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PRICES OF CASH WHEAT AND FUTURES AT CHICAGO SINCE 1883

A Tabular and Graphic Record of Weekly Price Data through Half a Century, with an Analysis of Cash-Future Price Relationships

Relations between prices of cash wheat and wheat futures have significance far beyond their obvious bearing on the principles and problems of hedging. They are intimately connected with price relations between futures for different delivery months, and therefore with inter-option spreads in the wheat markets. This connection runs in both directions: influences bearing on cash-future spreads may affect inter-option spreads, and influences bearing on inter-option spreads may affect cash-future spreads. Finally, cash-future price relations, along with the inter-option price relations with which

they are so closely connected, may have important bearing on the interpretation of more or less general wheat price movements.

A thorough examination of the relations between prices of cash wheat and wheat futures, of the two-way connections between these and inter-option price relations, and of the relations between both of these and general levels and movements of wheat prices is beyond the scope of the present study. The first requisites for such a broad treatment of wheat price relations, founded upon an adequate examination of the facts, are a body of suitable basic price data, and certain derived data prepared and assembled in such a manner as to bring important facts into relief. The present study aims chiefly at satisfying these first requisites. It is first of all a presentation of original and derived price data, together with technical information which has pro-

vided the basis for proper selection of the data. It includes, however, a considerable amount of summarization and interpretation of the main tendencies revealed in the data.

The immediate purpose of this study is four-

fold: (1) to present conveniently, in both tables and charts, a record of prices of cash wheat and of the principal wheat futures at Chicago, weekly for over half a century, compiled in such a way as to meet the exacting requirements of studies of price relations; (2) to throw the original data into a form that will clearly reveal the relations between prices of cash wheat and of futures in

connection with inter-option price relations and the actual levels and movements of wheat prices; (3) to summarize the more obvious relations and tendencies thus revealed; and (4) to put on record a considerable volume of technical information required for proper selection of the original data and pertinent to their interpretation.

1. The price data here presented are noteworthy in several respects. Because the series is weekly it is superior to familiar series of monthly data owing to its more faithful representation of the shorter price movements, such as those connected with crop-scare and related cycles; and at the same time it can be used more easily than records of daily prices, which give greater detail than is necessary for most purposes for which price series covering a long period of years are needed. All the futures price series are carried back to the

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beginning of active trading in each future in order to provide a record of each inter-option spread over the longest possible period. The cash price series has been so compiled as to represent at all times the spot prices most closely related to the dominant futures. All the quotations for each week apply to the same day and to the same time within the day (the close of the market session), thus providing an accurate reflection of price relations.

It is in the prices of cash wheat that the series here given differ most from those elsewhere available. The cash prices represent a special compilation from quotations on "contract" wheat, and are most adequately characterized as *basic* cash wheat prices, since they apply to the spot wheat which is the effective basis of the futures contracts. They have their chief advantage over other cash wheat quotations in uses that involve close comparison between prices of cash wheat and of futures, and in uses that involve comparison of cash prices closely tied to the futures with cash prices less closely tied to the futures. They constitute, moreover, a generally useful cash price series with the special merit of availability on a weekly basis.

2. To reveal clearly the relations between prices of cash wheat and of futures, an analysis of these price relations is required. The first step in this analysis is statistical treatment of the data in such a way as to set the facts clearly before the eye, in full detail. The selection of an appropriate method for this preliminary analysis is an important phase of the study, but requires only brief discussion. The method chosen must find its justification in the usefulness of the product, which appears in Plates I-III, following page 102.

Further analysis is devoted chiefly to examining the bearing of storage costs on price relations. The subject is considered first in general terms (pp. 84-87), and then in more detail in connection with the price record during certain periods in the 1880's when the provisions for payment of storage charges were such as to reveal the influence of different elements in the cost of storage with exceptional clarity (pp. 88-94). The periods chosen for detailed examination are ones in which

the effective cost of storage generally approximated the "full storage expense," comprising commercial storage charges plus interest and insurance. A record of storage charges for the entire period from 1883 is presented, which, compared with the record of cash discounts, permits the conclusion that during much of the period the cost actually effective in determining cash-future price relations was much less than the "full storage expense."

3. The main tendencies observed in cash-future price relations are discussed below under the head of "Seasonal and Related Tendencies" (pp. 95-97). Discounts of cash wheat under old-crop futures, which are related to the upward tendency of cash prices during the main part of most seasons, are discussed as reflections of varying *effective* costs of storage. Premiums of cash wheat, usually observed with respect to new-crop futures, are shown to be of complex character, depending chiefly on anticipated shortage of old-crop supplies of wheat, but partly on costs of storage. The "seasonal cycle" in cash wheat prices, as it is reflected in cash-future price relations, is shown to reflect no uniform seasonal tendency; and to represent, in its upward and downward phases, the influence of two mainly correlated sets of forces. These produce a broadly cyclical effect chiefly because their opposing price influences are usually effective at different times of the year. The inter-seasonal decline of cash prices relative to futures is in the main not a reaction from an antecedent rise of cash prices relative to futures.

4. Much of the technical information required for proper selection of the original price data and for their interpretation is presented in connection with the description of the price series and the analysis of the data. To avoid burdening the main part of the discussion with an unnecessary amount of technical detail, however, a considerable part of this information has been relegated to a group of technical notes at the end of the study. These constitute in the main a more detailed and specific description of the character of the cash price series than is given earlier in the study, and for the sake of completeness some information given earlier is there repeated.

THE PRICE SERIES

Although Chicago has long since lost its erstwhile primacy as a cash wheat market in the United States, it maintains unquestioned dominance among United States markets for wheat futures. In this capacity it occupies a central position also in the determination of price movements in the United States cash wheat markets; and commonly a central position in the determination of wheat price movements in all those wheat markets of the world that are in close commercial contact with each other. This position of the Chicago wheat market lends special significance to cash wheat prices as well as to futures at Chicago, and most particularly to that Chicago cash price which is most intimately and directly related to the Chicago futures. There has been lacking, however, any convenient compilation of what may be called the basic cash wheat prices at Chicago—that is, of the cash prices most directly related to Chicago futures prices.

The futures prices here presented in tabular and graphic form call for little comment beyond that made in earlier paragraphs. The four futures for which prices are given have in many years been the only ones in which there has been active trading, if indeed any trading at all. Prior to the early years of the present century there was active trading in contracts for delivery in many other months, but the purposes of the present compilation are served by a full record of quotations on those four futures which have latterly become the only important deliveries. Prices for one day each week rather than weekly averages of daily prices have been used because the averages have little advantage to offer in return for the much heavier burden of compilation. Friday prices have been used wherever available.

Special care has been taken to carry the quotations for each future back to the first week in which it was regularly traded. During many of the years covered in this compilation, prices of the more distant futures have been omitted from the tables published in the *Annual Reports* of the Chicago Board of Trade, in the *Chicago Daily Trade Bulletin*,

and elsewhere. Many of the futures price quotations here given have been compiled from data found only in the text of daily market reports.

Chicago basic cash prices.—The cash prices here compiled provide a series peculiarly suited to meet the requirements of two distinct classes of use for which a cash wheat price series may be required. It is uniquely adapted to the special requirements of analyses of relationships between prices of United States cash wheats and of Chicago futures, whether the analyses be historical or current. It is, moreover, one of the best available single series for representation of the course of United States cash wheat prices generally.

The definition of basic cash wheat prices, in principle, is simple. The basic cash price is the spot price of such wheat as is being delivered on Chicago futures contracts or is expected to be delivered on them, adjusted for any premium or discount applicable on delivery. The actual determination of basic cash wheat prices with adequate precision may be easy or difficult, depending on the degree of precision required for the purpose in hand. It is easy if the object be merely to obtain a cash price record suitable for most general purposes. It is by no means easy, however, if the object be to obtain a cash price record suitable for close comparison with other prices to which it is intimately related. The record of basic cash prices here presented is designed to meet as fully as possible the exacting requirements of use in comparisons with Chicago futures prices. To meet the requirements of such use the general definition of basic cash prices must be reduced to workable specific terms with close regard to a number of points of detail. It is not sufficient to take such quotations as are readily available on spot prices of "contract" wheat.

During the period from 1883 there has always been a number of different grades of wheat eligible for delivery on futures contracts, and these different grades have usually sold at different prices. These price differences result usually in a substantial range of prices for contract wheat on any one day. Different qualities and grades of contract

wheat have often sold simultaneously at prices differing by 10–15 cents, and at times the price range for contract wheats has exceeded 30–40 cents. Price variation within the day often adds 3–4 cents to the range of quotable prices for the day and at times has added more than 15 cents to the range. Prices expressed in terms of such wide ranges are of little use as a basis for the study of price differences attributable specifically to the distinction between a spot and a futures price.

Of the various grades and qualities of contract wheat to which these prices relate, there is usually only one which is expected to be delivered on futures contracts. That grade and quality of wheat is usually present in Chicago elevators in much larger quantities than wheat of other grades and qualities, having been accumulated specifically for the purpose of providing supplies for delivery on futures contracts. Typically, the wheat thus accumulated is highly uniform in quality and all quotable, at any time, at a single price or at prices varying through a range of only a fraction of a cent per bushel. It is the price of this *effective contract wheat* which is reflected in the basic cash price series here presented.

