured without rain. Corn is well up to the average.

STOCKPORT.—*C. L. Beswick*. Hay is fine quality and is about all harvested. Winter wheat and oats yield about 30 bushels. The heavy rain from the 4th to the 7th decreased the yield materially. Corn is growing rapidly.

WAUKEE.—*Saml. F. Foft*. Harvesting is completed. Corn is all in tassel and is looking well and fully up to the average.

WAVERLY.—*H. S. Hoover*. Pastures need moisture and corn is curling from the dry, hot winds.

TORNADO IN CHEROKEE COUNTY.

Soon after 6 P. M., of Sunday, July 11th, a black, threatening, funnel-shaped cloud was observed several miles west of Washta that proved to be a small but vigorous tornado. The first farm struck by the storm was the Kerney Wise place, about two miles west of town, where the trees of a thick grove on each side of the house were broken off, but no damage was done to the building. It then swept in an east-southeast direction for forty rods where the one and a half story house of Elijah Crum was blown six rods to the southeast, turned bottom side up and smashed beyond repair. The barn, which contained several horses, was completely torn to pieces and scattered over the surrounding fields. Only one of the horses was hurt and that one but slightly. The foundation was all that remained of the large hog house; and the corn crib, recently built, was moved several feet and badly damaged. Near by observes at this point saw two funnel-shaped clouds, but only one of them reached the earth. The storm track was about four rods wide at the Wise farm, but varied from two to four rods wide as it passed through a corn field between the Crum and the Little Sioux river. The storm crossed the river below the S. Lyman place at nearly right angles to the river, taking up a large amount of water as it went over, and then raised up, dipping down again about six miles southeast of Washta, where it destroyed the barns and outbuildings on the S. Cipperly place, the R. E. Knapp place, occupied by Herbert Hind, and the Henry Ashton place. The storm track was here about twenty rods wide, and two miles in length. Mr. H. L. Felter, co-operative observer at Washta, who kindly furnished the information for this report, says that there was very little wind except quite near the tornado; that there was about .05 inch of rain preceding

the storm and that the only thunder heard was at a distance and thirty minutes before the storm. A very heavy roar was heard during the passage of the cloud. The estimated damage to crops and property is placed at \$8,000, but there was no loss of life and no one was seriously injured.

AUGUST.

August, 1909, will be noted for its uniformly high temperatures, the small number of cloudy days, and, over the larger part of the State, the small amount of rainfall. Both the day and night temperatures were high until the 28th, when a cool wave passed over the State, resulting in light frosts on low ground on the morning of the 29th, over the northern and, in a few localities, in southern districts; but no damage was done to vegetation. The maximum temperatures were up to or above 90° on ten days in northern and twenty-one days in southern counties, and the average of the monthly maximum temperatures was 96°.

The rainfall was deficient in all but the northeast and extreme north central counties; yet at least a trace of rain fell in some part of the State on every day of the month, except the 19th and 20th. During the second decade, showers were frequent and the rainfall heavy over the northeast and north central districts; but over the remainder of the State the showers were extremely local, and the rainfall generally very light. The monthly rainfall ranged from a trace in Jefferson county to 8.21 inches in Chickasaw county. Drouthy conditions prevailed during the entire month over the southern half of the State, and the condition of the corn crop deteriorated from 10 to 25 per cent. There was also some depreciation in a few localities in the northern districts, but the early planted corn, on rich soil and well cultivated fields, withstood the drouth remarkably well and much of it was well up to the average of past years at the close of the month.

The drouth also seriously affected the pastures, fall plowing, late potatoes and the fruit crops. The pasturage was so short in many sections that it was necessary to give stock extra feed. The usual amount of fall plowing has been reduced and the acreage of fall grains will be considerably less than was anticipated. The second crop of hay will also be short, and the clover seed crop will be much smaller than last year. The dry, cloudless weather was favorable for stacking and threshing grain, and that work progressed rapidly. Shock threshing was practically completed at the close of the month.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 114 stations, was 76.1°, which is 4.3° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 74.7°, which is 4.4° above the normal; Central section, 76.2°, which is 4.3° above the normal; Southern section, 77.3°, which is 4.0°, above the normal. The highest monthly mean was 80.4°, at Bloomfield, Dallas county, and the lowest monthly mean 71.2°, at Olin, Jones county. The highest temperature reported was 103°, at Bedford, Taylor county, on the 16th, and at Bloomfield, Davis county, on the 15th; the lowest tem-

perature reported was 33°, at Washta, Cherokee county, on the 29th. The average monthly maximum was 96°, and the average monthly minimum was 44°. The greatest daily range was 52, at Massena, Cass county. The average of the greatest daily ranges was 34°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 122 stations, was 1.81 inches, which is 2.18 inches below the normal. By sections the averages were as follows: Northern section, 3.04 inches, which is 0.48 inch below the normal; Central section, 1.51 inches, which is 2.54 inches below the normal; Southern section, 0.87 inch, which is 3.53 inches below the normal. The greatest amount, 8.21 inches, occurred at New Hampton, Chickasaw county, and the least, a trace, at Fairfield, Jefferson county. The greatest amount in twenty-four hours, 4.30 inches, occurred at New Hampton, Chickasaw county, on the 9th. Measurable precipitation occurred on an average of five days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 21; partly cloudy, 8; cloudy, 2. Duration of sunshine was above the normal, the percentage of the possible amount being 83 at Charles City, 78 at Davenport, 84 at Des Moines, 65 at Dubuque, 84 at Keokuk, and 81 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 36 miles per hour from the southeast, at Sioux City, Woodbury county, on the 23d.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell*. August was an exceedingly hot and dry month.

ALBA.—*J. I. Chenoweth*. The month was dry and hot, there being only one thunder storm, which gave 1.03 inches of rain over about two miles square. It was, however, an excellent month for threshing grain, but corn suffered greatly during the last two weeks on account of the drouth. Some farmers estimate that the crop deteriorated 35 per cent.

ALGONA.—*Dr. F. T. Seeley*. August has been a very hot, dry month. The temperature was 90° or above on nine days.

ALLERTON.—*Mrs. Geo. Shriver*. The weather was very hot and dry. The corn crop was badly damaged and pasturage is short. Apples are falling badly.

ALTA.—*David E. Hadden*. The mean temperature for August, 1909, was the highest in twenty years and was 4.7° above the normal. The rainfall was 1.60 inches below the normal and the sunshine was greatly in excess, there being no day completely cloudy. It was an ideal month for corn.

ALTON.—*W. S. Siagle*. The light frost on the 29th did no damage. Dry weather has retarded fall plowing but the weather has been excellent for harvesting and second haying. It has been too dry for potatoes and plums, but corn is in fine shape and most of it will be out of danger from frost by September 15th.

AMANA.—*C. Schadt*. The month was very dry with much sunshine, there being only one cloudy day. The temperature was very high most of the time, but the month closed with much cooler weather.

ATLANTIC.—*Thos. H. Whitney*. Frost was observed on low land on the morning of the 29th, but did no damage to vegetation.

BAXTER.—*W. R. Vandike*. The month was very hot, with only one cloudy and five partly cloudy days. Pastures are drying up and corn has been damaged about 15 per cent.

BLOOMFIELD.—*C. R. Davis*. Corn has been damaged 35 per cent from continued drouth. Pastures are dry and much stock is being fed.

BONAPARTE.—*E. R. Vale*. August was an exceptionally hot and dry month, with only .17 inch of rain, yet we had 5.46 inches more rain in June and July than in 1908.

BRITT.—*Geo. P. Hardwick*. There was an excess of temperature and sunshine, and a deficiency of precipitation, but there was sufficient moisture for crop needs. There were no serious storms. Pasturage is exceptionally good and there was an average crop of hay, but oats yield only 20 bushels per acre. Belated corn advanced rapidly.

CHARLTON.—*C. C. Burr*. The month has been abnormally hot and dry. Corn has suffered seriously on sandy soil. There is no surface water and pastures are dry.

CLINTON.—*Luke Roberts*. The mean temperature was 3.1° above normal and 2.6° above that of July. There was 73 per cent of sunshine which is 9 per cent above the normal. There was no damage by drouth and crops are in good condition.

CORYDON.—*Clara Miller*. The late corn has been damaged by the dry weather, but the early planted and well cultivated is good. Pastures are drying up.

ELLIOTT.—*Henry Barnes*. The dry and hot weather retarded the development of corn, damaged pastures and prevented fall plowing.

FAYETTE.—*R. Z. Latimer*. Light frost was observed on the mornings of the 29th and 30th.

GRAND MEADOW.—(Postville P. O.)—*F. L. Williams*. The month was very dry except from 9th to 14th, when rains were excessive. Pasturage is good but the ears on late corn are rather small.

GRUNDY CENTER.—*J. B. Calderwood*. A remarkably dry month, but corn will be about an average crop.

INWOOD.—*F. B. Hanson*. High temperatures prevailed until the last four days of the month. The precipitation has been rather light, but the corn crop is very promising, except possibly some late replanted fields. Nearly the entire crop will be safe from frost by the first week in October. Barley yields are very poor, but oats are good quality with light yield.

KEOSAUQUA.—*J. H. Landes*. A remarkably dry and hot month. The drouth and excessive heat has badly injured the corn crop, turned the pastures brown and prevented fall plowing.

LAMONI.—*T. J. Fitzpatrick*. It has been exceedingly dry all the month with only two cloudy days and less than one-half inch of rainfall. All crops deteriorated. The maximum temperature for the year, 100.5°, occurred on the 12th.

LARRABEE.—*H. B. Strever*. An excellent month for harvesting and threshing. Very little plowing done and vegetation badly in need of rain at close of month.

LEON.—*Morris Gardner*. Driest August on record at this station.

LOGAN.—*G. H. Stern.* The rain, 2.04 inches, on the 22d, was extremely local, the country within a mile on each side of Logan received little or no rain.

MASSENA.—*C. E. Smeltzer.* There was a white frost on low ground on the 29th. The dry weather has injured the late planted corn and potatoes, but the early corn, on new ground, is going to be good and is nearly out of the way of frost.

MT. AYR.—*A. F. Beard.* With twenty-nine clear days and with the temperature up to 90° or above on twenty-four of them we are getting very dry at present. On the evening of the 28th there was a wind storm with some hail in the southeast part of the county.

NORTHWOOD.—*Chas. H. Duelle.* The worst storm of season occurred five miles southeast of here on the 13th. Trees were uprooted and buildings were damaged, but the storm was not very extensive.

OLIN.—*C. M. Miles.* This has been a very fine month for threshing. The average yield of oats is about forty bushels per acre. Corn is in fine condition and some fall plowing has been done.

PELLA.—*John H. VerSteeg.* Dry weather with high temperatures prevailed during the month and the corn crop depreciated considerably on thin soil and wet and weedy fields.

PLOVER.—*J. S. Smith.* A whole month without a cloudy day is something that has not occurred before in twenty years. Corn suffered from the drouth and late potatoes will not make 50 per cent of a crop.

RIDGEWAY.—*Arthur Betts.* This was the warmest August since 1900, but August, 1907, was wetter. There was only .18 inch of rainfall from July 9th to August 9th, but heavy rains fell during the second decade of the month.

SHELDON.—*A. W. Beach.* Shock threshing done without rain. It has been too dry for pastures and fall plowing. The month was abnormally hot.

SIGOURNEY.—*J. T. Parker.* There was much damage done by wind and hail on the 27th.

STOCKPORT.—*C. L. Beswick.* August was extremely dry, hot and cloudless. Corn has been cut short and pastures are dry and brown.

WASHTA.—*H. L. Fetter.* A light frost occurred on low land on the morning of the 29th, but no damage was done. Corn is maturing well, but the weather is too dry for pastures and plowing.

WAUKEE.—*Samuel F. Foft.* The dry weather during the month with hot winds damaged corn in places and pasturage is getting short.

WAVERLY.—*H. S. Hoover.* Part of the county was blessed with fine rains during the last ten days of the month, which will suffice to mature the corn crop. Corn on slough lands will be late and very light and has suffered from drouth along Cedar River.

WEST BEND.—*Phil Dorweiler.* The sunshine was excessive and the rainfall deficient. Pasturage is short and ground too hard to plow.

SEPTEMBER.

The hot and drouthy conditions prevailing at the close of August were broken by lower temperatures on the 1st and copious and general showers

on the 2d of September. From the 2d to the 14th showers occurred in some part of the State every day, and were general and the rainfall heavy between the 12th and 14th. Another period of showery weather prevailed between the 19th and 24th, but the last six days were generally clear and pleasant, although the night temperatures were quite low.

The temperatures were below normal from the 1st to the 8th; 14th to 16th; 22d to 27th, and on the last day of the month; the lowest occurring on the 27th when the minimum was below the freezing point at several stations in the northern counties. Light frosts occurred on low ground in the extreme northern part of the state on the 1st and 5th, and in all parts of the state on the 23d, 24th and 27th. On the latter date the frost was heavy on low ground over the northern and northeastern counties, but reports indicate that no damage was done to vegetation except in a very few places where some of the tender vines were injured.

The warmest periods were between the 9th and 13th and from the 17th to the 21st, when the maximum temperatures ranged from 80 to 87 degrees over the northern and from 85 to 94 degrees over the southern districts, the highest occurring generally on the 12th or 13th. The rains during the first half of the month revived the pastures and softened the ground sufficiently to permit fall plowing to be resumed, and excellent progress was made in plowing and seeding fall grains during the remainder of the month. The rains came too late, however, to be of much value to the early planted corn, but reports indicate that the rains and the subsequent warm weather were beneficial to the late planted corn, which improved one or two points during the month. The dry weather during the last six days caused the corn to mature and dry out rapidly, and nearly 90 per cent of the crop was safe at the close of the month from any damaging effect of frost. Heavy wind squalls on the 12th did material damage in blowing down corn over the northern, western and southwestern counties.

The potato crop did not recover from injury received during the August drouth and the yield will be very light.

The second crop of hay was lighter than last year but was put up in good condition.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 114 stations, was 62.4°, which is 1.3° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 60.6°, which is 1.5° below the normal; Central section, 62.6°, which is 1.0° below the normal; Southern section 64.1°, which is 1.4° below the normal. The highest monthly mean was 66.7°, at Bloomfield, Davis county, and the lowest monthly mean 58.4°, at Estherville, Emmet county. The highest temperature reported was 94°, at Bonaparte, Van Buren county and Fairfield, Jefferson county, on the 13th, and at Clarinda, Page county, and Massena, Cass county, on the 12th; the lowest temperature reported was 30°, at Elkader, Clayton county, Fayette, Fayette county, and Humboldt, Humboldt county, on the 27th, and at Washta, Cherokee county, on the 24th. The average monthly maximum was 88°, and the average monthly minimum was 36°. The greatest daily range was 54°, at Olin, Jones county. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 122 stations, was 3.58 inches, which is 0.17 inch above the normal. By sections the averages were as follows: Northern section, 3.54 inches, which is 0.13 inch above the normal; Central section, 3.23 inches, which is 0.01 inch below the normal; Southern section, 3.98 inches, which is 0.41 inch above the normal. The greatest amount, 7.34 inches, occurred at Thurman, Fremont county, and the least, 1.39 inches, at Gilman, Marshall county. The greatest amount in twenty-four hours, 3.35 inches, occurred at Amana, Iowa county, on the 13th and 14th. Measurable precipitation occurred on an average of 9 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 14; partly cloudy, 8; cloudy, 8. The duration of sunshine was about normal, the percentage of the possible amount being 66 at Charles City; 70 at Davenport; 64 at Des Moines; 54 at Dubuque; 60 at Keokuk, and 55 at Sioux City.

WIND.—Southeast winds prevailed. The highest velocity reported was 41 miles per hour from the South, at Sioux City, Woodbury county, on the 18th.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* There has been no frost on the uplands but light frost occurred on the morning of the 30th, on bottom lands. Corn is all matured.

ALBIA.—*J. I. Chenoweth.* September was a fine fall month but the first half was attended by frequent showers. The rain, however, was quite beneficial to late corn and fall pastures. There was no frost except possibly very light on low land.

ALGONA.—*Dr. F. T. Seeley.* September has passed without a frost. The leaves on the trees are still green; also the tomatoes and pumpkin vines.

ALLESTON.—*Mrs. Geo. Shriver.* Light frost on the 27th, but there was no damage done, and the bulk of the corn crop is now safe from damaging effect of frost.

ALTA.—*David E. Hadden.* First half of the month was showery, but the latter half was ideal with nights cool, and the days dry and warm. Very light frost in low places was noted on two or three mornings, being most noticeable on the 23d.

ALTON.—*W. S. Slagte.* Light frost occurred on the 23d and 24th, but no damage was done. Corn is entirely out of danger of frost. Soil is in fine tilth for plowing and pastures are in fine shape. The potato crop is small. Leaves are beginning to fall.

AMANA.—*C. Schadt.* The month was dry with fresh winds and abundance of sunshine, which were favorable for threshing and haymaking. Enough rain fell, however, for plowing and seeding fall grains. The season was one of the poorest for fruit crops. Apples, pears and plums generally dropped from the trees before ripening. No frost occurred during September.

ATLANTIC.—*Thos. H. Whitney.* Trace of frost on lowlands on several nights, but no vegetation was injured. Rains were not excessive and corn

has matured well except in places where badly tangled by wind on the night of the 12th.

BLOOMFIELD.—*C. R. Davis.* The corn, although poor, is maturing and getting out of the way of frost.

BONAPARTE.—*Hon. B. R. Vale.* September has been a pleasant and seasonable month with no killing frost. There has been only a little plowing done and there will be a small acreage of fall grain.

BRITT.—*Geo. P. Hardwick.* There have been no serious storms or extremes of temperature and the last week was exceptionally fine for maturing the belated corn, some of which is yet green. Pasturage is good and live stock is generally healthy. Fall plowing is well advanced.