The wheat contemplated for delivery is naturally of the grade and quality which is cheapest among those eligible for delivery on futures contracts. With changes in the demand and supply situation there occur from time to time changes in the grade of wheat of which delivery is contemplated. Such changes are accompanied by a more or less gradual closing up of the spread between the prices of two grades of wheat until for a time the prices become identical and deliveries of either or of both might be expected. Then the wheat that was formerly the cheaper becomes the higher priced and the other becomes definitely the cheapest deliverable wheat. Through such a period the basic cash price is first a quotation on wheat of one grade, then a quotation on wheat of either of two identically priced grades, and finally a quotation on wheat of the second grade. The transition, however, involves no discontinuity in the series.

The foregoing comments apply strictly only

in the simple case in which all deliverable grades of wheat are tenderable at contract price. During many years some grades of wheat have been subject to delivery at premiums or discounts, which must be taken into account. For example, when No. 2 Hard Winter wheat was first admitted to the list of deliverable grades (in 1903) it was made subject to delivery only at a discount of 5 cents per bushel. A trader who had sold December wheat at 95 cents a bushel and elected to deliver No. 2 Hard Winter wheat would have received 90 cents a bushel in payment, instead of the contract price of 95 cents. Under these circumstances, No. 2 Hard Winter wheat could have been contemplated for delivery only if its price had been 5 cents or more below the price of No. 2 Red Winter, or of No. 1 Northern Spring wheat, whichever was the cheaper.

If the price of No. 2 Hard Winter wheat had fallen more than 5 cents below quotations on the cheapest wheat deliverable at contract price, it would have become the effective contract grade. The spot equivalent of futures prices, however, would have been the price of No. 2 Hard Winter wheat plus 5 cents—the adjustment necessary on account of the discount applying on deliveries of that grade. This illustration explains the general rule here employed in making adjustments when the effective contract grade has been one deliverable at a discount or at a premium: the basic cash price has been taken as the quoted price plus the discount, or minus the premium, applicable on deliveries of such wheat.

Determination of the grades of wheat which were basic to the futures price, and of any necessary adjustments for premiums or discounts, has involved compilation of a complete record of delivery requirements in these respects. This information, together with price quotations on the different grades, usually gives clear evidence of the grade contemplated for delivery, but a compilation of stocks of contract wheat in Chicago public elevators, by grades, has provided useful supplementary evidence. The data compiled for these purposes are included herewith in appendix tables.

To avoid price differences attributable merely to differences in the time to which the

quotations apply, quotations on both spot wheat and futures have been taken as of the close of the market on the day to which they apply.¹ Price discrepancies attributable to differences in location and quality of the wheat have proved not wholly avoidable. Every effort has been made to select quotations on cash wheat of the quality contemplated for delivery and in the position required for tender on futures contracts—that is, generally, in store in “regular” elevators in Chicago. Cases in which the best available quotations were based on wheat apparently of better quality than that contemplated for delivery have been rare. Cases in which the best available quotations were for wheat on track rather than in store have likewise been rare except during the post-war period. The cash quotations for most of this period appear to report prices of wheat on track rather than wheat in store. The prices of wheat on track tend to run somewhat under those for similar wheat in store when wheat is moving actively into storage, and slightly over the prices of wheat in store when the principal movement is out of storage; but the differences are generally small. Only occasionally is it necessary to take account of the position of the wheat represented by the cash quotations in interpreting cash premiums and discounts during the post-war period.

Representative character of basic cash prices.—Because the Chicago basic cash price series is made up in an unconventional man-

¹ The futures prices are without exception closing quotations. The cash quotations may occasionally apply to an earlier hour of the day. In the main there have been available either cash prices designated unmistakably as closing quotations, or else quotations of cash discounts or premiums which could be applied to the closing price of the appropriate future to obtain a closing price of cash wheat. Often when no closing price or cash discount (or premium) was quoted, but merely a price range for the day, it has been clear that the range was related to price variation during the day rather than to price variation with quality, and it has been possible to estimate the closing cash price rather confidently on the basis of the closing price of a future and a comparison of the quoted range of cash prices with the quoted range of the futures price. When only a single cash price for the day has been quoted (for the effective contract grade), and that apparently not definitely a closing price, there has usually been evidence that it must have been approximately a closing price.

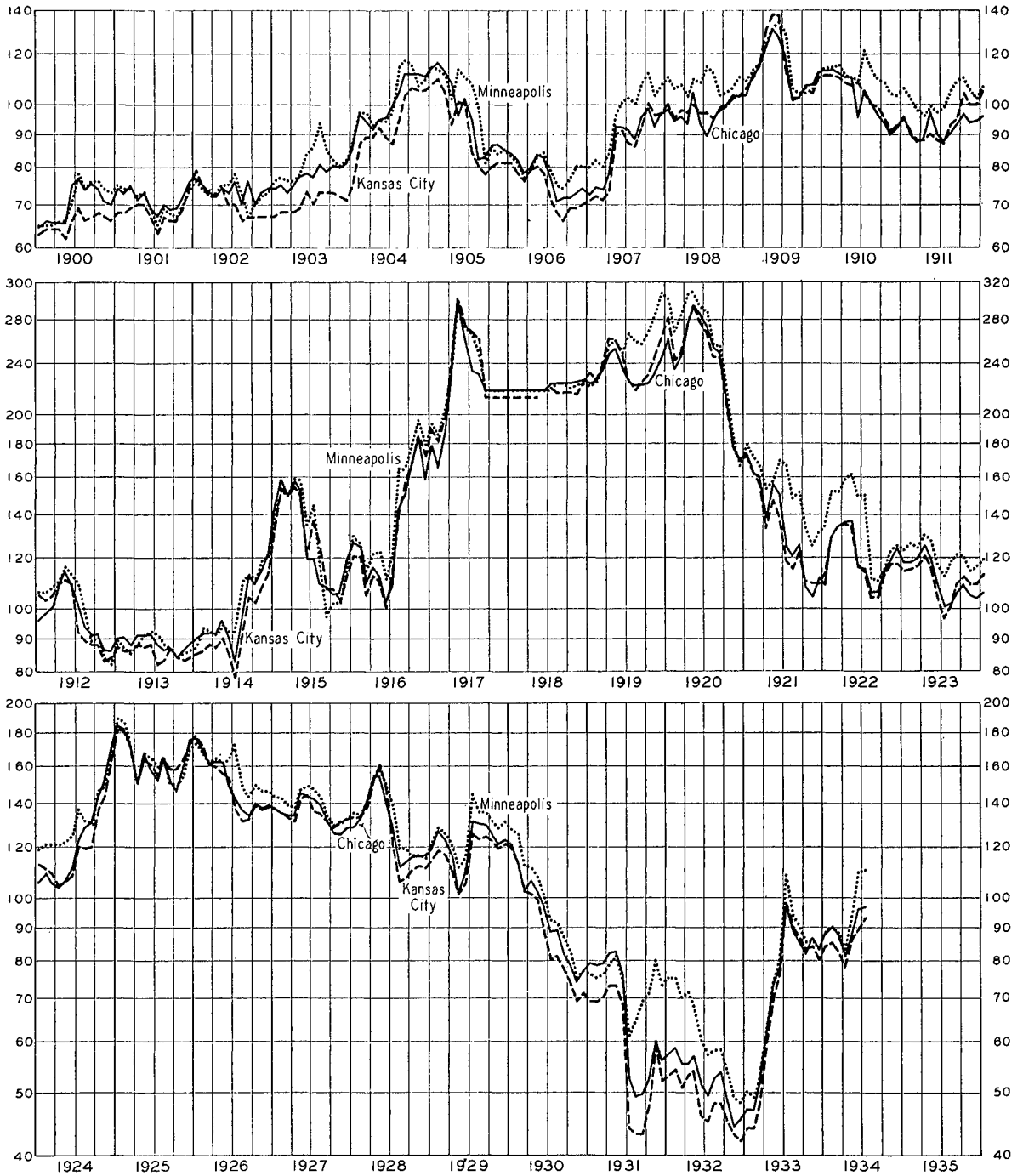
ner, there is special reason for inquiring into the question whether it may be regarded as a representative wheat price series, and into the extent and character of any peculiarities in its behavior. The fact that the prices represent sometimes one grade of wheat and sometimes another, and always substantially the minimum quality within the grade, may raise fears of erratic behavior. These same facts may be regarded, on the other hand, as providing assurance against certain types of erratic behavior.

The most trustworthy answers on these points are to be drawn from a comparison of price movements of Chicago basic cash prices with movements of other important United States cash prices. The comparison may be made both graphically and in terms of measures of correspondence of price movements. The most broadly representative series available for comparison seem to be the weighted average prices of cash wheats that have been compiled by the United States Department of Agriculture. In Chart 1 (p. 80) Chicago basic cash prices appear on a monthly basis in comparison with the weighted average prices of No. 2 Hard Winter wheat at Kansas City and of No. 1 Northern Spring wheat at Minneapolis. Small differences in month-to-month price changes are often to be expected solely from the fact that the monthly values in the Chicago series are based on only four or five quotations, at weekly intervals, while the monthly values in the other series are based on daily records and are so derived that more weight may be given to prices in one part of the month than in another, the weights depending on the quantities sold. Despite these differences in method of construction, the three sets of price averages conform closely enough in most month-to-month changes to render a few notable discrepancies conspicuous.