BURLINGTON.—*Max E. Poppe, Jr.* An earthquake shock was felt at 4 A. M. and another at 6 A. M. on the 27th.

CHARITON.—*C. C. Burr.* There has been about the usual amount of plowing and seeding done but the soil is now too dry to work well and there is very little surface water. Corn is maturing nicely.

CLINTON.—*Luke Roberts.* Light frost occurred on the 23d, 24th and 27th, but vegetation was not damaged. Corn ripened in good time. The last decade of the month was cool but clear and the month averaged about normal.

CORYDON.—*Clara Miller.* Corn was blown down badly in places during the storm of the 13th.

ELLIOTT.—*Henry Barnes.* The close of the month finds corn, pastures and soil for plowing, in good condition except that corn was blown down badly. There will be an increase in the acreage of fall wheat.

FAYETTE.—*R. Z. Latimer.* Frost occurred on eight days, but did no serious damage to corn. The frost on the morning of the 27th was the most severe and cut all tender vegetation and late corn on low lands.

FOREST CITY.—*J. A. Peters.* There was no killing frost during the month. Corn is all out of the way of frost except on very low ground. Pasturage is excellent.

GRAND MEADOW (Postville P. O.).—*F. L. Williams.* The month was favorable for finishing the ripening of the late corn. Pasturage is good and live stock of all kinds is doing well. Fall plowing is well advanced and threshing is about finished.

GRINNELL.—*D. W. Brainard.* September was one of the most beautiful, comfortable and profitable months on record at this station.

GUTHRIE CENTER.—*D. G. Beardley.* During the thunderstorm on the night of the 12th, considerable damage was done to shade and fruit trees by high winds. Many apples and much of the corn were blown down and some chimneys damaged.

INWOOD.—*F. B. Hanson.* September has been cool with frequent rains. Light frost occurred on three dates, but no damage resulted. Corn is drying slowly. Threshing will soon be finished. Fall plowing was resumed after the rains.

JEFFERSON.—*G. W. Jackson.* Pastures are in splendid condition at the close of the month and frost has done no damage up to this time.

KEOSAUQUA.—*J. H. Landes.* There have been only two light frosts during the month and apparently they did no damage. Corn is out of the way of frost and cribbing will soon begin.

LARRABEE.—*H. B. Streever*. It was too dry to plow until after the rain on the 11th. There has been no frost to damage vegetation and corn is practically ripe at the close of the month.

MASON CITY.—*J. S. Mills*. Light frost occurred on the 23d, 24th, 25th and 26th and heavy frost on the 27th.

MASSENA.—*C. E. Smeltzer*. There was frost on four nights but no damage was done. Corn is now safe from frost and the early corn on new ground is far ahead of last year's crop. Pasturage is fine but the second hay crop is short.

NORTHWOOD.—*Chas. H. Dwelle*. Corn is out of the way of frost and is of excellent quality and the yield is good.

PELLA.—*John H. Ver Steeg*. Frost occurred on five mornings during the last week of September, but did no damage. Corn is now out of danger.

POCAHONTAS.—*F. E. Hronck*. No frost to injure the tenderest plants and the month closes with the finest kind of weather for maturing corn. Plowing and threshing progressing and pastures are in good condition.

RIDGEWAY.—*Arthur Betts*. The temperature and precipitation were below the normal of eleven years. September, 1908, was eight degrees warmer than this month and in 1902 it was two degrees cooler. The past month was frostless except a little around the sloughs on the 26th and 27th. Nearly all of the rain came during the first fortnight.

SHELDON.—*Dr. A. W. Beach*. The rains during the month have put the soil in good tilth and made abundant feed in pastures; also added an extra crop of late hay which was cut the last ten days of September. A heavy crop of corn has been well cured without frost.

SIGOURNEY.—*J. T. Parker*. Frost occurred on six days but no damage was done.

STOCKPORT.—*C. L. Beswick*. There was no killing frost in September but light frost occurred on several days during the last decade of the month. Corn is all safe and fall grain is about all in. Pastures in fair condition.

WAUKEE.—*Samuel F. Foft*. Light frosts reported on the 5th, 23d, 24th, 25th, 26th, 27th and 30th, but no damaging effects observed. Corn is ripening well and pastures are improved since last month.

WAVERLY.—*H. S. Hoover*. September was a beautiful month to finish the fall work, but the last week has been too dry to do first class plowing. Pastures are generally good and stock is doing well.

WHITTEN.—*Dr. F. P. Butler*. A severe electrical storm occurred on the night of the 12th.

OCTOBER.

The mean temperature for the month was slightly below the normal; the average daily deficiency ranged from 2.2 degrees in the northern districts to 2.3 degrees in the southern districts. The warmest periods of the month were between the 1st and the 9th and between the 29th and 31st, when the maximum temperatures ranged from 70 to 89 degrees in the northern, and from 75 to 95 degrees in the southern districts; the highest occurring generally on the 2d, but at many stations the maximum for the month occurred on the 3d, 4th, 6th, 7th or 8th. The coolest period

was between the 10th and 20th; the lowest temperature occurred on the 12th or the 13th, except over the extreme northern and northeastern counties where it occurred on the 28th. During the past 19 years, there have been five cooler Octobers, but there are no records of as low temperature during the first 15 days of October as was registered this month on the 12th and 13th, when the minimum temperatures ranged from 10 to 20 degrees over the northern and from 15 to 23 degrees over the southern counties. The ground was frozen to such an extent that potatoes remaining in the ground were considerably damaged. Cabbage and turnips were also injured, and over the southern portion of the state, many thousand bushels of apples were frozen on the trees. As there had been no killing frost or freezing temperatures previously to the 12th, much of the vegetation was still green; and corn, though ripe, was not dry enough to withstand such a severe freeze without injury to its germinating qualities. The leaves fell from the trees soon after the freeze without their usual fall coloring.

The precipitation was generally below the normal over the northern two-thirds of the state and slightly above the normal over the southern third. There was no rain between the first and seventh, but from the 8th to the 12th the rainfall was general and was mixed with slight snow flurries on the 11th and 12th, which is much earlier than usual for the first snow of the season. From the 13th to the 19th, there were only a few scattered and generally light showers, but from the 20th to the 23d and on the afternoon and evening of the 31st the rainfall was again quite general. Between the 24th and the 30th the weather was generally clear and pleasant. While the rainfall was below normal, there has been enough moisture for the growth of winter wheat and for fall plowing, but not enough to have any material effect on the stage of streams and ponds which are low. Corn husking was begun about the middle of the month but reports indicate that there is still too much moisture in the ears to warrant its being cribbed in large quantities. A great deal of care should be taken in selecting and caring for the seed corn, or next year's crop will show a very poor stand.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 114 stations, was 49.7°, which is 2.2° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 47.9°, which is 2.2° below the normal; Central section 49.7°, which is 2.1° below the normal; Southern section 51.5°, which is 2.3° below the normal. The highest monthly mean was 57.8°, at Mt. Pleasant, Henry county, and the lowest monthly mean 42.6°, at Elkader, Clayton county. The highest temperature reported was 97°, at Bloomfield, Davis county, on the 2d; the lowest temperature reported was 10°, at Washta, Cherokee county, on the 13th. The average monthly maximum was 85°, and the average monthly minimum was 18°. The greatest daily range was 54°, at Iowa Falls, Hardin county. The average of the greatest daily ranges was 40°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 118 stations, was 2.22 inches, which is 0.13 inch below the normal. By sections the averages were as follows: Northern section, 1.71 inches, which is 0.56 inch below the normal; Central section, 2.08 inches,

which is 0.36 inch below the normal; Southern section, 2.87 inches, which is 0.52 inch above the normal. The greatest amount, 4.70 inches, occurred at Cumberland, Cass county, and the least, 0.48 inch, at Independence, Buchanan county. The greatest amount in twenty-four hours, 2.33 inches, occurred at St. Charles, Madison county, on the 9th. Measurable precipitation occurred on an average of 6 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 16; partly cloudy, 6; cloudy, 9. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 68 at Charles City; 66 at Davenport; 59 at Des Moines; 58 at Dubuque; 55 at Keokuk, and 56 at Sioux City.

WIND.—Southeast winds prevailed. The highest velocity reported was 49 miles per hour from the north at Sioux City, Woodbury county, on the 11th.

The average snowfall was a trace, and the greatest amount in 24 hours, 0.5 inch at Estherville, Emmet county, on the 12th, and also at Keokuk, Lee county.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* October did not give the usual amount of fair weather.

ALBIA.—*J. I. Chenoweth.* There was no frost until the 12th but on the 13th the temperature went down to 19°, doing great damage to apples on the trees.

ALGONA.—*Dr. F. T. Seeley.* There was a fine auroral display on the night of the 19th-20th. October has been a very good month for field work.

ALTA.—*David E. Hadden.* Compared with the average of the preceding 19 years the month was 1.6° cooler and the precipitation was 1.07 inches below the normal. It was, however, an ideal October; the first killing frost of the season occurred on the 12th and the first snow flurries were observed on the same day.

ALTON.—*W. S. Stagle.* The first killing frost occurred on the 12th but did no injury to corn. The month was fine for farm work. Pastures are in good condition.

AMANA.—*C. Schadt.* The first frost of the season, which was a killing one, occurred on the 12th. A bright aurora was observed on the evening and night of the 18th.

ATLANTIC.—*Thos. H. Whitney.* The cold spell beginning on the 12th destroyed a large per cent of the apple crop and damaged potatoes near the surface of the ground.

BAXTER.—*W. R. Vandike.* The temperature was down to 15° on the morning of the 13th and was the lowest on record for that early in October.

BEDFORD.—*E. E. Healy.* The first snow of the season fell on the 16th.

BONAPARTE.—*B. R. Vale.* With the exception of the freeze from the 12th to the 14th, October was a seasonable month as to temperature and rainfall. Corn husking has been in progress during the last ten days.

BOONE.—*Carl Fritz Henning.* A severe electrical storm occurred on

the night of the 9th, during which a \$10,000 residence was struck by lightning and burned to the ground. The ground was covered with snow on the evening of the 11th and scattering snow flakes fell on the 12th. During the night of the 12th the ground froze hard enough to hold up a team of horses and a wagon on rough ground.

BRITT.—*Geo. P. Hardwick.* The first killing frost occurred on the 11th and the freeze from the 11th to the 14th not only killed the foliage on the trees but froze the corn sufficiently to kill the germ. The month, however, was very fine for farm operations.

CHARITON.—*O. C. Burr.* Corn is a poor crop and still too heavy to put in crib. A large per cent of the apple crop was frozen on the trees, on the 13th and ruined. Stock looks well, but pasturage is getting short.

CLINTON.—*Luke Roberts.* The first nine and the last two days were mild but the remainder of the month was cold with freezing temperature on most of the days, but for out-of-door work the month was quite favorable.

CRESTON.—*Edgar Stovall.* The month was generally cold with a hard freeze on the 13th and 14th.

DAVENPORT.—*J. M. Sherier.* The first freezing temperature of the season, 27°, occurred on the 12th, though no frost was observed on that date. Killing frost, with a minimum temperature of 23°, occurred on the 13th. Very light snow flurries were observed on the 11th and 12th. The temperature was continuously above the average from the 2d to the 9th, inclusive, and was below the normal from the 10th to the 20th inclusive, with the greatest departures, —25° and —22° on the 12th and 13th respectively. The rainfall amounted to 0.01 inch or more, on but six days.

DUBUQUE.—*J. H. Spencer.* The first killing frost of autumn occurred on the morning of the 12th. There was no white frost, but a temperature of 29° killed all tender vegetation. The ground at 7 a. m. of the 12th was thinly covered with snow. With the exception of October 9th and 10th, 1906, when snow flurries occurred this is the only October snowfall at this station since 1898. The 12th, with an average temperature of 32°, was the coldest day here during the first 15 days of October since the station was established in 1873. It was the coldest October at this station in 13 years and the daily mean temperature was above normal only on eight days.

ELLIOTT.—*Henry Barnes.* October was a fairly good month for farm work. Corn gathering begun with yield fully up to expectations, 35 bushels per acre on old ground to 70 on new or sod ground.

FOREST CITY.—*J. A. Peters.* October was a beautiful autumn month. There has been considerable corn put in cribs and the corn in fields is in good condition for cribbing. The first killing frost occurred on the 12th.

INWOOD.—*F. B. Hanson.* The first killing frost of the season occurred on the 12th. On the 13th the temperature fell to 12° which is much lower than usual for the time of the year. The temperature since has been low. Some potatoes and vegetables were damaged by the early freeze. Corn husking has begun with variable yields. Corn is not very dry and its keeping quality is doubtful.

KEOSAUQUA.—*J. H. Landes.* October was a fine fall month. Corn is being cribbed. The first killing frost, on the 12th, was severe, the minimum temperature being 20°, and as a result, hundreds of bushels of unpicked apples were frozen.

KEOKUK.—*Fred Z. Gosewisch.* The precipitation has been sufficient for the growth of wheat and both wheat and fall pastures are looking well, although streams and ponds are low. The low temperature of the 13th damaged the apple crop, which was yet in the orchards, to some extent. On the whole the month, although somewhat cool, has been favorable for agriculture.

LAMONI.—*Prof. T. J. Fitzpatrick.* October was a month of contrasts. There were 15 clear days, 15 cloudy and one partly cloudy day. There were warm days and cold days. There was drouth and moisture, but all in all it was a month of decent fall weather. The freeze was so hard on the 13th that the leaves soon fell and without their usual fall coloring.

LARRABEE.—*H. B. Strever.* Corn was killed by frost on the 12th and badly frozen on the 13th with practically no seed corn saved.

LITTLE SIOUX.—*Geo. H. Gibson.* The auroral display on the 18th was the finest seen here in many years.

MASSENA.—*C. E. Smeltzer.* Corn husking is under full progress. Some pieces are yielding as high as 65 bushels per acre and the yield generally is better than was expected.

MT. AYR.—*A. F. Beard.* Ice that formed in tubs, etc., on the nights of the 11th and 12th did not thaw out during the following days.

OLIN.—*C. M. Miles.* October was a very fine month with plenty of rain for fall plowing. Corn husking began about the 12th and the yield will average in this vicinity about 50 bushels per acre.

PELLA.—*John H. Ver Steeg.* The first killing frost occurred on the 12th, with a quarter of an inch of snow on the same date. The last three days of the month were quite warm.

SHELDON.—*Dr. A. W. Beach.* October was a great month for fall work on the farm. The first frost being delayed until the 12th of the month, corn planted as late as the 10th of June was fully matured and a big crop is being gathered. About one-third of the crop has been gathered. The hard freeze on the 13th spoiled about 5,000 bushels of potatoes in this vicinity.

SIOUX CITY.—*C. D. Reed.* There was a decided cold wave for the season on the 11th, 12th and 13th. The minimum for the month was 17°, on the 13th. This is the lowest temperature in 20 years to occur so early in October. The ground was frozen to such an extent that potatoes remaining in the ground were considerably damaged. Cabbage and turnips were also greatly injured. The first killing freeze of the season was on the 12th, though no frost was deposited on that date because of the brisk to high wind. Snow flurries preceded this freeze on the 11th. It is rare at this station, that snow flurries precede the first killing frost or freeze of autumn. Beginning about 7 p. m. of the 18th the aurora borealis began to show as a slowly increasing white light in the northern sky, having something of the appearance of the eastern sky at the rising of the full moon. By 7:30 p. m. well defined streamers began to shoot upward and by 10 p. m. some of them had reached an altitude of 45° to 50°. The

brightest display was slightly to the east of north. By 11:30 p. m. no streamers remained and by midnight the display had faded away. Colors were not visible at any time and there was no noticeable arch or crown of light.

STOCKPORT.—*C. L. Beswick.* Very little fall plowing was possible until the last decade. Corn gathering is in progress at the close of the month with yield above expectations. Pastures are only fair but stock is generally in good condition.

WASHTA.—*H. L. Fetter.* Considerable of the winter apple crop was frozen on the trees between the 10th and 13th. There was a heavy thunder storm on the last day of the month.

WAUKEE.—*Samuel F. Foft.* Farmers are beginning to gather corn but it is a little too damp yet, although the quality is fair to good and the yield will average only five bushels less than the crop of 1908. It is not often that leaves and vegetables are killed by such a hard freeze as on the 13th, before being even nipped by a frost.

WEST BEND.—*Phil. Dorweiler.* The month was favorable for farm work and frost held off long enough to save the corn crop.

NOVEMBER.

The month will go on record as having been the wettest and one of the warmest Novembers since State-wide observations began in 1890. Both the temperature and precipitation were above the normal at every station in the State, which is unprecedented; and the temperature was above the normal on all but four or five days of the month. The average temperature for the State was 42.4 degrees, which is 6.5 degrees above the normal and the highest average for November during the past nineteen years, except in 1899, when the average was 43.9°. The first decade was the warmest part of the month, and the highest temperature occurred generally between the 4th and 6th, when the maximum temperature ranged from 66° to 77° over the northern district, which comprises the three northern tiers of counties; from 68° to 81° over the central district, comprising the three central tiers of counties; and from 74° to 84° over the southern counties. The only cold periods of the month were on the 17th and 18th, and the 22d and 23d; the lowest temperature occurring generally on the 18th, when minimum temperatures ranged from -4° to 12° over the northern district; the lowest being reported from the western part of the district or the northwestern part of the State. Over the central counties the minimum ranged from 3° to 17°, and from 6° to 18° over the southern district.