All of the cases in which the Chicago price series shows conspicuous divergence from both of the other series in Chart 1 are associated with corners or squeezes. In September 1902 the Chicago price rose sharply relative to the others in consequence of a squeeze. In May 1905 the Chicago price was depressed, relatively, because a squeeze which had been

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CHART 1.—PRICES OF BASIC CASH WHEAT AT CHICAGO, NO. 2 HARD WINTER WHEAT AT KANSAS CITY, AND NO. 1 NORTHERN SPRING WHEAT AT MINNEAPOLIS, MONTHLY, 1900-1934*
(Cents per bushel)



* Chicago prices from Table II; Kansas City and Minneapolis prices, weighted averages compiled by U.S. Department of Agriculture.

The Chicago price series represents sometimes wheat of one grade and sometimes wheat of another grade, but always wheat the price of which is most closely related to the price of Chicago futures. Its close connection with Chicago futures prices results occasionally in fluctuations that are not representative of general cash price movements. Apart from these instances of special speculative influence, however, the movements of basic Chicago cash prices seem to reflect general movements of cash prices as accurately as any other cash price series, and to be less affected by special influences than some other cash price series.

threatened for some time collapsed early in the month, after disproportionally heavy stocks had been built up in Chicago. In 1908 a squeeze raised Chicago prices in May; and its aftermath in the form of heavy stocks depressed Chicago prices in June and July. Similar divergent movements of the Chicago price series may be noted in June 1910 and in May 1911.

In the broader price movements extending over several months or a year the Chicago price series usually moves in close correspondence with the other series when they show closely similar price changes, and follows a middle course when the other two show divergent movements. Apart from the temporary discrepancies associated with squeezes, correspondence of movement seems better between the Chicago price series and each of the others than between the other two.

Such observations as the foregoing, based on visual appraisal, are necessarily somewhat uncertain and may advantageously be supplemented by measurements of the degree of correspondence between price movements in the different series, expressed in terms of coefficients of correlation. Appreciably different results may be obtained by selecting different classes of price movement for comparison, but it is sufficient for present purposes to examine the correspondence of price changes over four-month intervals. Such intervals are long enough to reflect fairly well the broad price changes that extend over many months and to obscure in considerable degree those discrepancies among price changes which depend solely on the fact that one of the price series is an unweighted average of prices taken on one day each week, and the others differently weighted averages of all cash transactions; and they are short enough to reflect clearly intermediate price changes such as those associated with crop-scare and related price cycles. Coefficients of correlation showing the degree of correspondence between price changes over four-month intervals in each of the three price series already discussed and also in the weighted average price of No. 2 Red Winter wheat at St. Louis are given in Table 1 below.

Measuring price movement in terms of

changes over four-month intervals, it appears that the closest correspondence of movement is found between the Chicago and Kansas City prices. The poorest correspondence is shown between St. Louis and Minneapolis prices. The Minneapolis prices move in closest agreement with the Kansas City prices, but in almost as close agreement with the Chicago prices. The St. Louis prices, likewise, show their closest correspondence of movement with the Kansas City prices, but almost as close correspondence with Chicago prices. From these comparisons it appears that if some one of the series had to be selected to represent the price movements common to all four, the Kansas City prices would deserve first choice and the Chicago prices would rank as a close second choice.

TABLE 1.—COEFFICIENTS OF CORRELATION BETWEEN CHANGES IN FOUR PRICE SERIES OVER FOUR-MONTH INTERVALS, 1900-1934*

Series Correlated	Chicago	Kansas City	St. Louis	Minneapolis
Chicago . . . . .	...	.93	.89	.87
Kansas City . . . . .	.93	...	.91	.89
St. Louis . . . . .	.89	.91	...	.77
Minneapolis . . . . .	.87	.89	.77	...

* Based on changes between monthly average prices, taking changes January-May, February-June, March-July, and so on, from January 1900 to April 1934. The series are: for Chicago, basic cash prices, from Table II below; for Kansas City, St. Louis, and Minneapolis, weighted average cash prices of No. 2 Hard Winter, No. 2 Red Winter, and No. 1 Northern Spring wheat, respectively, as computed by the U.S. Department of Agriculture. Read down the columns, the table shows coefficients of correlation between the series indicated at the head of the column and each of the other series, indicated in the stub.

In this sense the Kansas City series may be regarded as the most representative single price series among the four—least affected by price movements peculiar to itself—and the Chicago series as only slightly less representative. In view of the fact that the Chicago series has often shown marked peculiarities associated with squeezes, one may judge that in ordinary circumstances, when Chicago prices are not under the influence of such special forces, the basic Chicago cash price series may be the most representative in its movements. Certainly it does not exhibit marked peculiarities apart from those associated with squeezes in the Chicago futures market.

ANALYSIS OF CASH-FUTURE PRICE RELATIONS

Charts of original price data permit only very rough observation of changes in relations between prices of cash wheat and prices of the several futures. The difficulty of observing such changes, even roughly, virtually precludes the drawing of conclusions regarding tendencies in cash-future relations from direct study of the original price data. The first requisite for study of tendencies in cash-future price relations is reduction of the data to a form in which the relations and their changes may be perceived clearly and readily.

The most generally significant feature of the relation between the price of cash wheat and of a future is the absolute difference between the two prices—the discount of cash wheat under the future or premium over the future. When these price differences are to be shown graphically over a period of years a serious problem of effective presentation arises from the discontinuity of the series of differences. One solution is to employ a continuous base line from which to plot price differences for the various futures successively. The effect is to show the price of cash wheat as the base, with prices of the different futures commonly starting above the price of cash wheat and declining to meet it in the delivery month.¹ This is objectionable because the impression given is contrary to the main realities of the economic situation. It is more significant to view cash prices as rising (or sometimes falling) to meet the price of the future in the delivery month.

A graphic representation of cash-future price spreads giving the impression of the cash price approaching the price of the future can be obtained for periods of a year or more only in connection with certain more or less objec-

tionable features. To obtain the desired effect, the price of the future must be taken as the base, represented by a straight line, and the cash price plotted as a deviation from the price of the future. With the expiration of a future, if not earlier, change must be made to a later future as the base for computing the cash-future spread. If the computed spreads be plotted from a single horizontal line, representing the price of some future, the plotted curve representing the cash price will be broken into a series of disconnected sections, belying the true continuity of a cash price series.

For some purposes it is satisfactory to represent cash-future price relations by separate continuous curves for each twelve-month period. Continuity of the curves for twelve-month periods ending with May can be obtained with only a little departure from reality by using the May future as the base throughout its life, and for the remainder of the twelve months using as a base a hypothetical price of May wheat derived from the price of, say, December wheat, by adding some reasonable estimate of the difference that might have been expected between the two futures. We used substantially this method in a previous presentation of certain features of cash-future price relationships.²

A variant of this plan, resting even more largely on hypothetical prices of the May future, has been used by G. Wright Hoffman in a publication of the United States Grain Futures Administration.³ Indeed Dr. Hoffman refrains from designating the built-up series by other than the noncommittal term "adjusted futures price." In this variant of the plan, actual quotations on the May future are used only after that future began to lead in volume of open commitments, usually in November. What we here characterize as "hypothetical prices" of the May future were used for the earlier portion of the year, obtained by adjustment of prices of the September or December future, whichever had the larger volume of open commitments.

The plan of basing the spreads in part on a hypothetical futures price has two main defects. The division of the record into periods not longer than about twelve months, neces-

¹ See for example the chart facing p. 200 in *Prices of Grain and Grain Futures* (Report of the Federal Trade Commission on the Grain Trade, Vol. VI), 1924.

² See "Cycles in Wheat Prices," *WHEAT STUDIES*, November 1931, VIII, 5-8. The seasonal indexes there shown, if expressed in cents per bushel rather than as percentages of a base price, would exactly parallel a curve of discounts of cash wheat under the May future, actual or hypothetical.

³ *Future Trading and the Cash Grain Markets* (U.S. Department of Agriculture Circular No. 201), January 1932.

sary to avoid carrying the construction of the series of hypothetical futures prices to unreasonable lengths, considerably restricts the usefulness of the presentation; and the very simplicity of the presentation wholly obscures the fact that the relations shown are often influenced in considerable degree by choice of the method to be used in building up the hypothetical portion of the futures price series—the decision, for example, whether to use the actual prices of the May future from the time quotations begin, only after May becomes the dominant future, or perhaps only after the December future enters its delivery month.

To circumvent the defects of these methods of presenting graphically the relations and changes in relations between the price of cash wheat and the prices of futures, we have here resorted to a third method of presentation (Plates I–III, following p. 102). Superficially, this method is more complicated than the others; but the greater difficulty is encountered only in the initial stage of comprehending the meaning of the chart, and is chiefly a consequence of the larger amount of information presented. For actual study and interpretation after the initial stage the chart presents less difficulty than charts based on the other plans of presentation.

The fundamental plan in this method is extremely simple. The price of some future is always taken as the base, represented by a horizontal line. Discounts of cash wheat under the price of this future, or premiums over it, are plotted downward or upward from this base line. The curve connecting the points thus plotted represents the course of cash wheat relative to the future. When it becomes necessary to drop the use of one future as a base and shift to another, a new base line is taken, on a level so selected that the curve representing the price of cash wheat in relation to the futures continues without interruption.