The precipitation was excessive in all districts, and was well distributed throughout the month, there being only three days on which rain or snow did not fall in some part of the State, viz.: 4th, 18th and 19th. The heaviest precipitation occurred between the 11th and 16th, but the amounts were heavy on the 1st, 7th, 22d, 23d and 28th, and the monthly amounts at many stations exceeded all former records for November. The amounts of snowfall over the northern counties also exceeded all November records. Heavy snow fell on the 15th, 16th, 22d and 23d, and the monthly amounts ranged from 8 inches to 29.5 inches in the northern district. The fre-

quent and heavy rains and the frostless weather caused high water in all rivers and creeks, many of which, especially in the central and western districts, were at flood stage and overflowed the bottom lands, which is also an unprecedented condition for November. The rains interfered with the corn harvest and made the roads so muddy that they were almost impassable. Much of the corn is lying on the ground, and the grain is seriously damaged by the excessive moisture. From 35 to 40 per cent of the corn crop is still in the fields, and, unless the weather conditions improve at an early date, a large percentage of it will be lost or ruined. Corn in cribs is surcharged with moisture, and the warm, moist weather has caused it to mold badly. The excessive rains have, however, been beneficial for grass, alfalfa and fall grains, all of which are reported to be in good condition. The rains also assure an abundant water supply for the winter and will put the soil in good condition for early spring work, if the weather is favorable at that time. Fall plowing progressed until the close of the month.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 117 stations, was 42.4°, which is 6.5° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 38.7°, which is 5.0° above the normal; Central section, 42.8°, which is 7.1° above the normal; Southern section, 45.8°, which is 7.6° above the normal. The highest monthly mean was 50.2°, at Keokuk, Lee county, and the lowest monthly mean, 34.4°, at Sibley, Osceola county. The highest temperature reported was 84°, at St. Charles, Madison county, on the 5th; the lowest temperature reported was -4°, at Washta, Cherokee county, on the 18th. The average monthly maximum was 74°, and the average monthly minimum was 9°. The greatest daily range was 44°, at Estherville, Emmet county, and at Woodburn, Clarke county. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 123 stations, was 5.39 inches, which is 4.00 inches above the normal. By sections the averages were as follows: Northern section, 5.89 inches, which is 4.58 inches above the normal; Central section, 5.11 inches, which is 3.68 inches above the normal; Southern section, 5.18 inches, which is 3.74 inches above the normal. The greatest amount, 11.48 inches, occurred at Humboldt, Humboldt county, and the least, 2.07 inches, at Independence, Buchanan county. The greatest amount in twenty-four hours, 4.08 inches, occurred at Harlan, Shelby county, on the 13th. Measurable precipitation occurred on an average of 10 days.

The average amount of unmelted snowfall was 6.8 inches, averaging as follows: Northern section, 13.7 inches; Central section, 4.5 inches; and Southern section, 2.3 inches; the greatest amount was at Plover, Pocahontas county, 29.5 inches, and the least amount was a trace at a number of stations in the Central and Southern sections.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 10; partly cloudy, 7; cloudy, 13. The duration of sunshine was below the normal, the percentage of the possible amount being 41 at Charles City; 46 at Davenport; 34 at Des Moines; 45 at Dubuque; 43 at Keokuk, and 47 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 46 miles per hour from the South, at Sioux City, Woodbury county, on the 10th.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* The weather was unusually cloudy; there being 16 cloudy days, 6 partly cloudy and only 8 clear days during the month. Fields are too wet to plow or to permit corn husking, and on account of wet and warm weather corn is rotting on the stalks.

AFTON.—*J. I. Chenovert.* There were 12 rainy days during November with 4.51 inches of precipitation, which was beneficial to fall pastures and winter wheat.

ALGONA.—*Dr. F. T. Seeley.* There has been an unprecedented amount of precipitation for November; there being 23.5 inches of snow and a total of 8.04 inches of precipitation. A large amount of corn is still in the fields.

ALLESTON.—*Mrs. Geo. Shriver.* About all of the corn has been gathered but the quality and yield are poor.

ALTA.—*David E. Hadden.* November, 1909, was wet and warm. Compared with the normal for the past 19 years there was an excess of 4.1° of temperature and 4.88 inches of precipitation. Eleven inches of snow fell and the cloudiness was excessive. Much of the corn was still in the fields at the close of the month.

ALTON.—*W. S. Stagle.* A good deal of misty weather prevailed during the month. About 25 per cent of the corn is still in the fields, and that in cribs is not keeping well. The 16.5 inches of snow disappeared without any indication of a flood.

AMANA.—*O. Schadt.* The month was warm and moist. The mean temperature was 11.5 degrees and the precipitation was 2.41 inches above the normal. The roads are very bad and muddy.

AMES.—*M. McDonald.* The weather was very cloudy and wet with rather uniformly high temperature. Soft fields and bad roads make unfavorable conditions for picking and cribbing corn.

ATLANTIC.—*Thos. H. Whitney.* Excessive precipitation combined with cloudy days have made roads very heavy and greatly impeded the gathering of corn, besides injuring its quality, both in crib and fields.

BAXTER.—*W. R. Vandike.* November was a very cloudy month. The sun did not shine over one-third of the time and the month closed with a very foggy and misty day.

BEDFORD.—*E. E. Healy.* A heavy thunderstorm occurred on the 7th, and several buildings were struck by lightning.

BONAPARTE.—*Hon. B. R. Vale.* There was more precipitation during the month than in any November in the past 19 years, but the soil has taken in all the surplus moisture.

BRITT.—*Geo. P. Hardwick.* Very changeable and unseasonable weather with excessive rain and snowfall and only two clear days. Ground has been so muddy that only a little farm or road work was done. Two-fifths of the corn is still in the field and much of it is rotting on account of being on the ground.

BURLINGTON.—*Max. E. Poppe, Jr.* The first snow fell and the first sleet storm occurred on the 23d.

CHARLES CITY.—*E. W. McGann.* The month was characterized by high temperature, excessive precipitation and a great lack of sunshine, cloudy weather prevailing. The most distinguishing features of the month were the thunderstorms on the 7th and 11th, and the heavy snow on the 21st and 22d, the total depth being 11.3 inches, which is the heaviest fall on record. The Cedar River was bank full from the 15th to the close of the month, and flooded much of the low lands and did considerable injury, especially as a great deal of the corn was still in the fields.

CHARITON.—*C. C. Burr.* The corn crop is below the average as to yield and quality. Hay, however, is plentiful and all stock goes into winter quarters in good condition. High values prevail for all farm products.

CLINTON.—*Luke Roberts.* This has been the warmest November in 31 years. The mean temperature, the maximum temperature, the minimum temperature, the warmest day, the coldest day and the rainfall were each above the normal. The prevailing wind was from the south for the first time in November in 31 years.

DECORAH.—*F. H. Baker.* The rainfall exceeded all former records for November at this station.

DUBUQUE.—*J. H. Spencer.* The past month was the warmest November by 0.2° since the record began at this station in 1874. The total amount of precipitation was 2.94 inches, which has been exceeded only twice in November in 28 years. The flow of water in the rivers of this district was slightly greater than normal, due to heavy rains in Wisconsin and probably Minnesota on the 12th and 13th which caused the rivers to rise about two to four feet from the 12th to about the 22d. A large meteor fell west of this station at about 4:45 P. M. of the 23th. People who observed it claim that it was accompanied by a noise resembling light thunder and that it moved from south to north.

EARLHAM.—*Geo. Phillips.* The fields are and have been very soft and there is some corn still ungathered. Corn is spoiling, both in the fields and in the cribs.

ELLIOTT.—*Henry Barnes.* From 40 to 50 per cent of the corn remains in the fields and is badly down and rotting. Corn in crib is seriously damaged by warm, wet weather and unless a change comes soon a large per cent of it will not be marketable.

FOREST CITY.—*J. A. Peters.* About one-third of the corn is still in the fields and much of that in cribs is rotting. The cobs are very soft. The amount of precipitation breaks all records for November. There was a great deal of foggy weather during the latter part of the month.

GRAND MEADOW (Postville P. O.)—*F. L. Williams.* The month was warm, moist and cloudy. Pastures are still green and plowing is still in progress at the end of the month. Some corn is molding in cribs.

GRINNELL.—*D. W. Brainard.* The past month was one of the worst Novembers for securing the corn crop ever known in this section.

GUTHRIE CENTER.—*D. G. Beardsley.* The month has been so wet that farmers are having a serious time in gathering their corn. The last two days were very foggy.

HARLAN.—*C. A. Reynolds.* November has been an unusually bad month. On account of the heavy rains, rivers and creeks have been out of their banks, roads almost impassable, and the corn fields so soft that wagons would get stuck in the mud with only a partial load on.

HUMBOLDT.—*Henry S. Wells.* Corn is not all garnered yet on account of the frequent rains and heavy snows, but there is scarcely any frost in the ground and farmers are plowing on the last day of the month.

INWOOD.—*F. B. Hanson.* The first decade of the month was favorable for corn picking and other farm work, and the corn was fairly dry at the end of the decade. Snow fell on the 12th and since then the weather has been most disagreeable with rain, snow and fog much of the time. Only 50 per cent of the corn had been gathered up to that time and there is still 35 per cent of the crop in the fields and some of the corn picked early has spoiled in the cribs. The yields vary from 35 to 65 bushels per acre, with an average of about 50 bushels per acre.

KEOKUK.—*Fred Z. Goswisch.* The month has been unusually warm with plenty of rain. Streams and ponds are full, assuring plenty of water for the winter and pastures continue green. The gathering of corn has been retarded by soft ground, and in cases where the corn was blown down the grain has been damaged.

KEOSAUQUA.—*J. H. Landes.* November was a fairly good month for fall work and most of the corn is in cribs.

LAMONI.—*T. J. Fitzpatrick.* The month was good for the corn harvest, the crop generally being secured. There were only a few cold days, but there were 17 cloudy ones. All in all it was a month of pleasant fall weather.

DECEMBER.

December, 1909, will be noted for its low average temperature, excessive cloudiness and the frequency of snow storms. It was the coldest December since state-wide observations began in 1890, and probably the coldest since 1876. The average temperature was 12.1° lower than the average for December, 1908, and 2.9° lower than any other December since 1890. The monthly minimum temperatures were not, however, as low as in 1892, 1901 and 1903, but the weather was continuously cold from the 5th to the 30th inclusive. The first four days were moderate, with maximum temperatures above 40° and ranged from 45° to 60° on the 2d. A cold wave passed over the state on the 5th, and from that date to the 30th the maximum temperatures were below the freezing point, except on one or two days, and the minimum temperatures were near or below zero. At many stations, the minimum temperature was below zero on a greater number of days than was ever before recorded during the month of December. The lowest temperature was recorded on the 29th, except in the extreme southeastern counties where the minimum occurred on the 30th.

The average precipitation was .99 inch above the normal and has been exceeded in December only twice during the past 20 years. In 1891 the average precipitation was .26 inch greater, and in 1902 it was .05 inch

greater than the average for the past month. Rains were general from the 1st to the 3d, changing to snow in the northern district on the latter date, to sleet over the southern and eastern districts on the 4th and to snow over the larger part of the state on the 5th. After the 5th, snow fell at frequent intervals, but the daily amounts were generally light except on the 24th and 25th, when the amounts ranged from 2 to 12 inches of dry snow; the larger amounts being reported from the central and east central districts. At least a trace of precipitation fell at some station in the state on every day of the month, except the 31st, and the number of days with .01 inch or more of precipitation exceeded all former records for December at several stations. The average total snowfall for the state was 13.7 inches, and the ground was covered with snow from the 3d in the northern and from the 5th in the southern and eastern districts until the close of the month, and there has been more good sleighing than for many years so early in the winter. The snow has afforded good protection to winter grains, meadows, and alfalfa, and they are reported to be in excellent condition. The deep snow and severe cold weather have, however, put a stop to all drainage work and prevented the completion of corn husking. Fully 25 to 30 per cent of the corn is still in the fields, and much of it is covered with snow. The heavy snowfall on the 24th and 25th delayed all freight and the Christmas passenger traffic, but as there was but little wind no trains were stalled.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 116 stations, was 15.1°, which is 8.5° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 13.3°, which is 7.6° below the normal; Central section, 15.2°, which is 8.6° below the normal; Southern section, 16.9°, which is 9.3° below the normal. The highest monthly mean was 20.6°, at Keokuk, Lee county, and the lowest monthly mean 10.1°, at Sibley, Osceola county. The highest temperature reported was 60°, at Keosauqua, Van Buren county, on the 1st; the lowest temperature reported was -26°, at Inwood, Lyon county, on the 29th. The average monthly maximum was 49°, and the average monthly minimum was -15°. The greatest daily range was 55°, at Sibley, Osceola county. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 114 stations, was 2.18 inches, which is .99 inch above the normal. By sections the averages were as follows: Northern section, 1.75 inches which is .72 inch above the normal; Central section, 2.30 inches which is 1.10 inches above the normal; Southern section, 2.49 inches, which is 1.16 inches above the normal. The greatest amount, 6.10 inches, occurred at Clinton, Clinton county, and the least, .89 inch, at Storm Lake, Buena Vista county, and at West Bend, Palo Alto county. The greatest amount in twenty-four hours, 2.32 inches, occurred at Clinton, Clinton county, on the 12th and 13th.

The average depth of snowfall for the State was 13.7 inches; the greatest depth was 29.0 inches at Sheldon, O'Brien county, and the least was 5.9 inches at West Bend, Palo Alto county.

Measurable precipitation occurred on an average of 11 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 10; partly cloudy, 5; cloudy, 16. The duration of sunshine was below the normal, the percentage of the possible amount being 35 per cent at Charles City; 35 per cent at Davenport; 38 per cent at Des Moines; 36 per cent at Dubuque; 31 per cent at Keokuk, and 35 per cent at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 50 miles per hour from the northwest, at Sioux City, Woodbury county, on the 16th.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* The past month was the coldest December for 15 years.

ALBIA.—*J. I. Chenoweth.* December was a genuine winter month; there being two to nine inches of snow on the ground after the 7th and there were nine days with the temperature below zero. A fine quality of ice from twelve to fourteen inches thick is being harvested.

ALGONA.—*Dr. F. T. Seeley.* There has been a great deal of snow and winter weather during December. The temperature was below zero on twelve days.

ALTA.—*David E. Hadden.* December, 1909, was the coldest December in twenty years; the mean temperature being 10.5° below the normal. The ground was well covered with snow nearly all the month.

ALTON.—*W. S. Slogle.* There has been snow on the ground continuously since the 5th and there has been fine sleighing. Much of the corn was marketed during the month as the severe cold weather kept it in shipping condition.

AMANA.—*C. Schadt.* This has been the coldest December for many years and there was 8.5 inches of snow on the ground at the end of the month.

ATLANTIC.—*Thos. H. Whitney.* December was a cold and snowy month, and, as the pastures and stock fields have not been available in general, the price of hay and feed has been unusually high. Much of the corn still remains in the fields.

BAXTER.—*W. R. Vandike.* The snow was ten inches deep at the close of the month and the sleighing was good.

BELMONT.—*Geo. P. Hardwick.* Excessive snow and blustering weather prevented the completion of the corn harvest and one-fifth of the crop is still in the fields at the end of the year.

BLOOMFIELD.—*C. R. Davis.* About 10 per cent of the corn crop is yet in the fields.

BONAPARTE.—*B. R. Vale.* The precipitation was above and the temperature below the normal but as there were no severe storms it was a pleasant month for feeding stock.

BRITT.—*L. M. Goodman.* There was only one day during the last half of the month on which the temperature was above the freezing point.

BURLINGTON.—*Max E. Poppe, Jr.* The 11th of December was the most disagreeable day for years. The ground was covered with an ice sheet and the sharp wind, driving sleet in all directions, made all roads and walks dangerous.

CHARITON.—*C. C. Burr.* The month has given the greatest snowfall and the lowest temperature of recent years. Feed is scarce and high in price but stock is doing fairly well.

CHARLES CITY.—*Edward W. McGann.* The mean temperature was only 0.2° higher than the mean of the coldest December on record. The 29th was the coldest day of the month, when the mean temperature was 11° below zero. The total precipitation was above the normal and came principally in the form of light snow; the total depth for the month being 16.3 inches and falling upon 18 days. At the close of the month the ground was covered to the depth of 7.6 inches and good sleighing prevailed. The month was especially noted for its high humidity, frequent light snows and a great deficiency of sunshine, cloudy weather generally prevailing.

CLARINDA.—*A. S. Van Sandt.* This has been the coldest December since records began here in 1888.

CLINTON.—*Luke Roberts.* The precipitation was 4.22 inches above the normal and the greatest amount in any December for 31 years.

CRESTON.—*E. S. Stovall.* There has been about five inches of snow on the ground since the 5th of the month.

DAVENPORT.—*J. M. Sherier.* With the exception of the periods from the 1st to the 5th and the 12th to the 15th inclusive, the temperature was continuously below the normal, the greatest deficiency for any day being 29° on the 29th when the mean temperature was 6° below zero. A trace or more of snow occurred on 18 days, the total for the month being 16.3 inches, which is the greatest amount on record for any December, with the single exception of that for December, 1887. On the evening of the 29th the depth of snow on the ground was 11.3 inches, 7.1 inches of which fell in one storm, on the 24th and 25th.

DUBUQUE.—*J. H. Spencer.* This has been the coldest December since 1886, when the average was 16°. In 35 years the average has been lower only twice. The maximum temperature was below the freezing point on more dates than ever before recorded in December. The total amount of unmelted snow, 17.7 inches, is the largest amount on record in December since 1887. There were 17 days when .01 of an inch or more fell, a greater number than during any December at this station, with one exception. The heavy snow storm of the 24th and 25th was the most serious of the month. The snow drifted badly and railroad traffic was much interfered with. The severe cold also delayed trains during the greater portion of the month and made the shipment of perishable produce very difficult. Most of the rivers in this district froze over during the first ten days of the month. The Mississippi froze over at Dubuque on the 17th and at the close of the month the ice was about ten inches thick. Sleighing was fine from about the 10th until the close of the month.