The essentials of the plan may be clarified by examining its application in the first twelve months of the record as presented in Plate I. At the left of the topmost section of this plate the base line, a heavy broken line with scale-value zero, represents the price of the July future. The discount of cash wheat under the

July future is plotted as a heavy solid line, which rises from the left to meet the base line at the first of July, when the July future became (in this year) equivalent to basic cash wheat. Beginning with the first business day of July, the September future is taken as the base. It is drawn at a level above the previous base line equal to the premium of September wheat over July at the close on the last business day in June. As of this moment the cash price curve may be regarded as having a double base: the same position for this point on the curve is obtained whether it be located as a discount of cash wheat under the July future, plotted from the base line representing that future, or as a discount of cash wheat under the September future, plotted from the base line representing the September future. The September future is retained as the base until the close of the market on the last business day before the beginning of the delivery month, when the December future becomes the base, again at a level such that the continuity of the line representing cash prices is maintained.

With each change in level of the base line, representing zero premium or discount, the other horizontal grid lines shift also. The scale at the left of the plate applies directly only to the first set of grid lines, running through May and June; but it serves also as a convenient reminder that the distance between successive horizontal lines represents 10 cents per bushel.

The first section of Plate I provides convenient illustration of other features of the plan of presentation that call for comment. Each end of most of the base lines continues in a lighter irregular line. These lighter irregular lines represent the prices of futures not being used as the base, relative to the price of whatever future for the time being serves as a base. The chart thus gives, incidentally, a serviceable presentation of inter-option price relations. The chief purpose, however, of these curves representing the price of each future beyond the period in which it is used as the base is to permit study of the movement of the price of cash wheat relative to the price of any one of the four major futures being dealt in at any time. It may be important to recognize, for

example, that in May–June 1883 while the price of cash wheat was rising steeply relative to the July future it was maintaining a nearly constant discount under the September future.

A similar difference in movement of cash wheat with respect to different futures is to be noted in May–June 1884 and in various other periods. The representation of cash-future price relationships in Plates I–III shows most clearly and conspicuously the movement of the price of basic cash wheat relative to the price of the nearest of the four major futures not expiring in the current month; and it shows only a little less clearly the movement of the price of basic cash wheat relative to prices of each of the four major futures for which quotations are available.

It is convenient to think of the curves of cash-future price spreads in Plates I–III as the equivalent of the actual price curves drawn to a large vertical scale and then “ironed out” so as always to leave one of the futures price curves as a smooth horizontal line, but without disturbing the vertical relations among the curves. This concept is carried out in the labeling of the curves, each being given the name that would apply if it were an original price curve. The curves will be referred to, nevertheless, as curves showing cash-future price spreads—or, more briefly, cash discounts—since it is for the representation of these spreads that they are peculiarly fitted.

The breaks in the curves of cash-future spreads at the end of April 1885 and again at the end of April 1888 are of course introduced solely for the purpose of condensation. In some respects it would have been preferable to emphasize the continuity of the upward trend of cash prices relative to futures through the whole five-year period 1883–88 as it would have been emphasized if this portion of the chart had been made continuous. The condensation permitted by the break at this point, and at other similar points on Plates II and III, has the merit of bringing all the data within the range of easier vision and, in particular, of keeping the spread curves conveniently close to the original price curves.

Often it is desirable to compare changes in the discount of cash wheat under futures with changes in the prices themselves. Occasionally

there is a significant connection between changes in prices and changes in cash discounts, as for example in May–June 1887. Usually there is little or no direct connection between them. Absence of such connection is an important fact to be noted, quite as much as its presence. As part of the presentation of cash-future price relationships, therefore, we show directly below the curves of price spreads in Plates I–III the curves of actual prices of cash wheat and of three of the futures. Price curves for the December future are omitted because they would rarely contribute important information and would often detract through obscuring the movements and relative position of other curves.

The actual price curves in Plates I–III of course show in the most elementary fashion the relations between prices of cash wheat and of futures. The representation of these relations in the form of the curves of cash-future spreads is advantageous partly because of the gain in clarity consequent on use of the larger vertical scale possible for the spread curves, but chiefly because in them the essential features of relationship are isolated and emphasized. The direct representation in the form of the original price curves cannot be wholly replaced by the derived curves without some loss of pertinent information. The derived curves may well be given primary attention in a study of cash-future price relations, but their significance in terms of the original price data should not be lost from sight.

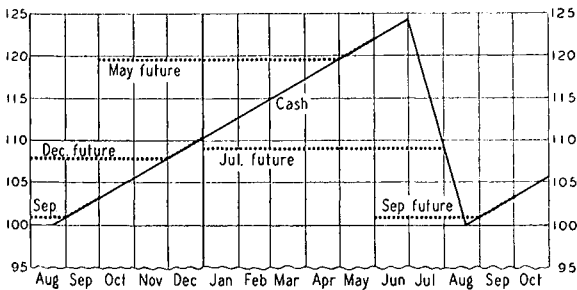
STORAGE COSTS AND PRICE RELATIONS

Commonly a discount of basic cash wheat under the price of a future may be viewed as a reflection of the cost of carrying cash wheat until the time when it becomes deliverable on the future. Often the cost effective in determining the discount is a simple summation of commercial storage charges, interest, and insurance. It is convenient to have a brief term to use in referring to storage costs as thus calculated: in subsequent discussion the summation of these costs will be referred to as the “full storage expense.” On rare occasions the effective cost of carrying wheat has exceeded the cost so calculated; more commonly it has been less than indicated by

such a calculation. The effective cost of carrying wheat has been greater than the "full storage expense" when congestion of storage facilities has forced the holding of wheat in cars subject to demurrage charges, or the hiring or purchase of storage space at costs in excess of those on wheat in public elevators prohibited from taking advantage of the situation through raising rates. It has often been less because when stocks of wheat are low they tend to fall into the hands of those willing to store wheat for a return less than the commercial rates for storage in public elevators. In general, the sum of commercial storage charges, interest, and insurance fixes an approximate maximum for the discount of basic cash wheat under the price of a future—a maximum often approached, occasionally equaled, and rarely exceeded.

Hypothetical relations.—It is instructive to consider the relations to be expected among the prices of cash wheat and of the several futures under certain simplified assumptions. Chart 2 presents such a hypothetical set of

CHART 2.—HYPOTHETICAL RELATIONS BETWEEN PRICES OF CASH WHEAT AND FUTURES*
(Cents per bushel)



* The simplified assumptions on which this chart is based include important features that are effective in determining actual cash-future price relations. The chart exhibits the logical consequences of these conditions, described in the accompanying text, and serves thereby as an aid in determining to what extent these conditions account for actual price relations. The main conclusions drawn are that tendencies of cash wheat prices to rise relative to futures are in fact related to "effective" costs of storage; but that interseasonal declines of cash prices relative to futures generally have little quantitative or causal relation to the previous rise.

price relations through a period of fifteen months. The first assumption, frankly unrealistic and made solely because it simplifies the presentation without affecting the conclusions, is that the price of each future remains un-

changed throughout its life. The other assumptions have an appearance of close conformity with fact. These assumptions are (1) that commercial charges for storage, interest, and insurance, taken to be 1/15 cent per bushel per day, are the actually effective costs from August 20 to June 30; (2) that the price of cash wheat starts at \$1.00 per bushel on the 20th of August, and, after rising solely under the influence of storage costs to a maximum at the end of June, returns to a post-harvest minimum of \$1.00 per bushel on the 20th of the next August, when a new rise commences; and (3) that the interseasonal decline in cash prices is accurately forecast in the futures.

Some further supposition is necessary on two matters of detail. The suppositions made are that quotations on each future begin with the expiration of trading in the second preceding future (for the purposes of the chart it is convenient to have relatively short curves for the futures prices); that the interseasonal price adjustment begins abruptly on the first of July (with arrival of the first new-crop wheat); and that the subsequent price decline proceeds at a uniform daily rate until the 20th of August, when it ends as abruptly as it began.

In the hypothetical situation of Chart 2 the price of cash wheat rises from the point of minimum price following harvest, and rises at a rate just covering the "full carrying expense." The price of each old-crop future moves horizontally on a level that permits it to meet the curve of cash prices at the beginning of the delivery month. Thereafter the futures price becomes substantially a cash price and rises accordingly through the delivery month. The spreads among old-crop futures are determined by the cost of carrying wheat from the first of an earlier delivery month to the first of a later delivery month. The price of cash wheat declines as end-of-the-season shortage is relieved by receipts from the new crop. The price of July wheat moves horizontally to meet the declining curve of cash prices at the end of July: the July future, under the conditions supposed, becomes equivalent to cash wheat only as the future expires, with cash wheat at its lowest

price for the month. The September future, however, meets the curve of cash prices as it is again rising, and therefore at the beginning of the delivery month, although during much of the life of the future its price has been below that of cash wheat.

Chart 2 bears a strong resemblance to the presentation of cash-future price spreads in Plates I-III. They may be regarded as giving the nearest approximation possible to a representation of actual price relations with the prices of futures held constant. Since in reality the prices of different futures usually move somewhat differently, it is usually possible to represent only one actual price series at a time as unchanging and still maintain faithfulness of the representation of price relations. Comparison of Chart 2, based on simplified hypotheses, with the facts of actual price relations as exhibited in Plates I-III reveals significant similarities and some equally significant dissimilarities.

The similarities suggest the degree to which cash prices rise relative to futures at a rate covering "full storage expenses" from about the end of one harvest to the beginning of the next, and then decline in an interseasonal readjustment; they suggest the degree to which this seasonal cycle in cash prices determines the relationships among futures prices; and the degree to which futures prices maintain through the season a constancy of relationship implying accurate market forecasts of the seasonal movement in cash prices. The dissimilarities between the hypothetical and the actual curves suggest important facts in the actual situation not comprehended under the simple assumptions of the hypothesis.

Quoted storage rates and their incidence.—

A review of the main facts regarding storage costs is a necessary preliminary to consideration of the connections between those costs and the actual cash-future price relations revealed in Plates I-III. A full historical analysis of costs of storage since 1883, however, is beyond the scope of the present study. Indeed it is often virtually impossible to compute with confidence the effective commercial costs of storage at a particular time. Costs are greater for wheat in some storage positions than in others—which cost total should be

taken as the one effective in determining price relations? If the effective cost is that for storage of wheat in public elevators, there is a known storage charge to be used in the calculation; but if the effective cost is that for storage of wheat in private elevators, the cost is often quite indeterminate. Assuming that the total costs of operation of the elevator are known and must be covered, there arise the questions: what portion of the total is chargeable against storage of grain, *per se*, and what portion against the merchandising or processing activities to which the availability of the elevator space contributes; how should that portion which may be supposed chargeable against storage of grain be apportioned among the several grades stored; and how much of the cost considered attributable to storage of wheat in general should be attributed to storage of the wheat carried through a particular interval of time?

Information on the charges for carrying wheat in "regular" elevators in Chicago, accurately ascertainable, is nevertheless useful for interpretation of several features of price relationship that require consideration here.

A full record from 1883 of published rates for storage of wheat (applicable likewise to the other grains and to flaxseed) has been compiled and is presented in Table III.

Notice must be taken also of the division of storage charges between buyer and seller, which has varied from time to time. Chicago wheat futures are contracts for purchase and sale of grain, normally to be received by the purchaser in the form of warehouse receipts representing grain in "regular" elevators in Chicago. Fulfilment of the contract through acceptance of delivery places upon the buyer the obligation of paying to the seller the stated purchase price, and to the elevator certain storage charges, the amount of which has varied, since 1883, between $\frac{3}{4}$ cent a bushel and 4 cents a bushel. The storage charge to be paid by the purchaser, though varying from period to period, has with one exception always been accurately ascertainable at the time the contract was made, and has been a factor, usually minor, affecting the price offered.¹ It

¹ The exception was a consequence of a change in storage rates on February 13, 1888, which became

requires to be taken into account chiefly in comparisons of prices of futures with prices of cash grain on which storage charges have not already been incurred, as for example grain on track. In three cases since 1883 changes in storage charges payable by the purchaser affect comparisons of prices of different futures.

Throughout the period of more than half a century here under consideration, storage charges on wheat in Chicago have been divided into two portions: a "first storage" charge, covering the receiving of grain into the elevator, storage for ten days, and delivery out of the elevator;¹ and an additional charge for subsequent storage. The "first storage" has always been borne by the purchaser of the grain. Beginning with April 16, 1888, storage charges other than "first storage" have been borne by the seller for whatever period the grain had remained in store in his ownership.

This apportionment of storage charges was in effect prior to 1888, also, during the period

effective immediately upon announcement. It reduced the storage charges to be paid by purchasers of wheat on futures contracts only on deliveries made between February 13 and April 15, 1888.

Under "winter storage" regulations, to be described below, the storage charge to be paid by the buyer was not ascertainable with entire certainty, being dependent on the date on which the grain delivered had been placed in store and on the date on which it was withdrawn from storage. But in practice it could be calculated with a probability amounting almost to certainty, since the wheat selected for delivery would normally carry maximum storage charges.

¹ The increase in the charge for "first storage" in 1910 from $\frac{3}{4}$ cent to 1 cent per bushel was accomplished by adding a charge of $\frac{1}{4}$ cent "for delivering out," which service had previously been included in the storage charge. In public notices of elevator charges this $\frac{1}{4}$ -cent charge has since been listed consistently as a charge separate from storage. The rules of the Chicago Board of Trade, however, have adhered to the earlier concept of the services covered by the first storage charge and prescribe as a maximum storage charge for the first ten days a single figure (1 cent from July 1, 1910; $1\frac{1}{4}$ cents from January 1, 1921) which includes the $\frac{1}{4}$ -cent charge for delivering out. We have here followed the usage of the Board of Trade.

² When storage charges ran for successive ten-day periods, it was often not possible to select for delivery only receipts carrying just five days' additional storage. When storage after the first ten days was made payable on a daily basis (from May 15, 1900), occasion for delivery of receipts carrying more than the minimum period of storage ceased except when it was necessary to deliver grain placed in the elevator less than five days before delivery.

April 16—November 30 of each year, under what were designated as "summer storage" rules. On deliveries on futures contracts between December 1 and April 15, inclusive, "winter storage" rules applied. Under these rules, charges for the first ten days and for each subsequent ten days were the same as under "summer storage" until a total of 4 cents per bushel had accumulated, after which there was no further charge. The total accumulated charge was paid by the buyer. Grain could be placed in store under "winter storage" rates any time from November 15 on, hence the buyer paid all storage accumulated from November 15 or such later date as the wheat was placed in store, the total accumulated storage not to exceed 4 cents. Further details of the "winter storage" rules will be given below in discussion of the effects of the system on cash-future price relations.

The purchaser of wheat on Chicago futures contracts has usually been entitled to a certain period of "free storage." Prior to January 2, 1930, the seller was required to deliver warehouse receipts entitling the buyer to hold the grain in store for five days without additional payment for storage. Not uncommonly, up to 1900, the receipts would carry more than five days' "free storage."¹ Between January 2, 1930, and July 31, 1931, receipts had to carry ten days' "free storage." Since July 31, 1931, receipts have carried no "free storage," but the buyer has received a credit from the seller covering ten days' storage at the rate applying on storage after the first ten days.

The term "free storage" used in this connection is misleading in its implication that the buyer received storage for which he did not pay. Until January 2, 1930, the buyer paid a charge covering the first ten days' storage, but was entitled in return to hold the grain in store for only five days. Subsequently the corresponding payment has entitled him in fact to keep the grain in store for ten days. Beginning with August 1, 1931, the buyer not only has been entitled to hold the grain in store for ten days, but has enjoyed a deduction from the "first storage" charge on grain moved out before the end of this ten-day period. The deduction is calculated at the "subsequent

storage" rate and its amount is subject to the condition that the total amount of storage paid by seller and buyer together shall not be less than the "first storage" charge.¹

REFLECTIONS OF "FULL STORAGE EXPENSE"
AS THE EFFECTIVE COST OF STORAGE

With storage charges in "regular" elevators accumulating after the first ten days at a uniform rate per day, as they have since May 15,

¹ This is a summary of the effect of the rules in terms differing from the official statement. The rules provide that the buyer shall pay the "first storage" charge plus additional charges accrued before purchase of the grain. He receives from the seller a credit covering these previously accrued charges, with the net effect described above.

The official rules are concisely stated and their operation clearly indicated in the following description supplied by Mr. E. M. Combs of the Chicago Board of Trade. "Under present storage rates an elevator operator collects one-twentieth of one cent per bushel per day for the entire life of the receipt, ten days being excepted. In addition to the one-twentieth of one cent mentioned above, the elevator operator collects 1¼ cent per bushel when the grain moves out, and this amount includes the ten-day period mentioned above as being excepted. The present Board of Trade rules provide that warehouse receipts are not deliverable on any future contracts unless storage on same has been paid up to the eighteenth day of the month preceding delivery. Take a warehouse receipt dated August 1st and delivered September 1st. The owner of that receipt, before he could deliver it, would pay the storage at the rate of one-twentieth of one cent per bushel per day until August 18th inclusive [a total of seventeen-twentieths of one cent per bushel]. From August 18th to September 1st inclusive is fourteen days. Therefore, when the holder of that receipt delivered it out he would be compelled to allow the buyer fourteen-twentieths of one cent per bushel storage. Should the buyer of this receipt order it loaded out immediately and succeed in getting it loaded, we will say, on September 2nd, which would be fifteen days after the paid up date of the receipt, he would be obligated to pay the elevator 1¼ cent per bushel, called the loading out charge, which included ten of the fifteen days from August 18th to September 2nd, and in addition to the 1¼ cent he would pay the elevator operator only five twentieths of one cent per bushel.

"Where the receipts are less than ten days old at the time of delivery the figures are slightly different. To illustrate, on a receipt dated September 1st delivered on September 2nd, the seller would allow the buyer only one-twentieth of one cent per bushel. The buyer would then have until September 12th to load this grain out, paying the elevator 1¼ cent per bushel, plus one-twentieth of one cent per bushel. Should he be fortunate enough to load the grain represented by this warehouse receipt on September 3rd or any time up to September 11th, he would be obligated to pay the elevator operator 1¼ cents per bushel and no accrued charges."