ELLIOTT.—*Henry Barnes.* Bad roads and cold and stormy weather prevailed during the month. Stock cannot be turned into the corn fields as much of the corn is ungathered, and as a result of the heavy feeding of hay, the price of hay is \$10 to \$15 per ton.

FOREST CITY.—*J. A. Peters.* There has been no opportunity to pick the corn remaining in the fields.

GRAND MEADOW (P. O. Postville).—*F. L. Williams.* The month was extremely stormy and cold, there being 14 days on which the temperature was down to or below zero. There is no bare ground at the end of the month and most of the roads are drifted full of snow.

GRINNELL.—*D. W. Brainard.* This has been the coldest December known here and we have had the best run of sleighing in several years. The ice harvest is also the best on record for December but the month was very unfavorable for the corn harvest. There are several hundred acres of corn unpicked and the grain is under a foot of snow.

HARLAN.—*C. A. Reynolds.* December was about as stiff a winter month as we have ever had.

INWOOD.—*F. B. Hanson.* Most of the corn that was in the field the first of the month is still unpicked. Much of the corn is down and it has been impossible to pick it on account of snow and cold.

KEOKUK.—*Fred Z. Gosewisch.* The month has been continuously cold with the minimum below 32° each day since the 5th and the ground has been covered with snow since the afternoon of the 5th. This has been the coldest December since 1876, and at the close of the month the ice in the canal is 14 inches thick.

LARRABEE.—*H. B. Strever.* The year closes with a cloudy, disagreeable month, corn husking has been in progress during the entire month and much of the corn is still in the fields.

MASSENA.—*C. E. Smeltzer.* Although the month has been very cold the ground is not frozen very much.

PELLA.—*John H. Ver Steeg.* This was the coldest December since 1889 and the amount of cloudiness, sleet and snow has been excessive since the 4th of the month.

PLOVER.—*J. S. Smith.* The month was cold and stormy and considerable corn is still in the fields. Farmers have had to feed their stock more hay than was anticipated, and, if present weather continues, hay will be very scarce by spring.

RIDGEWAY.—*Arthur Betts.* The month was the coldest and stormiest December during the past 12 years. Winter set in and ground froze on the 6th.

SHELDON.—*Dr. A. W. Beach.* Heavy snows make it almost impossible to get the corn out of the fields, but give us the best sleighing we have had for years. Inability to turn cattle in the stalk fields will make hay scarce before spring.

STOCKPORT.—*C. L. Beswick.* This has been the coldest December since records began at this station. Pastures are covered with snow and hay is high priced but stock is generally in fair condition.

WASHTA.—*H. L. Fetter.* The weather during the month was so unfavorable that farmers were unable to get much husking done and a large amount of corn is yet to be gathered.

WAUKEE.—*Samuel F. Foft.* About 35 per cent of the corn is yet in the fields, ungathered, and most of it is covered with snow.

and exceeded all previous records for March at several stations. The low temperatures also broke all former records for the second decade of the month in the north central counties, and the severity of the thunder during the snow storm on the 9th was phenomenal. The 23d was the warmest day of the month, when the maximum temperatures ranged from 45° in the northern to 71° in the southern counties. The lowest temperature for the month at all stations was recorded on the 17th and was generally below zero in the northern districts; the lowest being 15° below zero. The average precipitation for the State was slightly below the normal for March, but the average snowfall was considerably above the normal and was excessive in many localities. There was good sleighing from five to ten days in the northern districts, which was unusual for that time of the year. There had not been sufficient growth at the close of the month to determine whether or not the alternating freezing and thawing weather during the winter had been injurious to clover, winter grains and alfalfa.

April was abnormally cold and cloudy with an excessive amount of precipitation in all but the extreme western counties where there was a slight deficiency. Freezing temperatures occurred in all districts every week during April, and the month closed with the temperature at freezing or below in all parts of the State; but the average temperature for the month was 2.3° higher than the average for April, 1907, which was the coldest April on record and the only one colder than April, 1909. The precipitation, like the cold, was almost continuous, there being at least a trace of rain or snow in some part of the State on every day during the month, and the average snowfall was greater than the average of any preceding April since 1896. Thunder storms accompanied by hail and wind squalls were frequent, and, in many cases, were quite destructive to property. Under the adverse conditions, field work was retarded and was, at the close of the month, about two weeks behind the average of former years. Field work was especially backward in the east central and southeastern districts, where rain or snow fell almost daily from the 12th to the 30th, and the seeding of oats in those districts was only about three-fourths finished at the close of the month. A large acreage intended for oats was abandoned in all parts of the State, thereby reducing the acreage of that crop 6 per cent. below the acreage of 1908. The acreage of wheat was, however, increased. Wheat and early sown oats were up at the close of the month, but growing very slowly on account of the frequent freezing weather. No blossoms appeared on fruit trees except in the extreme southern counties, which was considered to be a favorable indication for a good fruit crop.

The cool wave that spread over the State at the close of April continued during the first three days of May, and caused freezing temperatures on one or more of these days in all parts of the State, and was attended, on the first day by snow flurries over the central and northern counties. The average temperature for the month was considerably below the normal and was the coldest for May, with one exception, 1907, since 1893. The precipitation for the State at large was slightly below the normal, but there was a slight excess over three northern tiers of counties. On the whole, the month was favorable for farm operations and

good progress was made in field work. Corn was practically all planted by the close of the month, except on low and wet ground, and cultivation was general. Grass and small grain made rapid growth during the latter half of the month, and was nearly up to the average for the last of May. The continued cold weather during April and the fore part of May kept the fruit buds dormant until the middle of the month, thereby escaping any material damage by the late frosts. The average date for all kinds of fruit trees to be in full bloom at Des Moines is about May 5th, but they were not in full bloom this year until the 16th.

The average temperature for June was only a fraction of a degree above the normal, but the rainfall was considerably above the average for June. There was an excess of rainfall in all districts of the State, the greatest excess being over Union and the adjacent counties, where the monthly amounts ranged from 8 inches to over 13 inches. It was also heavy over the Missouri Divide and the extreme northwestern counties. Showers occurred at some station of the State on every day of the month except the 19th and yet there were, on an average, 12 clear days. Thunder and lightning accompanied most of the showers, but wind squalls and severe hail storms were not as frequent as usual. The frequent and excessive rains caused high water in all rivers and creeks, especially in the western district. The flat and bottom lands were flooded two or three times, and a large acreage of corn was finally abandoned after being replanted once or twice. The surplus moisture also interfered with the cultivation of corn on ground not thoroughly drained and many fields were quite foul; but on high and well drained ground corn made very satisfactory progress and was generally clean. The condition of small grain, grass, potatoes and garden truck improved during the month, but there was a decline in the condition of fruit.

During July showers were heavy and frequent from the 3d to the 12th, and the temperature was unusually low from the 3d to the 7th; but as a whole July was one of the best harvest months on record. The latter half of the month was characterized by moderately warm weather, light and widely scattered showers, a high percentage of sunshine and the rarity of thunder storms and wind squalls. The rainfall was especially heavy over the southern, central and western districts during the first decade, and caused high water in all creeks and rivers within the area of heavy rainfall. Bottom lands were flooded for the third time during the year and many thousand acres had to be abandoned. The heavy rains also prevented haying, and in the southern districts, where the small grain was ready for the harvester, the ground was too wet and soft to run machinery. After the 12th the weather changed suddenly from wet and cool to comparatively dry and warm. During the second decade much of the belated corn was given some cultivation; but owing to its rapid growth, due to the higher temperature, the stalks soon became too high to permit further cultivation and many fields were laid by in a weedy condition. The third decade was the warmest part of the month, the 29th being the warmest day, when the maximum temperatures ranged generally from 90° to over 100°. During this period the showers continued light and scattered, and at the close of the month the surface of the ground was dry over the larger part of the State, and the crops in

the eastern districts were beginning to feel the effects of the drouth. Exceptionally rapid progress was made during the latter half of the month in haying and harvesting, and most of the hay and grain crops were secured in excellent condition. Clover made rapid advancement, and nearly all of the early planted fields were in full tassel and earing nicely at the close of the month, and the late planted fields were improving. Some threshing was done before the close of the month. Pastures and potatoes were still in good condition at the end of the month, but they, as well as corn were needing more rain.

August, 1909, will be noted for its uniformly high temperature, the small number of cloudy days, and, over the larger part of the State, the small amount of rainfall. Both the day and the night temperatures were high until the 28th, when a cool wave passed over the State, resulting in light frosts on low ground on the morning of the 29th over the northern and, in a few localities, in southern districts, but no damage was done to vegetation. The maximum temperatures were up to or above 90° on ten days in northern and twenty-one days in southern counties, and the average of the monthly maximum temperatures was 96°. The rainfall was deficient in all but the northeast and extreme north central counties; yet at least a trace of rain fell in some part of the State on every day of the month except the 19th and 20th. During the second decade, showers were frequent and the rainfall heavy over the northeast and north central districts; but over the remainder of the State, the showers were extremely local, and the rainfall generally very light. The monthly rainfall ranged from a trace in Jefferson County to 8.21 inches in Chickasaw county. Drouthy conditions prevailed during the entire month over the southern half of the State, and the condition of the corn crop deteriorated from 10 to 25 per cent; but the early planted corn, on rich soil and well cultivated fields, withstood the drouth remarkably well and much of it was well up to the average of past years at the close of the month. The dry, cloudless weather was, however, favorable for stacking and threshing grain, and that work progressed rapidly. Shock threshing was practically completed at the close of the month.

The hot and drouthy conditions prevailing at the close of August were broken by lower temperatures on the 1st and copious and general showers on the 2d of September. The average temperature was below normal, but the maximum temperatures ranged from 80° to 87° over the northern, and from 85° to 94° over the southern districts, between the 9th and 13th and from the 17th to the 21st. The lowest temperature occurred on the 27th, when the minimum was below the freezing point at several stations in the northern counties. Light frost occurred on low ground in the extreme northern part of the State on the 1st and 5th and in all parts of the State on the 23d, 24th and 27th. On the 27th the frost was heavy on low ground over the northern and northeastern counties, but little or no damage was done except to tender vines. The rains during the first half of the month revived the pastures and softened the ground sufficiently to permit fall plowing to be resumed, and excellent progress was made in plowing and seeding fall grains during the remainder of the month. The rains were beneficial to the late planted corn and the dry weather during the last six days caused the early corn

to mature rapidly, and nearly 90 per cent of the crop was beyond danger of frost by the end of the month. High winds on the 12th did much damage in blowing down and breaking corn stalks. The yield of potatoes and the second crop of hay were light on account of the August drought.

The mean temperature for October was slightly below the normal, the average daily deficiency being 2.2°. During the past 19 years there have been five colder Octobers, but there are no records of as low temperature during the first 15 days of October as was registered during that period in October, 1909, when the minimum temperature ranged from 10° to 20° over the northern and from 15° to 23° over the southern counties. The ground was frozen to such an extent that potatoes remaining in the ground were considerably damaged. Cabbage and turnips were also injured, and, over the southern portion of the State, many thousand bushels of apples were frozen on the trees. The precipitation, while below the normal for the month, was general from the 8th to the 12th, and the rainfall was mixed with light snow flurries on the 11th and 12th, which is much earlier than usual for the first snow of the season. Rains were also general between the 20th and the 23d and on the afternoon and evening of the 31st. Fall plowing was continued and the growth of winter grains was satisfactory. Corn husking was begun about the middle of the month, but, owing to the excessive amount of moisture in the cob, it could not be cribbed in large quantities.

November, 1909, will go on record as having been the wettest and one of the warmest Novembers since State-wide observations began in 1890. Both the temperature and precipitation were above the normal at every station in the State, which is unprecedented for that season of the year. The average temperature for the State was 42.4°, which is 6.5° above the normal and the highest average for November during the past 19 years, except in 1899, when the average was 43.9°. The 4th, 18th and 19th were the only days in the month on which rain or snow did not fall in some part of the State. The heaviest precipitation occurred between the 11th and 16th, and the monthly amounts exceeded all former records for November. The amounts of snowfall over the northern counties also exceeded all November records; the monthly amounts ranged from 8 inches to 29.5 inches in the northern district. The frequent and heavy rains and the frostless weather caused high water in all rivers and creeks, many of which, especially in the central and western districts, were at flood stage and overflowed the bottom lands, which is an unusual condition for November. The rains interfered with the corn harvest and made the roads so muddy that they were almost impassable. Much of the corn way lying on the ground and the grain was seriously damaged by the excessive moisture. From 35 to 40 per cent of the corn crop was still in the fields at the end of the month. Corn in cribs was surcharged with moisture, and the warm, moist weather caused it to mold badly. The excessive rains have, however, been beneficial to grass, alfalfa and fall grains, all of which were in good condition at the close of the month. The rains also assured an abundant water supply for the winter. Fall plowing was still progressing at the close of the month.

December, 1909, will be noted for its low average temperature, excessive cloudiness and the frequency of snow storms. It was the coldest December since State-wide observations began in 1890 and probably the coldest since 1876. The average was 12.1° lower than the average for December, 1908, and 2.9° lower than that for any other December since 1890. At many stations, the minimum temperature was below zero on a greater number of days than ever before recorded during the month of December. The average precipitation was .99 inch above the normal and has been exceeded in December only twice during the past 20 years. Rains were general from the 1st to the 3d or 4th, but after the latter date snowstorms were of frequent occurrence. The amounts were generally small, except on the 24th-25th, when about 12 inches fell over the central and east central districts. The average total snowfall for the State was 13.7 inches, and the ground was covered with snow from the 3d in the northern and from the 5th in the southern and eastern districts until the close of the month. There was more good sleighing than for many years so early in the winter. The snow has afforded good protection to winter grains, meadows and alfalfa, and they were in excellent condition at the end of the year. The deep snow and the severe cold weather, however, put a stop to all drainage work and prevented the completion of corn husking. About 25 to 30 per cent of the corn was still in the fields on December 31st, and much of it was covered with ice and snow. The heavy snowfall on the 24th-25th, delayed all freight and the Christmas passenger traffic.

COMPARATIVE DATA FOR THE STATE—ANNUAL.

	TEMPERATURE					PRECIPITATION			
	Mean Annual	Highest	Date	Lowest	Date	Annual	Greatest Annual	Least Annual	Average Snow Fall
1890	48.0	110	July 13	-27	January 22	31.28	45.74	16.00	....
1891	47.3	106	August 9	-31	February 4	32.90	49.05	23.48	....
1892	46.6	104	July 11	-38	January 19	36.58	48.77	24.78	31.7
1893	45.7	102	July *13	-36	January 14	27.59	33.27	19.19	36.2
1894	49.7	109	July 26	-37	January 25	21.94	29.81	15.65	19.4
1895	47.2	104	May 25	-33	February 1	36.77	35.25	18.57	25.5
1896	45.6	104	July 3	-29	January 4	37.23	51.60	28.68	19.8
1897	47.9	106	July *23	-30	January 25	26.97	36.18	20.21	38.5
1898	47.7	103	August 20	-25	December 31	31.34	55.47	19.51	38.6
1899	47.5	104	September 6	-40	February 11	28.68	42.05	21.79	23.2
1900	49.3	103	August 3	-27	February 15	34.15	47.33	25.05	26.3
1901	48.9	113	July 22	-31	December 15	24.41	37.69	16.35	37.2
1902	47.7	98	July 30	-31	January 27	43.82	58.80	20.14	27.7
1903	47.2	101	August 24	-27	December 13	35.39	50.53	26.41	19.1
1904	46.3	100	July 17	-32	January 27	28.51	38.93	19.34	30.3
1905	47.2	104	August 11	-41	February 2	36.56	52.26	24.66	37.9
1906	48.4	102	July 21	-32	February 10	31.60	44.34	20.63	32.5
1907	48.0	102	July 5	-31	February 5	31.61	43.90	19.93	24.3
1908	49.5	101	August 3	-18	January 29	35.26	49.98	24.11	20.7
1909	47.6	103	August *15	-26	February *15	40.01	53.48	27.20	46.8

* And other dates.

CLIMATE AND CROP BULLETINS.

Summaries of Weekly Bulletins Issued in the Season of 1909.

BULLETIN NO. 1, WEEK ENDING APRIL 11, 1909.

The average daily temperature for the State for the six months, October, 1908, to March, 1909, inclusive, was 32.9° or an average daily excess of 2.3°. The mean temperature was above the normal in all of the months except October and March, the average daily deficiency for the latter month being 1.5°. The average total precipitation was 10.24 inches which is 1.28 inches above the normal. December and March were the only months that had a deficiency, but the snowfall for March was far in excess of the normal for that month.

The drouth which prevailed during August and September of last year continued during the larger part of October and prevented the seeding of as large an acreage of fall grains as was anticipated. The drouth also caused uneven germination and prevented the usual growth, and the alternating freezing and thawing weather during the winter months did considerable injury to the plants so that the average condition of winter wheat is said to be below the average for this time of the year; but the spring growth has not been sufficient to permit an accurate estimate of the condition being made. This also applies to clover which is reported as being winter killed in many sections of the State.

The cold and stormy weather in March has continued thus far in April and has prevented the usual amount of field work being done. There has, however, been a great deal of sod ground plowed and a good start has been made in the southern counties, in seeding oats and spring wheat, and, if the weather continues favorable, this work will become general in all parts of the State, during the coming week. The season is from ten days to two weeks later than last year, but the soil is in excellent tilth with an abundant supply of moisture so that the growth of all vegetation will be rapid with the advent of warm weather. All fruit trees, except peaches, are reported to be in good condition and the prospects are favorable for bounteous crops of fruit. The cold weather has retarded the development of the buds, thereby lessening the possibility of injury by frost when the trees are in blossom. Stock is generally in good condition, but the supply of hay and rough feed is getting short in many sections of the State.