1900, a condition in which the "full storage expense" is the effective cost of storage tends to be reflected in a very simple relation between prices of cash wheat and of futures. In such circumstances the tendency is for cash wheat to stand at a discount equal to the "full storage expense" for carrying wheat to the beginning of the delivery month. This carries with it a tendency for the price of cash wheat to rise progressively relative to the futures at a daily rate equal to the full storage expense per day. The price relations tend to resemble closely those between prices of cash wheat and *old-crop* futures shown in Chart 2 (p. 85).

With storage charges after the first ten days at a uniform rate per ten-day period, as they were from April 15, 1888, to May 14, 1900, the situation is essentially the same. The rise of the price of cash wheat relative to futures may sometimes proceed largely by steps, with the chief increases at ten-day intervals, as will be illustrated below; but such steps must escape notice in weekly data.

Under the storage regulations in effect for many years prior to April 16, 1888, effectiveness of "full storage expense" tended to be accompanied by a sharp reduction in the rate of rise of cash prices relative to the May future from November 15 to early February. All price relations involving futures for delivery in the months December–April were also notably different from such price relations in subsequent years. These price relations, which now appear peculiar, reveal with special clarity how closely cash-future price relations may be determined by the "full storage expense," and indeed show separately the influences of elevator storage charges and of interest and insurance. The system of regulations governing storage charges at that time is, moreover, of considerable historical interest and must be taken into account to reach a proper interpretation of the relations between prices of cash wheat and of futures during the winter months of years prior to 1888–89.

"*Winter storage*" provisions.—The main provisions of the system of storage charges in effect until 1888—with one set of rules for charges under "summer storage" and another for charges under "winter storage"—have been

given above. From the frequent repetition of the rules in columns of the *Chicago Daily Trade Bulletin*, year after year, one may surmise that they were contemporarily a source of some uncertainty or even confusion. The most complete description of the operation of the system which we have found appeared in the *Daily Trade Bulletin* for April 13, 1887, just before the annual transition from the "winter storage" to the "summer storage" basis. It deserves quotation in full:

Storage rates on Grain are $\frac{3}{4}$ c for the first ten days, and $\frac{1}{2}$ c more for each additional ten days or part thereof, except from November 15th to April 15th, when rates are the same until 4 c storage has accumulated. After that there is no more accumulation until April 15th, when, in addition to the 4 c storage, $\frac{1}{2}$ c is charged for every ten days or part thereof. Under the rules of the Board of Trade, receipts delivered on sales (unless otherwise specified at time sale is made) from December 1st to April 15th are on the basis of "winter," or 4 c storage, and from April 16th to November 30th (inclusive) on basis of "summer," or first storage of $\frac{3}{4}$ c, and receipts must have five days to run on current rates of storage. As "winter" storage expires April 15th, winter receipts will not be regular for delivery later than April 10th; therefore, $\frac{1}{2}$ c will have to be paid by seller to make the receipts regular from the 11th to the 15th of April, inclusive.

On April 16th there is $4\frac{1}{2}$ c storage to take winter receipts out of store, and as deliveries on and after that date are made on basis of $\frac{3}{4}$ c, it costs $3\frac{3}{4}$ c to deliver winter receipts on sales the 16th of April, $4\frac{1}{4}$ c April 21st, $4\frac{3}{4}$ c May 1st, $5\frac{1}{4}$ c May 11th, &c. Receipts may be regular when delivered and not regular for delivery the next day without deduction of $\frac{1}{2}$ c for storage, as the delivery rule requires that receipts have five days to run, and the first delivery may be made at the last hour of the day on which this five-day limit expires.

While receipts for Grain arriving after April 15th can be taken from store ten days after date of receipts without extra storage, they cannot be delivered on regular sales after five days from date without deducting $\frac{1}{2}$ c for every ten days, or part thereof, after five days from date of receipt.

To this should be added certain details regarding the annual transition from a "summer storage" to a "winter storage" basis in November. Although wheat placed in store on November 15 and later came under "winter storage" rates, "summer storage" receipts continue to be tendered on futures contracts

through November 30. Regular "summer storage" receipts could be converted to "winter storage" at a cost of $\frac{1}{2}$ cent per bushel at any time during November 17-30. For some time prior to November 15, however, wheat freshly placed in store could be carried to November 15 and placed on a winter storage basis with no charge except for storage to November 15 at the going rate of $\frac{1}{2}$ cent for each ten days or part thereof.

Price relations in 1884-85.—The price record for November-April 1884-85 gives excellent illustrations of behavior of price relations almost wholly under the influence of "full storage expenses." Chart 3 (p. 90) shows the chief price relations daily throughout this period, all prices being plotted as discounts under the price of the May future. Prices are as of the close on each business day. The cash prices are mainly for wheat just placed in storage, which over much of the period sold at prices above those of wheat which, because longer in store, was subject to larger storage charges to be paid by the buyer. They are shown on the chart as a discontinuous series of lines, breaks being introduced at the point of each significant change in dating of the storage receipts for the wheat quoted. The range of dates is indicated in connection with each such line by number of the days of the month, usually without explicit statement of the month.

Explanation of the price relations appearing in this chart may best proceed from the latest dates back toward the earlier; and deal first with the prices of futures. On the last day of April the expiring future closed at a price $\frac{1}{2}$ cent under that of the May future because receipts tendered on those contracts could be made eligible for delivery on May contracts only by payment of $\frac{1}{2}$ cent per bushel for an additional ten days of storage. Although they would carry five days' "free" storage when delivered on April 30, they would on May 1 carry only four days' "free" storage. The storage to be paid by purchasers accepting delivery on April contracts at any time from April 21 and carrying for delivery on the May future was the same as on April 30, but there were involved also costs of interest and insurance that caused the April future to sell

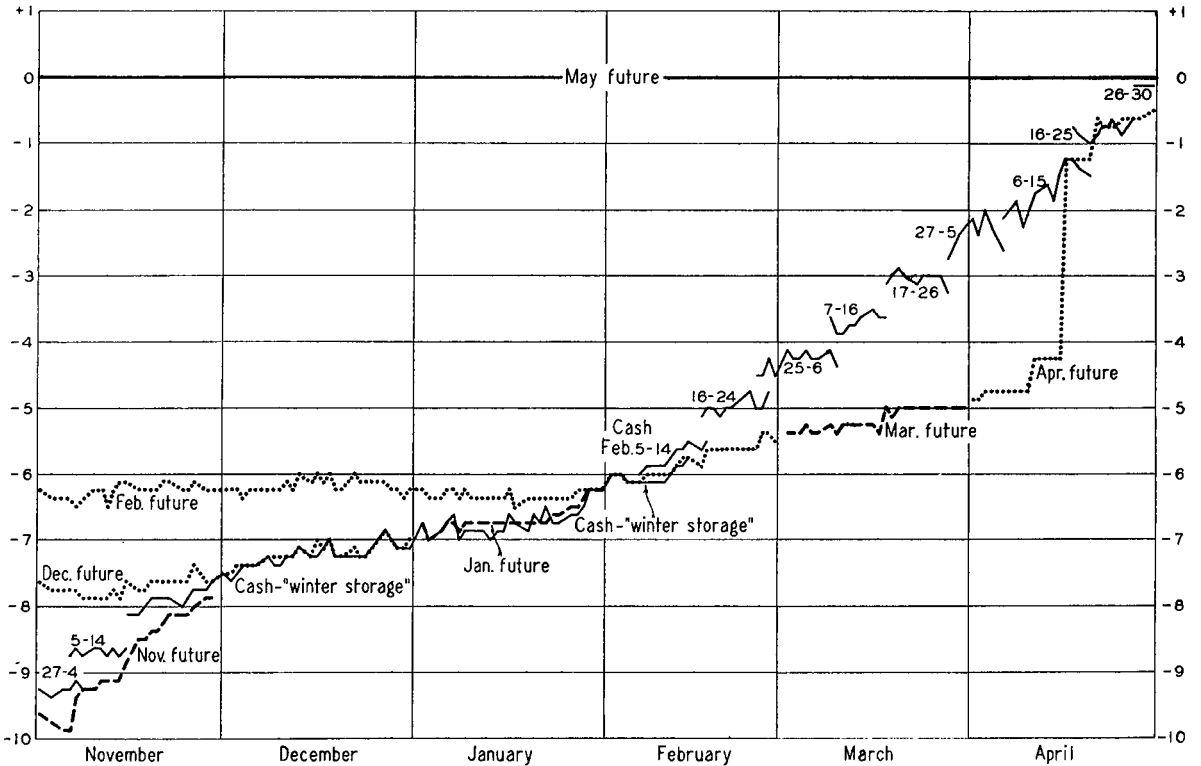
as much as $\frac{3}{4}$ cent under the May during April 21-30.

Wheat delivered on the future as early as April 20 would require payment of storage for two 10-day periods—1 cent—to carry into May with five days or more left to run, as was necessary if the receipts were to be delivered

represented a difference of $2\frac{3}{4}$ cents in value to the purchaser. Receipts tendered on April 15 were on the "winter storage" basis, requiring the purchaser to pay all accumulated storage, which might not exceed 4 cents per bushel and could be counted on to equal that amount; receipts tendered on April 16 were required

CHART 3.—DISCOUNT OF BASIC CASH WHEAT AND OF CERTAIN FUTURES, UNDER THE MAY FUTURES, DAILY, NOVEMBER 1884 TO APRIL 1885*

(Cents per bushel)



* Data compiled from the Chicago Daily Trade Bulletin.

on May contracts. There was accordingly a difference of about $\frac{1}{2}$ cent between the price of the April future on the 20th of the month and the price on the 21st and later. (We use the word "price" here and often elsewhere in the present discussion to signify "price relation to the May future," or in reference to an absolute price change or difference that presumably would have been observed if the price of the May future had not changed.)