BULLETIN NO. 2—APRIL 18.

The weather during the past week has been abnormally cold, wet and cloudy. Freezing temperatures occurred in all parts of the State, the minimum ranging from 30° in the southeastern to 18° in the northwestern counties on the 13th. Lower temperatures were reported on April 14, 1907, and April 14, 1905, than have occurred during the past week; but the average minimum temperature at the Central Station for the first fifteen days of this month was lower than has been recorded during the first half of April since 1881. The amount of precipitation at Des Moines

for the first fifteen days of the month breaks all former records of the Central Station for the first half of April, the total being 2.92 inches, or .20 inch more than any previous record. From one to three inches of snow fell on two days during the week in the northern half of the State, and rains have been frequent in all parts of the State and heavy in southern and eastern sections. Very little, if any, field or garden work has been done, and in some counties of the State oats sown over a week ago have not yet been covered. Some of the early sown oats in the southern counties are up and the reports in regard to the condition of winter grains and clover are more promising than they were last week. Most fields now show a good stand, and the plants are vigorous and healthy. The continued cold weather has kept the fruit buds back and all trees, except peaches, are in good condition.

BULLETIN NO. 3.—APRIL 25.

Cold and wet weather continued during most of the past week, the average daily temperature being about 7° below the normal; and the amounts of precipitation ranged from .25 inch in the extreme western portion of the State to over four inches in some of the northeastern counties. Freezing temperature occurred on one or more nights in all sections. The fore part of the week was very unfavorable for farm operations and there was but little work done except on the Missouri slope where the rainfall was light. More favorable conditions prevailed during the past three days and considerable progress was made in seeding and plowing. Most of the seeding has been completed in the western and southern and from 50 to 75 per cent in the northeastern districts. With favorable weather this work will be finished in all parts of the State by the close of the coming week, and the preparation of corn land will progress rapidly. On account of wet weather the acreage of oats will be materially less than was anticipated, and the acreage of corn will be correspondingly increased. The early sown grain is up in the southern counties and shows a good stand, except in a few localities where the seed used was not up to the standard. Grass and clover have made rapid growth during the past three days and stock will be in pasture by May 1st in southern and central districts. Fruit buds are still dormant and no damage was done by the recent freezing temperatures.

BULLETIN NO. 4.—MAY 2.

Typical March weather prevailed during the larger part of the past week. Showers, accompanied by high winds, hail, thunder and lightning, were followed by sleet and snow storms with minimum temperatures ranging from 20° in northern to 31° in southern counties. The average daily temperature was 4° to 12° below the normal, and the average precipitation was below the normal in western and extreme southern and considerably above the normal in east central and northeastern counties. A large amount of damage was done to property in many localities by hail and high winds, and many reports indicate that the early sown grain was probably injured by freezing temperature on May 1st. In the

northeastern districts, where rainfall has been heavy for the past three weeks, there is some complaint of oats rotting in the ground. Farmers have taken advantage of every opportunity to get in the fields, but, owing to the adverse conditions, farm work has progressed very slowly. There is still a large acreage intended for oats not yet sown, and the work of preparing ground is from two to three weeks late. The acreage of small grain will not be as large in any part of the State as was anticipated, and the acreage of oats will be considerably less than that of last year. There has, however, been a slight increase in the acreage of wheat, and the present indications are favorable for a large increase in the acreage of corn.

It is not thought that fruit has been damaged by the freezing temperatures, except possibly in the extreme southern counties where peaches, cherries, plums, apricots and pears are in bloom.

BULLETIN NO. 5.—MAY 9.

Six days of almost uninterrupted sunshine has given a more cheerful tone to the reports of correspondents. The week opened and closed with temperatures near or below freezing, but during the middle of the week the weather was unseasonably warm. The maximum temperature on the 5th was near or above 90°, and the highest ever before recorded this early in the year, at many stations in the northern part of the State. The average for the week was, however, about 2° below the normal and the rainfall was deficient in all districts. The only rainfall reported was in the form of light scattered showers on two days in the eastern counties. Farmers have made the best of their opportunity and field work has progressed rapidly. Seeding of oats in districts heretofore too wet is about finished and much ground has been prepared for corn. Considerable corn has already been planted in southern and some in central and northern districts, and, with favorable weather, planting will become general in all parts of the State during the coming week. Grass and small grain, though growing slowly, are generally in good condition and give promise of good yields. Fruit trees are in blossom over the southern part of the State and do not yet show any injury by frost or freezing weather.

BULLETIN NO. 6.—MAY 16.

The average temperature for the week was slightly below the normal, and the precipitation was above the seasonable average except in the extreme northwestern and extreme southeastern counties where it was very light. During the first three days of the week the weather was dry with abundant sunshine making exceptionally favorable conditions for field operations, and the work of preparing ground and planting corn was vigorously pushed. Fully 75 per cent of the corn ground has been plowed, and about 45 per cent of the planting has been done and the remainder will be practically finished by the 25th. From Thursday to Saturday the weather was mostly cloudy with frequent showers, and, in many localities in the central districts, the rainfall was excessive. Some of the showers were accompanied by severe thunder and hail storms and considerable

damage was done by lightning, but the hail storms were generally of short duration and confined to small areas so that, for the State at large, there was but little injury done. The heavy rains interfered with plowing and corn planting and have made the fields, in southern, central and eastern districts, so wet that planting cannot be resumed on low ground for several days. Field work is, however, about as far advanced as it was at this time last year, but the growth of vegetation is still backward. The rains were very beneficial to grass and small grain and in breaking up the hard clods and in softening the surface of the ground in fields which were plowed when the soil was too wet. The soil is now in good tilth, and the growth of vegetation will be rapid.

Fruits are still in good condition, notwithstanding the fact that frost was quite general on the morning of the 10th with freezing temperatures over the northern and western counties. Trees are now in full bloom in central districts and the buds are beginning to open in northern districts.

BULLETIN NO. 7.—MAY 23.

With warm weather during the week and the absence of rain over the larger part of the State, corn planting has been vigorously pushed. The average temperature was slightly above in western and slightly below the normal in the eastern counties and the rainfall was decidedly below the seasonable average except in the extreme western districts where moderate to heavy local showers occurred on the 18th and 19th. About 75 per cent of the corn has been planted and some of the early planting is up in all parts of the State and shows a good stand. Cultivation has begun in a few localities in southern counties and the fields are generally reported as being in good condition. The rains of last week, where not excessive, were very beneficial to pastures, meadows, small grain and potatoes. Vegetation made rapid growth and the prospects are very promising for all crops, including fruit. The week closes with indications of showers over the larger part of the State.

BULLETIN NO. 8.—MAY 30.

The fore part of the week was cloudy, wet and moderately cool, but more favorable conditions prevailed during the latter half of the week. The average temperature was, however, slightly below the normal except over the northwestern counties. The rainfall was general from Sunday evening to Wednesday, but it came in gentle showers and was of great benefit to all growing crops. Quite general showers also occurred on Saturday night causing an excess of precipitation for the week in all parts of the State except over the northeastern counties where there was a deficiency of one-half to over three-fourths of an inch.

All of the corn on high and well drained lands has been planted, but much of the low ground, probably 5 per cent of the total corn area has been too wet to permit plowing or planting. The rains have necessitated some replanting, but no more than usual and not nearly as much as last year. Cultivation is becoming general over the southern half of the State and many fields in the northern counties will be ready for the first plow-

ing during the coming week. The stand is generally very good, but cut-worms are doing considerable damage in certain localities on sod ground. All small grain, grass and potatoes are reported as being in good condition and growing rapidly. Fruit trees now show an abundance of bloom in northern districts and the indications are still favorable for bounteous crops of fruit in all districts.

BULLETIN NO. 9.—JUNE 6.

This has been the best week of the season notwithstanding the fact that the rainfall was above normal over the larger part of the State. The temperature was considerably above the average and all vegetation has made vigorous and very rapid growth. The frequent showers in the fore part of the week interfered with field work and in a few localities caused some damage, but by working between showers and during the last three days farmers have succeeded in finishing corn planting except on low and wet ground. Some replanting has also been done and good progress was made in cultivating the corn. Cultivation is now general in all parts of the State and the second plowing has begun in the southeastern counties. All reports indicate a good stand with no more than the average amount of replanting to be done on account of worms, washing and flooded fields. There has been sufficient moisture and heat to keep up the rapid growth of grass, wheat, oats, barley, rye, potatoes and garden truck, and the prospects are very promising for all crops.

BULLETIN NO. 10.—June 13.

The temperature was below the normal for the week, with an excess of rainfall over the larger part of the State and a decided deficiency of sunshine. During the first three days of the week showers were general and in a few localities very heavy and damaging. Bottom lands were flooded and in places where the rainfall was the heaviest hillside lands were badly washed. If the rain continues a few days longer some of the acreage intended for corn will have to be abandoned and used for some later crop. Field work was practically impossible until Friday and then only in the most favored localities. As a result weeds and grass are getting a good start and many fields are foul. But in spite of the adverse conditions and the lack of cultivation, corn on uplands and well drained ground, comprising the larger percentage of the corn acreage, shows a good stand, has a good color and is growing rapidly. The soil is still in fine condition and with a few days of favorable weather the fields would be cleaned and the condition of the crop decidedly improved. All reports indicate that grass, small grain, potatoes and garden truck have made rapid growth and give promise of abundant yields.

BULLETIN NO. 11.—JUNE 20.

The daily mean temperature for the last week ranged from 2° to 4° below the normal, but the latter part of the week was seasonably warm. There was an abundance of sunshine and only a few light showers, mak-

ing ideal conditions for farm work. The cultivation of corn has progressed rapidly; the fields on high and well drained land have been plowed once and the second cultivation is well advanced. Many of the fields on low ground are still weedy and a few are too wet to be worked, but the conditions are improving rapidly. Some planting was done in fields heretofore too wet and there was considerable replanting done in fields that had been flooded. Corn is reported to be making fine growth and over the larger part of the State to be in good condition. Grass and small grain have continued to make rapid growth and are in fine condition except in a few low places in the southern districts where oats are reported to be turning yellow. Wheat, oats, barley and timothy are in the heading stage of growth and the clover and alfalfa harvest has begun in a few localities. The hay crop, in all districts, will be about as large as it was last year. Fruits are generally in fair condition and a good crop of strawberries is being gathered. Potatoes and garden truck are doing remarkably well.

BULLETIN NO. 12.—JUNE 27.

The week was warm with frequent showers and excessive humidity. The mean temperature was 2° to 4° above the weekly normal and the rainfall was considerably above the average except over the south central and southeast counties where it was light. Although the rainfall was heavy and in some localities excessive, it was beneficial over the eastern and extreme western counties, but over the upper half of the Des Moines valley, where the amounts were the largest, the effect will be injurious, on flat and bottom lands. As most of the showers occurred at night there was nearly the normal amount of sunshine and while the ground, in many sections, was too wet to work most of the time, fair progress was made in cleaning the corn fields and the majority of them are now in good condition, and replanting was finished on the bottom lands in southern districts.

The warm and moist weather caused an unusually rapid growth of all vegetation, but corn is not yet up to the average for this time of the year.

Dry, warm weather with sunshine is now needed to mature the small grain and securing the bountiful hay crop which is nearly ready to cut. Wheat and barley are reported to be in good condition and oats are doing well except on low ground. Potatoes and garden truck are very thrifty, but wind and hail storms have caused considerable damage to fruit.

BULLETIN NO. 13.—JULY 3.

From Monday to Friday the weather was almost tropical with maximum temperatures, on two days, ranging from 90° to 98° and a high percentage of humidity, but the week closed with an unusually cool wave and general rains. At the Central Station the mean temperature, 60°, on Sunday, was the lowest on record for the 4th of July during the past thirty years. Showers were general except over the northeastern counties on the first of the week and scattered showers occurred in a few localities

on June 29th and 30th, but the amounts of rainfall were not much above the normal except over the south central and extreme northwestern counties where they ranged from two to over three inches. The heavy rains in the southern districts have caused further delay in cleaning the corn fields and as a result there has been a large acreage abandoned. Over the larger part of the State the conditions were favorable for cultivation and much of the corn has been laid by with a portion of the crop up to the 4th of July standard in size, color and condition. The small grain harvest has begun in the southeastern counties and oats, barley, rye and wheat have headed nicely in northern districts. The condition of those crops is generally good except in localities where the moisture has been excessive, but even there, no rust is reported. Oats, straw is, however, shorter than usual. Clover cutting is general and considerable timothy was put up during the week in fine shape. Potatoes and garden truck are thrifty and while there has been a decline in the condition of fruit there will be a fair crop of apples.

BULLETIN NO. 14.—JULY 11.

The average temperature of the week was 5° to 6° below normal; the first half of the week was unusually cool, cloudy and wet, and the latter half moderately warm, but with considerable cloudiness and some rain. The rainfall over the southern, central and western districts was heavy and in many localities excessive; the total amounts for the week ranged from four to almost nine inches over the southern and from two to five inches over the central and western counties. This excessive precipitation falling on land already saturated with moisture, has caused flood stages in all creeks and rivers within the area of heavy rainfall. Bottom lands have been flooded for the third time this season and a large acreage of corn has been lost. Very little if any work could be done in the fields and as a great deal of the corn is now too large to plow, much of it will be laid by without the third cultivation. The rains have prevented haying, and in the southern district where the small grain is ready for the harvester the ground is too wet and soft to run machinery. While the aggregate of damage to crops in the flooded valleys and on the flat lands is very heavy, the percentage of total loss for the whole State is not very large. The precipitation was light and below normal in the northeastern counties and all crops have continued to improve in that section. Early planted corn on uplands in all parts of the State is in good condition and growing rapidly. Small grain over the larger part of the State is reported to be doing well, but dry weather is at once needed for harvesting and haying. This is a very critical period in the crop situation and the final returns of the harvest depend largely on the weather conditions during the next week or ten days.

BULLETIN NO. 15.—JULY 18.

The weather during the week was almost ideal for farm work. There was a slight deficiency of temperature, a decided deficiency of rainfall and an excess of sunshine. The rain came in the form of light and widely

scattered showers, the amounts of precipitation being, generally, less than a quarter of an inch and in no case was there over one inch reported. With such favorable weather farm work has progressed rapidly. A very large acreage of belated corn has been plowed and laid by. About all the winter wheat and early oats in the southern half of the State are now in shock and the harvest is well advanced in northern districts. A great deal of hay has been put up in the best of condition. The clover harvest is about completed and the timothy harvest will be continued during the coming week with increased vigor. There has been considerable loss of wheat and oats in southern counties on account of shelling and lodging, but there has been no rust reported from any part of the State. Early corn is beginning to show its tassels in many localities, and the corn crop as a whole is reported to be in good condition, but there are thousands of acres on low bottom lands that are weedy and much of it cannot mature. Potatoes and garden truck are very thrifty, but there is some complaint of potatoes rotting in districts heretofore too wet.

BULLETIN NO. 16.—JULY 25.

Ideal wather conditions continued during the past week. The temperature was 4° to 5° below the normal, but there was a large excess of sunshine and a decided deficiency of rainfall. The fore part of the week was moderately warm, but the latter part was unusually cool, especially at night. There was no rain from the 18th to the 25th except generally light showers in the southern and western districts on the night of the 21st and the 22d. Light showers occurred on the 25th over the larger part of the State. Exceptionally rapid progress was made in haying and harvesting. The bulk of the tame hay has been secured in the very best of condition and the small grain harvest is nearly finished in southern and well advanced in northern districts. Timothy seed harvest will begin in the southern counties during the coming week. Threshing of winter wheat has begun and the early reports indicate good quality and yield. Corn has made rapid growth and the early planted fields are mostly in tassel and are beginning to shoot. Plowing has continued in the late planted fields and a large acreage was laid by in good condition. The showers on the 25th will be very beneficial to corn in all parts of the State and especially over the eastern and southern counties where the surface of the ground was getting hard and dry. Pastures, potatoes and gardens will also be benefited by the showers. Apples, in many localities, are falling badly and plums are reported to be wormy.

BULLETIN NO. 17.—AUGUST 1.

The average temperature during the past week was very nearly normal, and, while the rainfall was generally deficient, showers occurred on one to three days over the larger part of the State. The first three days of the week were cloudy and moderately cool with frequent light showers, but the last four days were clear and hot, Thursday being the warmest day of the year when the maximum temperatures ranged from 90° to 100°. The rains were timely and especially beneficial to corn, potatoes, pastures,

and garden vegetables. Corn is doing remarkably well and has not yet suffered from the lack of moisture in any part of the State. Nearly all of the early planted fields are in full tassel and earing nicely. The belated corn is doing its best, but a great deal of the very latest cannot mature unless frost occurs much later than usual. The weather has been exceptionally favorable for haying and harvesting and most of the hay and grain crops have been secured in the best of condition. Harvest work is now nearing completion and threshing will become general during the coming week. Early reports of threshing indicate winter wheat to be of good quality with yields ranging from twenty to thirty-five bushels. The quality of oats is better than for the past two years and the yield ranges from twenty-five to forty-five bushels. Considerable timothy has been cut for seed in the southern districts and more will be cut during the coming week.

Pastures and potatoes are doing well, but will soon need more rain. Rain would also be very beneficial to corn, especially in the eastern and northeastern counties where the rainfall during the past month has been below the average for July.

BULLETIN NO. 18.—AUGUST 8.

Clear, warm days, moderately warm nights and no rainfall, except light scattered showers in the western districts, were the special features of the past week. The rainfall was abnormally light over the most of the State; the only sections receiving anywhere near the normal amount being the west central and northwest counties. Haying and harvesting are practically finished and stacking and shock threshing is progressing rapidly. Threshers' reports continue to show a good yield and quality of winter wheat and oats of good quality and fair yield. Late oats are generally better than the early varieties. Corn has made good progress but is needing rain especially in the eastern districts. It is earing nicely and many of the early planted fields are nearly up to the roasting ear stage. Pastures, late potatoes and garden truck are beginning to show the effect of dry weather, and will deteriorate very rapidly unless a good rain comes soon. Fall plowing has begun in a few localities and indications are now favorable for a large increase in the acreage of winter wheat. Reports vary as to the condition of fruit, but apples are falling badly and grapes are rotting in many localities.

Following is a summary of reports received from crop correspondents of the Iowa Weather and Crop Service, showing the estimated condition of the staple crops August 1, 1909, as compared with the average condition on that date in past years: The condition of corn has improved materially during July over the larger part of the State, but there has been a corresponding decrease over the large section of the southern counties, due to the excessive rains during the first ten days of July, so that the average for the State at large is 91 per cent; spring wheat, 92; oats, 92; barley, 87; flax, 93; hay crop, 101.5; pastures, 102; potatoes, 92; apples, 65; and grapes, 80.

The condition on August 1, 1908, was: Corn, 88 per cent; spring wheat, 93; oats, 85; flax, 92; barley, 94; hay crop, 104; pastures, 102; potatoes, 93; apples, 48; grapes, 78.

BULLETIN NO. 19.—AUGUST 15.

The past seven days have been unseasonably hot, and, over the larger part of the State, excessively dry. The average temperature was 5° to 10° above the normal; the maximum temperatures ranged from 90° to 100°, and the minimum temperatures were generally above 70°. The rainfall was very unevenly distributed; the amounts over the four northern tiers of counties ranged from .25 to 7.64 inches, while over the central and southern counties there was very little or no rain. The heaviest rains were over the north central and northeastern districts where the need of moisture was greatest. In many localities, over the northern counties, the rains have prevented stacking and threshing and caused considerable damage to wild hay, which had been cut, and to grain in shock, but were very beneficial to corn, pastures and late potatoes. Corn has made remarkably rapid advancement, and in a few places has had enough moisture to insure a good crop. Over the central and southern districts, the conditions have been entirely different. Corn is firing badly on light, sandy soils, pastures are brown, potatoes are drying up and stock water is beginning to be scarce in many localities. Corn on rich soil and in fields which had been well cultivated is holding its own remarkably well, but must soon have rain. Threshing and stacking have continued over all districts where the rainfall was not heavy and the reports as to yield and quality are about the same as given in previous bulletins, except that oats in many localities over northern and central districts are yielding better than early reports indicated.

BULLETIN NO. 20.—AUGUST 22.

The average daily temperature was 3° to 6° above normal, although the latter half of the week was considerably cooler than the preceding seventeen days. The weather was almost cloudless until Sunday, the 22d, and the few showers that have occurred have been very light and widely scattered. The drouthy conditions have been intensified over the southern half of the State, but corn on rich and well tilled land is holding its own remarkably well. The late planted fields and corn on poor and weedy ground has suffered materially from the lack of moisture, and the whole of the crop will deteriorate daily until a good rain falls. Corn in the northern part of the State is generally in very good condition and developing nicely. Much of it is beyond the roasting ear stage and some of the earliest planted is beginning to dent. Late potatoes and pastures have also suffered in the drouthy districts, and fall plowing has been retarded. Threshing has progressed rapidly and is practically finished in many districts.

BULLETIN NO. 21.—AUGUST 29.

The week was unseasonably warm until Saturday when the weather became much cooler. The minimum temperatures Saturday night ranged from 40° to 50°, but the average daily excess of temperature for the week was about 5°. Light frost was observed Sunday morning on low ground over the northern half of the State, but it is not believed that much, if

any, damage was done. The prevailing drouthy conditions were relieved somewhat by showers in nearly all parts of the State. The amounts of rainfall, however, were generally light except over the east central counties where they ranged from one to over two inches, and from .50 to over one inch in the southwest district. Corn is doing as well as could be expected under present conditions; and in many localities where showers have prevailed, the crop is still up to the average for this season of the year; but where there has been little or no rain many of the fields are badly fired and in some sections the late planted corn is beyond recovery. The early planted fields are maturing rapidly, and, with continued warm and dry weather, 50 per cent of the entire crop will be safe from any damaging effects from frost by September 20th. All of the remainder that can possibly mature, will need favorable weather until October 1st. Fall plowing has been practically suspended except in sections where there have been copious showers, and pastures are dry and brown. The prospects for the potato crop are very unpromising and the second crop of clover has been shortened which will result in a decrease in the yield of clover seed as compared with last year.

BULLETIN NO. 22.—SEPTEMBER 5.

The past week brought a notable change from the hot, dry weather which prevailed through the larger part of August. The average temperature was 5° to 7° below the normal, and showers occurred Thursday or Friday in all parts of the State. Light frost was observed on low ground in the northern districts on the mornings of September 1st and 5th, but no damage was done except to the most tender vines. The rainfall was general, but came too late to benefit the early corn, and will not be of any advantage to the late corn unless dry, warm weather prevails until after the first of October. The rain has, however, revived pastures somewhat, and in some localities has softened the ground sufficiently to permit fall plowing to be resumed. The long drouth has seriously affected the corn crop, and the yield will be from 10 to 20 per cent less than was anticipated during the fore part of August, although there are many sections in the northern half of the State where the yield will be fully up to the average of past years. The drouth has also prevented plowing to such an extent that the acreage of fall wheat and rye will be much less than previously indicated. The second crop of timothy and clover hay will be considerably shorter and lighter than last year, and late potatoes will be almost a failure in many sections. More rain is needed to put the ground in condition for plowing and for fall pasturage. Reports vary as to condition of apples; in some sections an average crop is expected while in other localities the prospects are very poor.

BULLETIN NO. 23.—SEPTEMBER 12.

The fore part of the week was cool and cloudy with light showers, but the last four days gave an excess of temperature and more sunshine with light showers on Saturday in western and north central districts. The cool, cloudy and damp weather during the fore part of the week checked

the rapid maturing and drying up of the corn; but the needed moisture will be of some benefit to the late corn if frost holds off for another month. Some of the early corn is now reported as being safe from frost, but most of it will need ten days to two weeks of warm, ripening weather to be entirely out of danger. There are some reports of cutting corn in the early planted fields, and this work will likely be general in portions of the State within the next two weeks. Pastures are improving under the effects of the late rains and considerable plowing and seeding of winter grains has been done, but in the larger part of the State the ground is still too dry for satisfactory work. Reports continue to be discouraging in regard to the late potato crop.

BULLETIN NO. 24.—SEPTEMBER 19.

The past week has been favorable for farm work and the ripening of the belated corn, although the first two or three days were cool, cloudy and wet. The average temperature was, however, above the normal, the latter half of the week being warm and pleasant. The rainfall was copious in all parts of the State, and in many localities the amounts ranged from two to over three inches. Severe wind storms accompanied the rain on the evening of the 12th and did considerable damage to the corn, especially in northern, western and southwestern counties. The corn stalks in many fields were broken or uprooted, but for the State at large the crop has made satisfactory advance toward maturity, and fully 60 per cent of it is now beyond danger of an ordinary heavy frost. The late corn will require from ten days to two weeks of warm, dry weather to mature, and, as usual, a small percentage of the crop will need until the middle of October. Considerable corn has been cut and shocked or put in silos. The rains have softened the ground which is now in excellent condition for plowing and seeding winter grains, and this work has progressed rapidly during the past four or five days. Some clover has been cut for seed in the southern counties.

BULLETIN NO. 25.—SEPTEMBER 26.

The past week was favorable for farm work and ripening the belated corn. The rainfall was fairly well distributed, but was generally light and considerably below the normal over the larger part of the State, but there has been sufficient moisture to make good pasture and for plowing and seeding fall grains. More rain will, however, soon be needed to keep the soil moist enough for plowing. The temperature was considerably below the normal, and light frost occurred in low places in all parts of the State on the mornings of the 23d and 24th, but no damage was done. Most of the days were clear and warm; the average maximum temperature for the week being about 73°. Over 85 per cent of the corn is beyond danger of injury by frost, and over 90 per cent of it will be safe with another week of warm weather. Reports indicate that the general rains during the fore part of September and the subsequent warm weather have been beneficial to the late corn, which has improved one or two points during the month. In many parts of the State more corn is being cut than

usual. Excellent progress is being made in plowing, fall seeding, and harvesting the minor crops. More plowing and seeding have been done than was thought possible during the August drouth. The potato crop as a whole will be much below the average, but apples and grapes are better than early reports indicated. On the whole the season has been a profitable one for the State at large, in spite of the excessive rains during the planting season and the drouth in August. The small grain crops were secured in excellent condition, and, while the yields are not large, the quality of the grain is generally very good. The hay crop was above the average and of the best quality. The corn will be nearly up to the State average, although it is very poor over most of the southern counties.

IOWA CROP REPORT, JUNE 1, 1909.

Acres of Farm Crops. Estimated Condition of Staple Crops, Fruit and Live Stock.

Reports received June 1st from county and township correspondents of the Iowa Weather and Crop Service show the following results as to the number of acres and average condition of staple farm crops; also the condition of fruit and live stock.

CORN.—The unfavorable conditions that prevailed during March and April prevented the seeding of the usual acreage of small grain and the acreage of corn has thereby increased a little over 5 per cent as compared with the acreage planted in 1908. So the acreage is about 105, and the average condition on June 1st was rated at 94. Last year at corresponding date it was 92 per cent.

WHEAT.—The drouth of last August, September and October prevented the seeding of as large an acreage of winter wheat as was anticipated and the cold wet weather during the early spring months of this year caused a reduction in the acreage of spring wheat of about 2 per cent. The estimated acreage is now, winter wheat 100 and spring wheat 98 and the average condition is 92 and 94 per cent respectively. Last year the estimates were 101 and 100.

OATS.—The acreage of oats is placed at 94 per cent and the average condition 90 per cent. Last year the condition on June 1st was 102 per cent.

RYE.—Acreage seeded, compared with last year, 95 per cent, and the average condition 94 per cent. Last year the condition was 101 per cent.

BARLEY.—Acreage 98; estimated condition 94 per cent as compared with 101 per cent last year.

FLAX.—Area seeded, 97 per cent; condition, 95 per cent.

POTATOES.—Acreage planted, 102 per cent; condition, 96 per cent. Last year condition 98.

MEADOWS.—There has been a reduction of about 2 per cent in area of meadows, the acreage being 98 per cent. The condition 97 per cent as compared was 104 per cent last year. Grass was slow in starting this spring but owing to favorable weather in May the condition is improving rapidly.

Pastures are about 99 per cent in acreage and 97 per cent in condition.

CONDITION OF FRUIT.—As Compared with an Average Crop.—Apples, 90 per cent; plums, 92; peaches, 22; grapes, 94; strawberries, 85; raspberries, 90; blackberries, 85; cherries, 82.

CONDITION OF LIVE STOCK.—Cattle, 94 per cent; hogs, 95; horses, 96; sheep, 96; foals, 90; spring pigs, 85.

The acreage of crops cannot be tabulated until the returns of the township assessors are received from all the counties. The complete report of acreage will probably be published in July.

IOWA CROP REPORT, JULY 1, 1909.

Following is a summary of reports received from crop correspondents of the Iowa Weather and Crop Service, showing the estimated condition of staple crops July 1, 1909, as compared with the average condition on that date in past years: Corn, 92 per cent, winter wheat, 96; spring wheat, 95; oats, 91; rye, 96; barley, 94; flax, 94; hay crop, 100; pastures, 103; potatoes, 100; apples, 76; plums, 68; grapes, 85.

Condition July 1, 1908: Corn, 85 per cent; winter wheat, 99; spring wheat, 94; oats, 90; rye, 95; barley, 93; flax, 89; hay crop, 103; pastures, 104; potatoes, 99; apples, 50; plums, 40; grapes, 80.

July 1st average of the past ten years: Corn, 89 per cent, winter wheat, 92; spring wheat, 92; oats, 90; rye, 93; barley, 94; flax, 92; hay crop, 88; pastures, 96; potatoes, 98.

A revised estimate of the area of corn planted this year shows about 102 per cent, or an average increase of 2 per cent, compared with the area planted in 1908, and a decrease of a little over 2 per cent as shown by reports on June 1, 1909, before the heavy rains began.

IOWA CROP REPORT—AUGUST, 1909.

Following is a summary of reports received from crop correspondents of the Iowa Weather and Crop Service, showing the estimated condition of the staple crops August 1, 1909, as compared with the average condition on that date in past years: The condition of corn has improved materially during July over the larger part of the State but there has been a corresponding decrease over large sections of the southern counties, due to the excessive rains during the first ten days of July, so that the average for the State at large is 91 per cent; spring wheat, 92; oats, 92; barley, 87; flax, 93; hay crop, 101.5; pastures, 102; potatoes, 92; apples, 65; and grapes, 80.

The condition on August 1, 1908 was: Corn, 88 per cent; spring wheat, 93; oats, 85; flax, 92; barley, 94; hay crop, 104; pastures, 102; potatoes, 93; apples, 48; grapes, 78.

CROP ACREAGE FOR 1909.

Following is an estimate of the acreage of the staple crops for 1909 based on the reports of crop correspondents of the Iowa Weather and Crop Service, and the acreage for 1908 as shown by the returns of the township assessors: Winter wheat, 133,740 acres; spring wheat, 265,330;

corn, 8,213,280; oats, 4,261,410; rye, 49,590; barley, 492,320; tame hay, 3,485,550; wild hay, 886,740; pastures, 8,901,970; flax, 25,520; potatoes, 127,840 acres.

The full report showing the acreage of the various crops by counties, will be found on another page of this report.

IOWA CROPS—FINAL REPORT, 1909.

Final Report for the State—Total Yield of Soil Products—Value of Farm Prices, December 1, 1909.

Following is a summary of reports from crop correspondents of the Iowa Weather and Crop Service and Threshermen, showing the average yield per acre and total yields of staple soil products, and the average prices at the farms or nearest stations, December 1, 1909. The value gained by feeding farm crops for the production of live stock, poultry and dairy products is not taken into consideration in this report.

CORN.—A revised report of the estimated corn acreage, made August 1st, after the heavy rains had ceased, indicated that the area planted this year was 8,213,280, or 186,330 acres less than the estimated acreage planted in 1908. The average yield per acre for the State this year was 32.9 bushels, making a total yield of 269,812,000 bushels. Of this amount about 35 per cent is still in the fields, and a large percentage of the corn in the cribs is in very poor condition. There is no record of corn being in as poor condition on December 1st as it is this year. High winds on September 12th blew much of the crop down, and the excessive rains in November made the ground so soft that it was difficult to get in the fields, and the unusually warm and moist weather has caused much of the corn in cribs to mold and that on the ground to rot. From present indications, much of the corn in the fields will be ruined and lost. The average farm price on December 1st was 51 cents per bushel, making the aggregate value \$137,604,120. The total yield last year was 301,873,150 bushels, and the average total yield for the ten preceding years is 301,412,384 bushels.

WHEAT.—Winter wheat, area harvested, 133,748 acres, yield per acre, 20.5 bushels; total yield, 2,739,050 bushels; average price, 92 cents per bushel; total value, \$2,519,926. The total yield last year was 1,678,540 bushels and the average total yield for the ten preceding years is 1,161,011 bushels.

SPRING WHEAT.—Area harvested, 265,339 acres; average yield, 13.6 bushels per acre; total product, 3,608,910 bushels; price per bushel, 90 cents; total value, \$3,248,019; aggregate value of wheat, \$5,767,945. The total yield last year was 4,968,250 bushels, and the average total yield for the ten preceding years is 10,665,709 bushels.

OATS.—On account of unfavorable weather conditions last spring, oats were planted from two to four weeks later than usual, and as a result the acreage seeded was 170,236 acres less than the area harvested in 1908; but notwithstanding the many adverse conditions, the yield per acre was slightly better and the quality much better than last year. The area harvested was 4,261,414 acres; average yield, 27.4 bushels per acre; total product, 116,557,830 bushels; aggregate value at 35 cents per bushel,

\$40,795,240. The total yield last year was 112,830,490 bushels, and the average total yield for the ten preceding years is 121,224,606 bushels.

BARLEY.—Area harvested, 492,327 acres; yield per acre, 21.6 bushels; total product, 10,629,300 bushels; average price, 46 cents per bushel; total value, \$4,889,478. The average total yield for the ten preceding years is 13,289,695 bushels.

RYE.—Area harvested, 49,591 acres; average yield, 16.3 bushels per acre; total product, 805,730 bushels; average price, 60 cents per bushel; total value, \$483,468. The average total yield for the ten preceding years is 1,301,120 bushels.

FLAX.—Area harvested, 25,525 acres; average yield, 10 bushels per acre; total yield, 255,205 bushels; average price, \$1.29 per bushel; total value, \$329,214. The ten year average is 669,202 bushels.

POTATOES.—Area harvested, 127,841 acres; average yield, 88 bushels; total product, 11,209,950 bushels; average price, 53 cents; total value, \$5,941,273.

HAY (Tame).—Average yield per acre, 1.7 tons; total product, 5,828,580 tons; average farm price, \$7.42 per ton; value of crop, \$43,248,063.

HAY (Wild).—Yield per acre, 1.4 tons; total product, 1,219,630 tons; average price, \$5.90 per ton; total value, \$7,196,718.

IOWA CROPS, 1909—NUMBER OF ACRES BY COUNTIES.