Between the 15th and 16th of April the price of the April future jumped 3 cents, almost wholly in consequence of the change from "winter storage" to "summer storage," which

to be on the "summer storage" basis, calling for payment by the purchaser of only the $\frac{1}{4}$ -cent "first storage." To carry forward for delivery on May contracts wheat accepted on either the 15th or 16th would involve a further payment of 1 cent for additional storage.

Between the 10th and 11th of April the price of the April future rose $\frac{1}{2}$ cent, relative to the May, owing again to a change in cost of carrying wheat forward for delivery on May contracts. "Winter storage" receipts, although entitling the holder to keep the wheat in store through April 15, were eligible for delivery on futures contracts during April 11-20 only

on payment by the seller of $\frac{1}{2}$ cent additional storage to meet the requirement that the receipts delivered carry at least five days' "free storage." A purchaser likewise, if he carried the grain forward for delivery May 1, would incur storage charges $\frac{1}{2}$ cent greater on wheat delivered to him April 10 or earlier than on wheat delivered April 11-20.

Storage charges to be paid by a person accepting delivery of grain on futures contracts and for storing it to May 1 and delivering on receipts carrying five days' "free storage" were, in 1884-85, the same for grain that was tendered on futures contracts at any time from December 1 to April 10, inclusive. These charges totaled $4\frac{1}{4}$ cents.¹ During April 3-10 the expiring wheat future sold at $4\frac{3}{4}$ cents under the May future, reflecting a carrying charge $\frac{1}{2}$ cent in excess of the bare storage charges for carrying into May. During early December the expiring future sold at $7\frac{1}{2}$ - $7\frac{3}{8}$ cents under the May, reflecting a carrying charge of $3\frac{1}{8}$ - $3\frac{1}{4}$ cents in excess of the storage charges. The excess in each case reflects costs of carrying wheat, in addition to storage charges, accumulating at a rate of 1 cent per 45-50 days.

The relation of *cash prices* to the May future during March and April 1885 shows considerable irregularity. At times milling and shipping demand for the limited fresh supplies led to the payment of prices sometimes as much as half a cent over what the wheat would have been worth for storage to carry into May. At other times, when there was little demand except for storage, the only

¹ Comprised of 4 cents due on winter storage receipts (only those that had accumulated maximum storage would be delivered), plus $1\frac{1}{2}$ cents storage from April 10 into May, less $1\frac{1}{4}$ cents paid by the purchaser receiving the grain in May.

² In the contemporary market reports there were no references to receipts dated April 26 because that was a Sunday. Had any receipts been issued on the 26th, however, they would have been eligible for delivery as stated. To avoid compelling the reader to give attention to the dates on which Sundays and holidays fell in order to understand irregularities in dating, we have given dates in logical sequence even when they fell on a Sunday or a holiday.

³ They would of course have 14 days to run from May 1. Had the final day of "winter storage" been April 16 instead of April 15, it would have been necessary to pay additional storage for only two 10-day periods.

quotable prices were on car lots sold at some price disadvantage owing to difficulty in making up the "round lots" (5,000 bushels) wanted for storage receipts to be used in making deliveries on futures contracts. These conditions resulted in fluctuations of cash prices around levels dependent upon a prevailing tendency for the price of cash wheat to be determined by its value for storage into May, or later. It is this prevailing tendency which deserves chief notice here.

Cash wheat placed in store on receipts dated April 26-30 sold at approximately the price of the May future because the receipts were eligible for delivery on May contracts as much as five days later (May 1-5) without payment of storage by the person making delivery.² On receipts dated April 16-25, storage charges of $\frac{1}{2}$ cent had to be paid by the seller tendering them on May contracts. The cash price was $\frac{3}{4}$ cent to 1 cent under that of May wheat. On receipts dated April 6-15, storage charges of 1 cent had to be paid by the seller tendering them on May contracts, since storage had to be paid for two 10-day periods. They sold through a range of $1\frac{1}{4}$ - $2\frac{1}{4}$ cents under May wheat, just $\frac{1}{2}$ cent cheaper, when both were quoted on the same day, than receipts dated April 16 or later.

Skipping intermediate stages, we may pass directly to consideration of the prices of wheat on the first winter storage receipts for which it was important to note the dates, namely those of February 5-14. Wheat on receipts of these dates carried to May 1 would incur storage charges of $5\frac{1}{4}$ cents ($1\frac{1}{4}$ cents "first storage" plus additional storage for eight 10-day periods) and be deliverable on May contracts. Wheat on "winter storage" receipts carrying any earlier date (the earliest possible being November 15) would incur storage charges of $5\frac{1}{2}$ cents (4 cents "winter storage" plus additional storage for three 10-day periods) to carry to May 1 and still have at least five days to run.³

The "winter storage" rules provided that storage charges should accumulate at the rate of $\frac{1}{2}$ cent for each ten-day period until a total of 4 cents was reached, when further accumulation should cease; but so long as immediate consumption demand could be met by current

arrivals until April 16 at least, the effect was as though the regulations had read that beginning November 15 wheat might be stored without charge until February 5, when a charge of $\frac{1}{4}$ cent would be made, followed by an additional charge of $\frac{1}{2}$ cent on each tenth succeeding day. So long as the price paid for wheat was dependent on calculations involving the assumption that it would be carried through the whole winter storage period, the price of cash wheat tended to rise relative to the May future between November 15 and February 4 only in consequence of expenses of carrying other than storage charges.

During November 1884 relations between prices of cash wheat and of the November and December futures were largely under the influence of regulations governing transfer of wheat to the "winter storage" basis. Wheat placed in store on November 15 and later was of course on "winter storage" receipts, and its discount under the price of December wheat reflected primarily costs of interest and insurance to December 1. Wheat placed in store on receipts dated November 5-14 inclusive sold at an additional discount of $\frac{1}{2}$ cent because payment of ten days' storage was necessary before it could be entered on the "winter storage" basis. For wheat on receipts dated October 27-November 4, payment for two 10-day periods was necessary. The November future sold below the price of cash wheat because wheat delivered on futures contracts was transferable to the "winter storage" basis only on November 17 and later, and then at a cost of $\frac{1}{2}$ cent. The price of the November future consequently ran about $\frac{1}{2}$ cent under that of cash wheat, with sharp increases in level two days later than those in cash wheat.

Price relations in 1887-88.—Several features of price relationships during November-April of 1887-88 differed from those in 1884-85 and throw additional light on tendencies in cash-future price relations, especially tendencies under "winter storage" regulations, which were in effect during this season for the last time. The differences, as compared with 1884-85, were chiefly a consequence of relatively lighter supplies of cash wheat. The data appear graphically in Chart 4.

The cash quotations shown in Chart 4 differ

slightly from those shown in Chart 3. Corresponding differences in their designations on the charts require explanation. During the period covered in Chart 3, cash wheat quotations were uniformly accompanied by statement of the range of dates within which the receipts fell. The cash price series was in a sense truly discontinuous, as suggested by the breaks in the price curve. During the period covered by Chart 4, however, the distinctions made were in this form only as regards receipts of February 13-15. Otherwise the only date distinction made among the quotations here used was between "winter storage" receipts and "gilt edge" receipts. The latter were receipts dated not more than three days prior to the time of sale.¹ The curve representing prices of cash wheat on "gilt edge" receipts has nevertheless been interrupted at each date on which a change in cost of storage into May might have been expected to result in an upward step in the price of newly arrived wheat.