COUNTIES	Winter Wheat—Acres	Spring Wheat—Acres	Corn—Acres	Oats—Acres	Rye—Acres	Barley—Acres	Hay (Tame)—Acres	Hay (Wild)—Acres	Pastures—Acres	Flax—Acres	Potatoes—Acres
Adair.....	175	3,910	92,675	27,707	310	4,980	52,970	4,380	112,210		1,034
Adams.....	1,550	1,160	65,741	21,857	175	1,700	28,610	1,930	79,940		520
Allamakee.....	550	675	40,000	31,830	490	13,390	45,745	4,530	107,390	220	930
Appanoose.....	1,730	410	42,000	12,370	620	100	50,110	1,600	112,600		410
Audubon.....	25	4,470	80,330	34,410	60	5,880	30,450	3,300	75,250		775
Benton.....	55	500	125,830	68,120	740	12,640	47,100	6,540	108,630		1,480
Black Hawk.....	12	160	83,630	49,150	2,400	5,480	36,140	13,700	95,280		2,150
Boone.....	40	1,507	100,100	52,830	241	1,648	22,204	17,670	73,710		1,050
Bremer.....	25	140	60,370	48,190	830	5,900	18,900	25,450	71,204		1,330
Buchanan.....	15	210	84,770	45,980	550	3,420	41,110	14,290	99,980		1,050
Buena Vista.....	40	1,920	96,720	71,620	35	1,285	22,830	17,100	68,090	275	2,095
Butler.....	25	180	96,230	65,040	1,720	3,140	28,800	10,850	79,450	50	1,650
Calhoun.....	60	300	33,720	67,670	105	1,920	16,640	16,630	65,533		320
Carroll.....	120	6,100	103,070	57,730	160	5,500	25,480	13,110	75,659		2,000
Cass.....	2,140	8,560	96,350	35,440	200	2,930	42,970	2,000	97,860		1,270
Cedar.....	630	890	87,580	30,730	670	18,340	49,900	390	89,130		970
Cerro Gordo.....	35	197	81,400	67,350	260	2,160	34,500	14,540	73,580	340	1,720
Cherokee.....	40	1,180	102,270	67,220	15	5,400	31,890	11,650	80,390	30	1,460
Chickasaw.....	45	800	61,000	59,240	270	5,800	40,140	15,890	75,390	1,490	2,000
Clarke.....	1,240	180	47,650	14,720	260	850	43,150	380	90,280		335
Clay.....	80	425	66,590	60,310	40	1,110	24,600	22,010	66,770	410	700
Clayton.....	750	880	71,800	53,480	1,560	18,460	56,590	3,970	137,000	10	1,870
Clinton.....	580	1,390	109,360	37,320	1,370	10,810	65,090	3,870	129,740	30	1,185
Crawford.....	970	14,470	133,900	57,590	200	8,280	50,890	7,430	118,310		2,350
Dallas.....	1,500	1,850	112,200	45,280	530	1,360	22,060	6,350	103,370		890
Davis.....	2,040	70	53,960	19,890	1,410	100	50,810		186,300		400
Decatur.....	2,780	20	54,720	23,490	290	35	39,400	620	115,980	60	420
Delaware.....	40	190	82,270	37,930	1,240	14,400	46,900	7,830	107,500	50	1,242
Des Moines.....	4,300	35	66,920	27,960	950	830	28,660	260	66,590		1,090
Dickinson.....	60	720	39,100	36,000	80	2,650	14,700	17,580	42,820	410	530
Dubuque.....	170	730	65,760	43,250	390	6,700	52,090	1,380	120,520		1,715
Emmet.....		500	45,600	37,890	50	1,080	23,600	13,150	47,000		530
Fayette.....	200	680	87,520	61,720	450	13,390	58,170	15,700	142,680	620	2,000
Floyd.....	35	380	72,300	69,820	430	2,380	32,200	6,110	63,900		1,225
Franklin.....	35	715	96,190	67,460	140	2,550	26,610	15,200	77,300	100	1,385
Fremont.....	2,250	2,140	121,230	11,420	230	125	17,390	4,130	62,350		525
Greene.....	15	370	102,200	50,900	70	2,120	22,810	13,030	57,710	120	900
Grundy.....	30	540	88,650	66,960	40	7,650	37,340	8,700	69,900		6,210
Guthrie.....	630	7,320	69,100	32,530	190	1,910	34,700	4,725	103,790		610

IOWA CROPS, 1909—NUMBER OF ACRES BY COUNTIES—CONTINUED.

COUNTIES	Winter Wheat—Acres	Spring Wheat—Acres	Corn—Acres	Oats—Acres	Rye—Acres	Barley—Acres	Hay (Tame)—Acres	Hay (Wild)—Acres	Pastures—Acres	Flax—Acres	Potatoes—Acres
Hamilton	430	1,530	105,830	63,200	90	870	25,330	20,860	81,770	170	1,600
Hancock	25	1,140	68,450	85,750	60	2,150	20,850	19,050	66,460	490	950
Hardin	105	2,030	98,800	61,130	115	2,120	27,760	21,980	73,150	25	1,330
Harrison	6,880	14,900	124,550	20,800	230	2,520	19,900	12,140	96,040		1,280
Henry	1,890	100	75,630	26,700	1,030	290	26,410	40	83,830		500
Howard	20	575	40,480	30,900	435	8,950	33,538	13,700	58,140	4,170	860
Humboldt	50	1,890	55,400	52,900		805	29,450	18,270	59,740	220	650
Ida	60	1,860	85,860	40,000	35	1,830	27,590	2,490	56,740	50	850
Iowa	405	2,050	90,000	38,940	370	2,210	57,540	975	97,700		1,350
Jackson	325	845	38,320	22,900	790	7,085	60,980	1,000	149,150		945
Jasper	700	5,750	118,890	49,040	705	2,270	50,525	1,900	133,220		1,670
Jefferson	2,410	390	59,430	25,200	1,250	660	36,870	40	93,230		515
Johnson	655	1,390	100,400	46,360	1,645	3,450	54,760	1,580	107,380		1,680
Jones	40	215	78,140	34,630	680	8,780	53,130	500	102,660		640
Keokuk	915	3,350	90,300	37,000	910	3,050	46,660	450	98,010	1,450	730
Kossuth	80	2,900	119,450	105,410	35	3,230	33,570	64,060	121,080		1,710
Lee	10,600	30	48,780	19,100	3,290	150	38,920	100	98,320		1,190
Linn	30	1,000	96,080	45,020	1,250	3,210	52,000	5,800	110,800		1,780
Louisa	5,110	510	63,570	19,890	2,220	380	19,440	660	65,950		1,820
Lucas	1,535	100	93,300	16,800	610	170	46,380	690	97,040		430
Lyon	30	1,400	93,200	76,560	135	26,860	19,600	11,100	55,170	180	2,420
Madison	540	1,620	76,680	18,520	190	4,580	40,020	1,900	124,800		700
Mahaska	590	1,800	70,900	26,200	530	2,300	33,740	710	72,800		775
Marion	1,990	3,690	76,000	23,430	625	2,800	35,000	700	104,560		590
Marshall	485	2,145	98,500	56,800	110	1,490	40,880	1,380	73,000		2,270
Mills	2,785	4,550	85,080	12,420	70	450	21,130	3,640	58,780		790
Mitchell	540	540	54,220	72,550	150	8,320	34,150	2,880	59,380	2,900	1,470
Monona	15,700	11,830	121,134	27,330	330	3,400	15,250	12,730	87,400	25	1,540
Monroe	1,130	625	25,600	7,160	50	94	29,970	45	77,000		400
Montgomery	4,500	10,690	87,500	15,240	120	1,080	28,160	900	69,880		615
Muscatine	2,550	780	61,680	17,320	*3,280	9,740	28,670	1,480	80,000		2,565
O'Brien	170	870	81,270	62,530	25	14,500	27,720	11,300	63,620	170	1,460
Osceola	10	320	80,700	58,640	10	10,700	25,100	10,800	39,630	515	840
Page	9,680	4,730	107,290	15,540	400	1,550	33,790	2,200	88,790		960
Palo Alto		390	57,700	47,500	25	670	14,400	29,850	54,730	500	1,200
Plymouth	2,430	25,280	169,600	89,550	130	12,410	29,860	24,200	109,330	35	2,100
Pocahontas	130	430	82,000	75,390	100	770	14,800	26,600	71,100	910	880
Polk	1,600	4,080	85,400	35,800	210	700	27,940	5,790	70,570		2,440
Pottawattamie	2,670	16,440	189,190	41,230	200	4,260	49,600	10,900	122,870		2,970
Poweshiek	60	2,000	93,240	38,280	185	4,470	49,180	350	110,710		960
Ringgold	2,100	130	52,200	20,480	200	170	41,000	188	108,200		350
Sac	220	840	109,420	64,900	25	6,600	28,530	13,230	75,560	1,400	1,110
Scott	2,380	2,720	67,350	19,710	1,450	24,720	33,500	3,710	69,600	20	8,430
Shelby	500	10,320	118,220	38,060	145	11,280	35,880	6,480	89,120	85	1,380
Sioux	850	14,450	149,280	83,130	30	28,070	28,850	29,800	80,800	115	1,680
Story	500	890	107,400	56,300	200	1,395	27,970	11,240	72,390		885
Tama	60	3,850	110,910	62,970	300	10,440	57,040	3,250	116,700		2,760
Taylor	3,900	220	65,310	18,150	190	1,130	40,030	900	109,080		575
Union	600	440	54,440	19,220	180	1,080	40,060	900	98,700		900
Van Buren	4,080	20	48,000	16,880	1,270	165	35,490	25	185,450		320
Wapello	1,796	220	49,850	19,540	350	840	37,000	65	87,790		1,000
Warren	2,320	2,300	72,610	20,490	480	1,400	45,060	740	109,750		1,100
Washington	970	1,080	90,920	42,970	500	1,340	42,320	140	100,020		750
Wayne	1,380	40	70,580	22,770	260	45	60,540	100	117,120	40	330
Webster	90	3,130	103,050	81,610	120	845	22,910	27,560	92,190	390	1,200
Winnebago	20	5,200	45,000	37,560	15	2,740	16,430	20,690	48,140	990	865
Winneshiek	190	3,140	70,000	59,710	320	22,900	54,290	10,670	116,830	3,170	1,190
Woodbury	7,725	9,250	149,510	59,550	130	8,690	28,930	16,350	98,280	20	2,100
Worth		2,340	38,120	49,000		2,880	19,130	17,200	49,920	1,690	630
Wright	325	1,550	85,440	68,790	40	2,135	24,920	18,340	73,410	280	1,390
Total for State	133,748	265,339	8,213,280	4,261,414	49,591	492,327	3,485,552	866,743	8,902,973	25,525	127,841

THE ORIGIN AND THE PURPOSE OF THE MOUNT WEATHER OBSERVATORY.

BY PROF. WILLIS L. MOORE, CHIEF U. S. WEATHER BUREAU.

In 1870 the United States government undertook the important work of forecasting today what kind of weather might reasonably be expected tomorrow. This service, because of its value to the industries of the country, has rapidly grown and we now get reports twice daily of the surface conditions of temperature, moisture, rainfall, wind velocity and direction, and other data from more than two hundred stations in the United States, West Indies, Mexico, Canada and elsewhere.

From this information the forecaster now makes predictions for the coming two days with such success that they are of service to nearly every class of people. But the more accurate this forecasting, and the greater the length of time ahead to which it can be made to apply, the greater is its value—the ideal condition being the forecasting of the type of season to expect together with detailed forecasting from day to day. A knowledge of the type of the coming season will, among other things, tell the farmer what crops to plant, while the daily forecasts advise him in regard to cultivating and harvesting, and when safely to ship. These ideal conditions, however, do not exist at the present time, and can not be had without a great deal more knowledge than we now possess of the interrelations of meteorological phenomena. Forecasting, that practical part of meteorology so valuable to the public, is an art that can improve only as our knowledge of the underlying science is increased, and therefore it seems proper for the government to undertake to add to that knowledge.

Anything so extensive as general meteorological investigations can not be undertaken with much hope of success by an individual, nor is it practical for private institutions to do so, though much of value is constantly appearing from these sources. Many of the needed investigations of storms, for instance, require simultaneous observations, made at different places, and some of them demand for their solution years of continuous work. From these and other similar considerations it is imperative that the Weather Bureau push investigations of this nature as vigorously as possible, and in every way that seems hopeful of success. But from the difficulty and complexity of the problems involved the improvement of the forecasting may be only imperceptibly gradual, just as have been the improvements in every other art and science, but it is certain that this is the only way by which improvements can be made, and it is equally certain that so long as this kind of work is continued the predictions in the future will continue to improve over those of the past.

The possible investigations are very numerous, but in general may be classed under some one of the following heads:

(a) Studies of the atmosphere at the surface of the earth and at various altitudes; determinations of its temperature, moisture content, pressure, state of electrification, direction and magnitude of its movements, its cloudiness, dust content, absorption of light, of heat, and of electric waves, and its various other properties.

(b) Solar investigations; involving a careful measurement of the insolation, or amount of solar energy reaching the earth in a unit of time, the size and distribution of sun spots, faculae, and prominences; and an especial effort to detect all changes in the registered amounts of solar energy, and a careful effort to refer these changes to their real causes, whether of terrestrial or of solar origin.

(c) Terrestrial magnetism—a study of the regular and of the irregular changes in the magnitude and direction of the earth's magnetic force, in connection with other terrestrial phenomena and with solar activities of all kinds.

(d) Laboratory investigations—the reproduction under controllable conditions of various meteorological phenomena, and experiments that may aid in explaining the origin and laws of weather conditions; also the construction and standardizing of certain apparatus.

Since all these different lines of investigation have a common object—the solution of meteorological problems and the improvement of forecasting—they are, therefore, more or less intimately related and interdependent, and obviously would better be carried on simultaneously, and so far as possible at the same place and under the same general management. The location should be suitable for the various investigations likely to be taken up, and the management should give all possible freedom and encouragement to individual investigators consistent with proper co-ordination and unity of purpose.

The study of the upper air demanding as it does the daily use of kites, requires a location with a high average wind velocity, and one where sometime during every day there is a strong probability of having a wind of at least 8 to 10 miles per hour. It also calls for a location 10 miles or more away from cities and electric light wires, since at such localities the loose wire falling down as a result of some accident to the kites during a storm would be very troublesome and even a source of danger. Besides the surrounding country for 15 to 20 miles should be comparatively open, so that lost kites and their instruments may the more readily be recovered.

The magnetic work also requires a location remote from cities, and from trolley lines, and free from beds of iron ore. The solar work calls for a place away from the smoke and dust of cities and above the haze of valleys; while the needs of the physical laboratory can be met nearly as well at one place as at any other, provided only that it is free from the disturbing jars of heavy traffic.

Obviously, too, it is desirable to have this important part of the Bureau's work done as near as practicable to Washington so that the central office may be in close touch with it.

Mount Weather Observatory, the name of the group of laboratories and observatories where the Weather Bureau is doing this work, well meets these conditions. It is 1,725 feet above sea level, and is located in Virginia, on the top of the Blue Ridge Mountains, some 20 miles south of Harpers Ferry, and 47 miles in a direct line from Washington. It is only 6 miles from Bluemont, the nearest railroad station, and is easily reached from that point along an excellent mountain road. It overlooks

to the west the entire Shenandoah Valley from Strasburg to Harpers Ferry, while to the east all that portion of Piedmont Virginia between the Blue Ridge and the Bull Run mountains is in full view. This extensive sweep of valleys, mountains and plains affords rare opportunities for the study of storm formation and action. This location is satisfactory for the physical laboratory, and for the magnetic observatories. For solar work it is as well adapted as any place east of the Rocky Mountains; while for the study of the upper air it is peculiarly well situated, since kite flights can be obtained there almost daily through the entire year.

The ground for this observatory was purchased September 22, 1902, and the contract for the central or administration building let December 20th, of the same year. Since then the observatory has gradually grown both in extent of plant and in scope of work.

At present the administration building at Mount Weather is well equipped with apparatus for determining and automatically registering the atmospheric pressure, direction and velocity of the wind, sunshine, rainfall, temperature, and humidity; in short, it is equipped as a first-class meteorological station, and the data secured are regularly telegraphed to the central office in Washington twice daily and used in all forecasts for this part of the country. Besides this instrumental equipment the administration building contains offices and several living rooms, all well adapted to the needs of the place.

The aerial department is provided with an engine and dynamo, an electrolytic plant for generating the hydrogen used for the balloons, and tanks for containing this gas, a liquid air plant to provide means for standardizing instruments at the low temperatures to which they are subjected at high altitudes, an instrument room where repairs can be made, a room adapted to kite building, a computing and testing room, and a kite storage room. It also has a small half round revolving structure which contains the kite reel, and from which the kites are flown.

Upper air data, as given by the self-registering apparatus carried by the kites, are telegraphed to Washington daily and used in forecasting. These data are also worked up in a very complete form and used in the study of the general movements and condition of the atmosphere, and it is already evident that in this way important information will be obtained.

Two small buildings are devoted to the proper housing of the magnetic apparatus, where the magnetic condition of the earth with all its periodic, its irregular, and its spasmodic changes, whether small or great, mild or violent, are automatically recorded.

The curious tracings are being studied in connection with solar and terrestrial phenomena, and it is practically certain that important relations will be found, though it is difficult to decipher the writings of these delicate magnets.

The physical laboratory is now under roof, but is not sufficiently completed to be of any service.

Solar physics is represented by only a small shelter, but a few feet square, containing a pyrheliometer for measuring the amount and intensity of the solar radiation and the absorption of the earth's atmosphere.

When the physical laboratory is finished and the solar-physical building put up, the Mount Weather Observatory, as contemplated, will be complete. There will then be at this one place, so far as any one locality and its equipment can provide them, facilities for investigating any and every meteorological phenomenon, both directly by observation and indirectly through experimentation. Its purpose is to be the helping friend and not the competing rival of other places, whether public or private, and therefore every investigator engaged in research of importance to the Weather Bureau is invited to come and make use of its facilities for the prosecution of his studies. The whole aim of the observatory is the discovery, no matter how or by whom, of fundamental truths of nature, and of their application to human welfare.—(Bulletin of the Mount Weather Observatory, Volume I.)

TABULATED CROP SUMMARY

Corn.....	260,812,000 bu.	\$137,604,129
Winter Wheat.....	2,739,050 bu.	2,519,926
Spring Wheat.....	3,608,910 bu.	3,248,019
Oats.....	116,557,830 bu.	40,795,240
Rye.....	895,780 bu.	483,468
Barley.....	10,629,300 bu.	4,889,475
Flax.....	255,205 bu.	329,214
Potatoes.....	11,209,950 bu.	5,941,273
Hay (Tame).....	5,829,580 tons	43,248,063
Hay (Wild).....	1,219,630 tons	7,195,817
Pastures and Grazing.....	Estimated	95,000,000
Buckwheat.....	..	145,000
Sweet Potatoes.....	..	130,000
Sorgham and Broomcorn.....	..	180,000
Timothy and Clover Seed.....	..	1,500,000
Alfalfa and Millet.....	..	535,000
Sweet Corn.....	..	675,000
Fruit Crops.....	..	4,000,000
Garden Truck.....	..	9,000,000
Total.....		\$337,419,615

FINAL CROP REPORT, 1909.
AVERAGE YIELD PER ACRE AND TOTAL PRODUCT—BY COUNTIES.

Counties	Winter Wheat		Spring Wheat		Corn		Oats		Rye		Barley		Flax Seed		Potatoes		Hay (Tame)		Hay (Wild)	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total B's'h's	Bushels per acre	Total Bushels	Bushels per acre	Total B's'h's	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons
Adair.....	17	3,000 12	46,900 30	2,780,000 21	581,800 12	3,700 17	84,800	58	60,000	1.5	79,400	1.5	6,500							
Adams.....	17	26,300 12	13,900 26	1,709,000 25	546,400 16	2,800 19	33,300	64	33,300	1.6	45,700	1.7	3,200							
Allamakee.....	18	9,900 17	11,500 36	1,440,000 38	1,219,500 16	7,800 28	374,900 13	2,800 100	89,000	1.6	73,200	1.5	6,700							
Appanoose.....	18	31,100 13	5,300 26	1,922,000 28	346,300 13	1,900	8,000 19	1,900	27,500	1.3	65,100	1.5	2,400							
Audubon.....	18	450 10	44,700 32	2,570,000 22	757,000 15	900 14	32,900	100	77,500	1.3	39,500	1.1	3,600							
Benton.....	24	1,300 16	8,000 36	4,781,000 32	2,179,800 18	13,300 17	214,800	85	125,800	1.5	70,600	1.2	7,800							
Black Hawk.....	20	240 15	2,400 35	2,927,000 34	1,671,100 17	40,800 30	164,400	85	182,700	1.8	65,000	1.5	20,000							
Boone.....	19	760 10	15,100 27	2,702,000 24	1,267,900 17	4,100 16	26,400	63	66,150	1.2	28,600	1.2	21,200							
Bremer.....	21	520 17	2,400 36	2,173,000 29	1,397,500 22	18,200 30	177,000	82	109,000	1.9	35,900	1.3	33,000							
Buchanan.....	19	280 17	3,600 34	2,882,000 31	1,421,600 19	10,400 25	85,500	95	99,700	1.8	74,000	1.9	27,100							
Buena Vista.....	16	640 12	28,000 34	3,288,000 28	2,005,300 15	500 22	28,400 10	2,750 80	167,600	2.2	50,200	2.0	34,200							
Butler.....	18	450 13	2,300 32	3,079,000 26	1,691,000 14	24,100 21	65,900 12	600 80	132,000	1.8	51,800	1.4	15,100							
Calhoun.....	20	1,200 14	4,200 27	2,530,000 23	1,556,400 15	1,600 22	42,200	106	35,900	1.9	31,600	1.4	23,400							
Carroll.....	20	2,400 13	79,300 34	3,504,000 26	1,930,000 15	2,400 12	66,000	70	140,000	2.0	50,900	1.5	19,600							
Cass.....	21	44,900 14	119,800 36	3,289,000 27	956,800 16	3,200 25	73,200	109	138,400	2.0	85,900	2.2	5,700							
Cedar.....	24	15,100 18	16,000 33	3,151,000 35	1,075,500 15	10,000 19	345,400	78	75,600	1.9	93,100	1.5	400							
Cerro Gordo.....	21	730 15	2,900 34	2,784,000 22	1,481,700 15	3,900 22	47,500 9	3,060 87	149,600	1.9	65,500	1.6	23,400							
Cherokee.....	18	720 13	15,300 33	3,374,000 27	1,814,900 16	240 16	86,400 10	300 115	167,900	1.8	57,400	1.4	16,300							
Chickasaw.....	20	900 15	12,000 33	2,013,000 23	1,364,800 12	2,900 27	156,600 11	16,000 80	87,200	1.7	65,200	1.5	22,800							
Clarke.....	14	17,400 14	2,500 20	853,000 25	368,000 16	4,100 19	16,100	125	48,100	1.4	60,400	1.0	400							
Clay.....	18	1,400 13	5,500 34	2,264,000 27	1,628,300 12	500 22	24,400 9	3,700 75	52,500	1.7	41,800	1.2	26,400							
Clayton.....	20	15,000 22	19,400 37	2,656,000 28	1,597,400 15	23,400 18	352,200 11	110 130	245,400	1.9	108,400	1.2	4,700							
Clinton.....	23	13,300 15	22,200 37	4,046,000 32	1,213,400 18	24,800 25	270,200 12	240 102	120,800	1.5	97,600	1.3	5,800							
Crawford.....	26	9,600 13	188,100 35	4,686,000 27	1,554,630 11	2,300 24	198,200	92	207,000	2.0	100,700	1.8	13,300							
Dallas.....	20	30,000 13	24,400 33	3,702,000 29	1,313,100 14	7,400 17	23,100	68	60,500	1.7	49,400	1.8	11,400							
Davis.....	19	38,800 15	1,050 28	1,509,000 34	658,900 15	21,000 20	2,000	68	27,200	1.5	76,200	.....	.....					
Decatur.....	15	41,700 13	260 18	984,000 22	516,700 15	4,300 18	600 9	540 27	11,300	1.4	55,100	1.5	900							
Delaware.....	21	840 18	3,400 35	2,879,000 29	1,099,900 16	19,800 17	244,800 13	650 73	100,600	1.7	79,700	1.8	14,000							
Des Moines.....	21	90,300 16	500 32	1,821,000 31	866,700 15	14,200 29	24,000	86	93,700	1.5	43,000	1.5	400							
Dickinson.....	19	840 15	8,700 26	1,016,050 20	720,000 12	1,000 17	45,000 12	4,920 109	57,700	1.8	26,400	1.1	13,300							
Dubuque.....	14	3,200 17	12,400 36	2,367,000 40	1,780,000 16	6,200 25	167,500	88	150,800	1.4	72,900	1.5	2,000							
Emmet.....	.....	.....	8,000 29	1,322,000 22	883,500 15	750 20	21,600 10	4,900 83	44,000	1.5	35,400	1.2	15,700					
Fayette.....	24	4,500 19	12,900 36	3,150,000 32	1,975,000 24	10,800 21	281,200 10	6,200 75	154,500	1.6	93,000	1.0	18,700							
Floyd.....	18	1,700 14	5,300 33	2,392,000 22	1,536,000 17	7,600 21	50,000 12	10,900 85	184,100	1.8	57,800	1.4	8,000							
Franklin.....	24	840 12	8,800 35	3,154,000 29	2,056,300 13	1,800 21	53,500 8	600 90	178,600	1.6	42,500	1.0	15,200							
Freemont.....	24	54,000 18	38,500 35	4,243,000 25	285,500 20	4,600 15	1,900	120	63,000	2.0	35,180	2.0	8,200							
Greene.....	24	300 12	4,400 28	2,861,000 25	1,272,500 20	1,400 20	42,400 9	1,080 86	77,400	1.7	38,600	1.5	19,500							
Gundy.....	22	600 22	11,800 36	3,280,000 30	2,008,800 25	1,000 20	153,900	103	639,600	2.0	54,600	1.5	13,000							
Hanckey.....	22	13,800 10	73,200 28	1,934,000 23	748,200 15	2,800 19	36,300	88	53,600	1.0	34,700	1.0	4,700							
Hamilton.....	22	9,400 15	22,900 29	3,069,000 25	1,580,000 22	2,000 22	19,100 9	1,500 85	136,000	1.9	48,100	1.5	31,300							
Hancock.....	18	450 16	18,200 34	2,327,000 23	1,512,200 15	800 21	45,100 9	4,400 122	115,900	1.7	35,400	1.5	28,600							
Hardin.....	22	2,810 16	32,500 35	3,453,000 29	1,772,700 16	3,000 22	63,800 11	270 100	133,000	1.7	47,100	1.4	30,700							
Harrison.....	20	137,600 13	193,700 34	4,234,000 26	1,585,500 13	9,000 22	55,400	90	115,300	1.5	29,800	1.4	17,000							
Henry.....	29	54,800 16	1,800 42	2,420,000 26	694,200 23	23,700 24	6,700	71	35,500	1.8	47,500	1.5	15							
Howard.....	28	560 18	10,300 31	1,254,000 28	865,200 22	9,600 28	250,600 10	41,700 58	49,800	1.9	63,700	1.5	20,500							
Humboldt.....	18	540 14	26,400 34	1,883,000 30	1,587,000 20	540 19	23,300 10	2,200 103	66,900	1.5	35,200	1.1	20,100							
Ida.....	19	1,140 13	24,200 35	3,905,000 25	1,000,000 18	630 17	31,300 10	500 100	85,000	2.0	55,100	1.4	3,400							
Iowa.....	23	10,100 17	34,800 35	3,150,000 29	1,129,200 15	5,500 21	46,400	63	85,000	1.9	109,000	1.1	1,000							
Jackson.....	21	6,800 18	15,200 37	2,157,000 22	503,800 19	15,000 21	145,700	110	103,900	1.9	115,800	1.8	1,800							
Jasper.....	22	15,400 15	86,200 33	3,920,000 28	1,873,100 10	7,600 18	40,800	49	81,800	1.3	65,700	1.2	2,300							
Jefferson.....	24	57,800 16	6,000 29	1,723,000 29	730,800 19	25,700 22	14,500	69	35,500	1.5	55,300	1.4	60							
Johnson.....	23	15,100 17	23,100 36	3,614,000 30	1,399,800 16	26,300 28	96,600	80	164,600	1.7	93,000	1.0	1,580							
Jones.....	25	1,000 18	3,800 37	2,891,000 30	798,000 14	9,500 24	219,700	90	57,860	2.0	106,200	1.5	750							
Keokuk.....	25	22,900 14	46,900 34	3,070,000 31	1,147,000 20	18,200 24	73,200	100	73,000	1.8	82,800	1.6	720							
Kossuth.....	20	1,600 17	49,300 33	3,941,000 26	2,740,600 18	800 25	80,700 9	13,000 110	188,100	1.5	50,300	1.4	89,700							
Lee.....	21	222,600 16	480 35	1,707,000 33	630,300 16	52,600 20	3,600	61	72,600	1.9	74,000	1.5	150							
Linn.....	23	700 14	14,000 36	3,458,000 27	1,215,500 16	30,000 21	67,400	100	178,000	1.0	52,000	1.2	6,900							
Louisia.....	23	117,500 16	8,100 32	2,034,000 28	556,900 16	35,500 20	7,600	70	43,400	1.6	31,000	2.0	1,300							
Lucas.....	18	27,600 15	1,500 20	1,066,000 28	470,400 16	9,750 19	3,200	44	48,900	1.1	51,000	1.0	700							
Lyon.....	20	600 13	18,200 32	2,382,000 25	1,890,500 15	2,000 25	671,500 7	1,260 80	193,600	1.5	29,400	1.0	11,100							
Madison.....	20	19,800 13	21,000 29	2,223,000 22	407,400 16	3,000 17	77,800	66	46,200	1.7	68,000	1.2	2,300							
Mahaska.....	30	11,800 15	27,000 33	2,359,000 26	881,200 17	9,000 23	52,900	80	62,000	1.7	57,300	1.5	1,000							
Marion.....	22	43,800 16	59,000 33	2,508,000 26	609,100 17	10,600 22	61,600	76	44,800	2.0	77,000	1.5	1,050							
Marshall.....	25	12,100 18	38,800 36	3,546,000 30	1,704,000 18	1,900 20	29,800	82	186,100	1.6	65,400	1.5	2,100							
Mills.....	18	50,100 11	50,000 33	2,807,000 22	273,200 17	1,200 21	9,400	100	63,200	1.5	31,700	1.2	4,400							
Mitchell.....	20	400 16	8,600 33	1,789,000 30	2,176,500 18	2,700 25	208,000 8	23,200 120	176,400	1.9	64,900	1.5	4,300							
Monona.....	21	329,700 14	166,600 36	4,360,000 25	683,200 17	5,600 25	85,000 9	225 60	92,400	2.0	30,500	1.8	22,900							
Monroe.....	18	20,300 14	8,500 25	640,000 25	177,500 14	700 20	1,800	52	20,800	1.2	35,900	0.9	40							
Montgomery.....	19	85,500 11	117,500 33	2,887,000 24	365,700 15	1,800 25	27,000	110	67,600	1.8	50,700	1.6	1,440							
Muscatine.....	24	61,200 20	16,400 37	2,282,000 31	546,800 15	49,200 21	294,500	60	230,800	1.6	45,800	1.5	2,200							
O'Brien.....	22	3,700 12	10,400 27	3,006,000 30	1,875,900 14	350 19	275,500 9	1,500 100	146,000	1.8	49,800	1.6	18,100							
Osceola.....	22	220 14	4,500 34	1,723,000 27	1,382,200 14	140 20	214,600 10	5,150 116	98,000	1.6	37,000	1.5	16,200							
Page.....	19	183,900 12	56,700 33	3,540,000 26	404,000 16	6,400 23	55,6													

FINAL CROP REPORT, 1909—CONTINUED.

AVERAGE YIELD PER ACRE AND TOTAL PRODUCT—BY COUNTIES.

Counties	Winter Wheat		Spring Wheat		Corn		Oats		Rye		Barley		Flax Seed		Potatoes		Hay (Tame)		Hay (Wild)	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons
Shelby.....	19	9,500 13	134,100 34	4,019,000 26	989,500 14	2,000 19	214,300 10	850 100	138,000	1.5	53,800	1.4	9,100							
Sioux.....	23	19,500 15	216,700 38	5,671,000 30	2,493,900 21	630 23	645,600 10	1,150 90	151,200	1.6	46,100	1.3	27,000							
Story.....	21	10,500 15	13,300 34	3,651,000 29	1,632,700 19	3,800 25	34,900	85	75,200	2.0	55,900	1.5	16,800							
Tama.....	20	1,200 15	53,200 36	4,062,000 31	1,952,000 10	3,000 20	208,800	92	253,900	1.7	96,900	1.6	5,200							
Taylor.....	20	78,000 12	2,600 23	1,502,000 28	504,200 20	10,000 26	29,400	65	48,800	1.5	60,000	1.4	1,200							
Union.....	16	9,600 5	2,200 21	1,143,000 21	403,600 15	2,700 20	21,600	25	22,500	1.9	76,100	1.5	1,300							
Van Buren..	20	80,600 12	240 32	1,536,000 27	454,400 14	17,700 23	3,800	68	21,700	1.5	59,200	1.5	35							
Wapello....	16	28,700 9	1,980 25	1,246,000 27	527,500 17	16,100 21	13,400	55	55,000	1.5	55,500	1.5	190							
Warren.....	24	55,700 11	25,300 26	1,887,000 28	573,700 17	8,100 22	30,800	80	88,000	1.8	81,100	1.4	1,000							
Washington	21	20,400 15	16,200 32	2,909,000 29	1,246,100 19	9,500 26	34,800	62	46,500	1.7	71,900	1.6	220							
Wayne.....	16	22,000 13	500 21	1,482,000 22	500,900 16	4,100 19	900 8	320 57	18,800	1.4	84,700	0.9	90							
Webster....	21	1,900 15	46,900 30	3,091,000 30	2,448,300 14	1,600 25	21,100 10	3,900 95	114,000	2.0	45,800	1.6	43,800							
Winnebago..	21	400 16	83,200 33	1,485,000 24	901,400 17	250 26	71,200 11	10,900 107	92,500	1.3	21,300	1.5	31,000							
Winneshiek	20	3,800 20	62,800 32	2,240,000 29	1,731,500 19	6,000 24	549,600 12	38,000 97	115,400	2.0	108,600	1.8	19,200							
Woodbury..	21	162,200 11	101,700 38	5,081,000 25	738,700 19	2,400 30	173,800 3	180 68	142,800	1.9	55,000	1.7	27,800							
Worth.....	19	9,200 15	23,300 31	1,257,000 30	1,479,000	25	72,000 10	16,900 65	40,900	1.7	32,500	1.3	22,400							
Wright.....	19	9,200 15	23,300 31	2,648,000 28	1,326,100 16	640 25	53,400 9	2,600 93	129,200	1.7	42,400	1.5	27,500							
Total State.	.....	2,739,050	3,608,910	269,812,000	116,557,830	895,780	10,629,300	255,205	11,209,950	.....	5,828,580	.....	1,219,630				
Avg per acr.	20.5	13.6	32.9	27.4	16.3	21.6	10.	88	1.7	1.4	.....	.....						