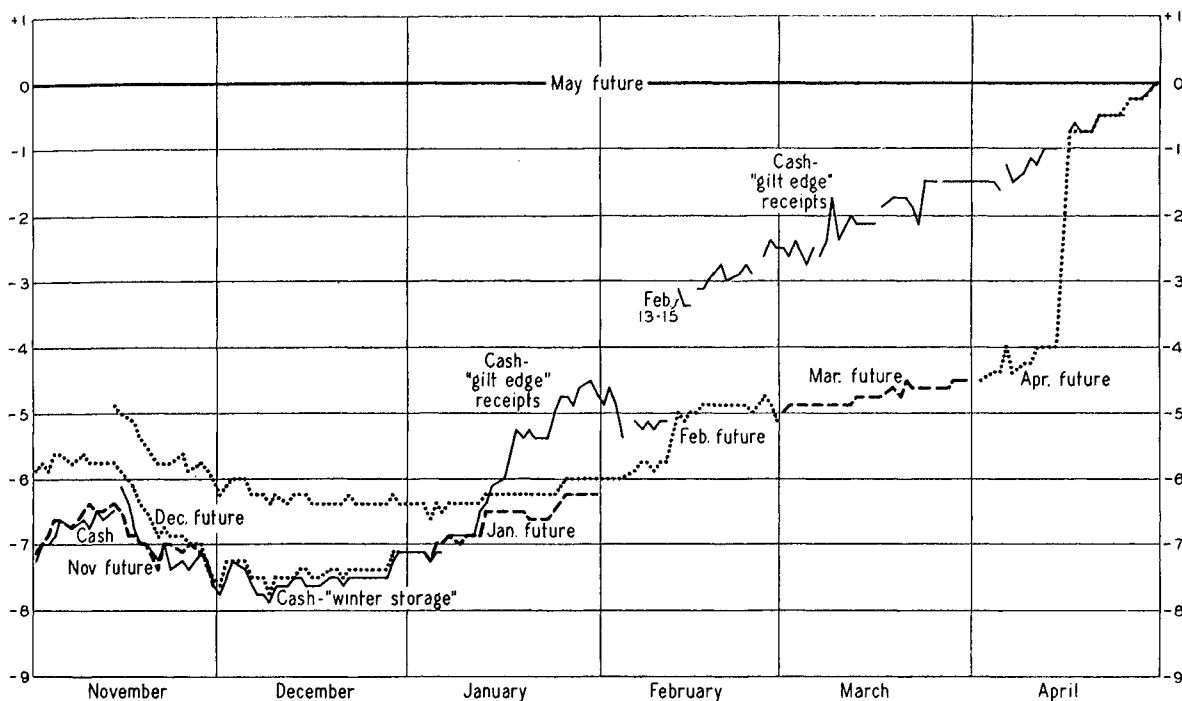
Among the price relations shown in Chart 4, noteworthy features appear in November in the form of cash prices above a level that would have covered full storage expenses into May; and prices of the November future on a par with prices of fresh receipts of cash wheat. During most of November stocks of cash wheat of the effective deliverable grade (No. 2 Spring) were steadily declining. The November future was being bought, with intent of obtaining delivery, in such volume as to maintain its price on a par with that of cash wheat or above, instead of $\frac{1}{2}$ -1 cent below, as in November 1884. Cash wheat was at a discount under the December future approximating the full storage expense, but both were at discounts under the May future approximating full storage expenses only through the "winter storage" period rather than into May. During the latter part of November and early De-

¹ The following explanation is quoted from the *Chicago Daily Trade Bulletin* of April 13, 1888: "There are three terms applied to receipts: 'GILT EDGE,' those but three days old, having consequently seven days to draw from elevator on first storage of $\frac{3}{4}$ c per bu. 'REGULAR,' those five days old and having five days to run on current storage. 'SHORT RECEIPTS,' those having less than five days to run before additional storage accrues. Most of the receipts are sold 'GILT EDGE,' being most desirable on account of having longest time to run without additional storage."

ember, under the influence of more liberal receipts of wheat, prices of cash wheat and of the nearer futures declined relative to the May to discounts approximating full storage expenses into May.

storage charges. During January 14-23, "gilt edge" receipts, on which storage charges amounted to only $\frac{3}{4}$ cent for "first storage," might in theory have commanded a premium of $2\frac{1}{2}$ cents per bushel over wheat that had

CHART 4.—DISCOUNT OF BASIC CASH WHEAT AND OF CERTAIN FUTURES, UNDER THE MAY FUTURES, DAILY, NOVEMBER 1887 TO APRIL 1888*
(Cents per bushel)



* Data compiled from the Chicago Daily Trade Bulletin.

Just before the middle of January prices of cash wheat began to strengthen relative to prices of all the futures. Arrivals of wheat in Chicago, already light, were further curtailed by severe snowstorms, and it became necessary to withdraw wheat from storage to meet current requirements. For purposes of storage into May, newly arrived wheat would, until January 27,¹ have been worth only as much as wheat placed in store at any earlier date. But for purposes of immediate consumption or shipment, newly arrived wheat had an advantage over wheat that had accumulated

gone into "winter storage" on November 15 and had therefore accumulated storage charges of $3\frac{1}{4}$ cents by January 14.

By February 7 the price of wheat on "gilt edge" receipts had fallen back again to a discount under the May future approximating the full storage expense. During February 7-11 it sold at $\frac{1}{2}$ - $\frac{5}{8}$ cent over the February future as against a premium of $\frac{3}{4}$ cent that might have been expected on the basis of comparative costs of carrying into May.

On February 13 there was announced an apparently quite unexpected reduction of "additional" storage rates from $\frac{1}{2}$ cent for each ten days to $\frac{1}{4}$ cent. On the reduced rates a buyer of wheat on receipts dated February 13-15 could carry it into May and deliver on futures contracts at a net charge for storage

¹ A reduction of the "first storage" charge from $1\frac{1}{4}$ cents, as it was prior to 1886, to $\frac{3}{4}$ cent had resulted in advancing by ten days the date on which newly arrived wheat might have been expected to command a premium over wheat that had been in store for some time.

of 2 cents as against a net charge of 4 cents that would have been incurred under the old rates.¹ The price of cash wheat promptly rose 2 cents relative to the May future. On the reduced rates a buyer receiving wheat on futures contracts delivered February 13 could carry it into May and tender it on May contracts at a net charge for storage of 4 cents, as against a net charge of $4\frac{3}{4}$ cents that would have been incurred under the old rates.² The price of the February future promptly rose $\frac{5}{8}$ cent relative to the May future.

With storage charges reduced to $\frac{1}{4}$ cent per ten-day period, after the first ten days, the "steps" in the price of the April future on April 11 and 21 were less conspicuous than they had been in 1884-85, and that future closed its delivery month at a discount of $\frac{1}{4}$ cent rather than $\frac{1}{2}$ cent under the May. The steps in the price of cash wheat on April 26 and each tenth previous day were so small as to be doubtfully distinguishable from fluctuations not associated with changes in storage cost.³

Under the new rates there ceased to be much point in maintaining the "winter storage" plan

¹ The "first storage," paid by the person accepting delivery on the May contract, would have carried the wheat to February 23-25, depending on the date of the receipt. Additional payments for eight 10-day periods would have been necessary on the part of the person carrying the wheat and making delivery.

² Supposing that the receipts selected for delivery in February would have been dated December 27 or earlier and therefore even with the reduction in rates could not be carried into May and delivered (with five days still to run on the receipts) for less than the maximum winter storage charge of 4 cents, plus storage for three additional 10-day periods, less $\frac{3}{4}$ cent credit for first storage. The reduction in storage rates affected only the cost for the last thirty days of storage.

³ The date of the "gilt edge" receipt for wheat sold on April 26 might have been any day from April 23-26, and only those dated the 26th should have shown a price advantage owing to a smaller charge for storage into May. A similar comment applies to earlier dates at ten-day intervals. On the assumption that the "gilt edge" receipts quoted would have been three days old (the maximum), the price "steps" might be expected on April 29 and on each tenth previous day. The breaks in the price curve as shown in Chart 4 have been dated on the other extreme assumption: that the receipts quoted bore the date of sale. The observed price behavior, the absence of quotations by date of receipts, and the evident active demand for fresh arrivals of wheat for current use rather than storage make this assumption appear the most reasonable.

after the end of the season of 1886-87, since grain placed in store at the beginning of the "winter storage" period on November 15 could be carried into May on regular "summer storage" rates as cheaply as it could be carried with benefit of the "winter storage" provision that charges to April 15 should not exceed 4 cents. The provisions for carrying wheat on the "winter storage" basis—a source of real inconvenience from the differences in value of wheat on receipts of different dates—were abolished before the beginning of another "winter storage" season. On December 26, 1889, increased storage rates were announced, to become effective on the following January 1, with provision for "winter storage" at a maximum of 4 cents from December 1 to May 1, but application of the new rates was successfully resisted.

Among the reasons for choosing for detailed discussion cash-future price relationships in the two periods analyzed above is the fact that during these periods the influence of the element of storage cost was subject to peculiarly accurate appraisal. In consequence it is possible from the price record for these periods to judge rather closely the extent to which the cash-future relations were under the influence of costs of storage and the extent to which they were under the influence of other factors. The possibility of close determination of effective storage costs depended in large part on the fact that a substantial portion of the storage stocks was in the hands of people actually paying the commercial storage rates. When, as in many later years, the situation was one in which storage stocks were commonly held mainly or wholly by people whose costs for storage cannot be determined in this simple manner, if at all, the segregation of influences of different factors on cash-future price relations presents much greater difficulty. The features revealed by detailed examination of price relations in these two periods must not be considered generally representative except as regards the character of the main influences effective in determining cash discounts. As such, they provide a useful background for consideration of general tendencies revealed in the full record of cash-future price relations from 1883.

SEASONAL AND RELATED TENDENCIES IN
CASH-FUTURE PRICE RELATIONS

Relations between prices of cash wheat and of futures fall in two categories which in typical examples differ sharply. Although instances are to be observed in which the relation is difficult to classify as between the two categories, the general distinction between them is useful. The two types of relation may be designated conveniently as "discount relations" and "premium relations."

The "discount relation" is that typically observed between cash wheat and old-crop futures, in which the price of basic cash wheat is below that of a future by an amount equal to the effective cost of carrying wheat to the beginning of the delivery month. This effective cost, as noted above, may be the "full storage expense"; it may be somewhat in excess of the "full storage expense"; or it may be considerably less than the "full storage expense." The effective cost of carrying wheat into the delivery month may be negligibly small; and it may logically be calculated as a negative quantity. When the effective cost of carrying wheat is negative, however, the price of basic cash wheat stands above that of the future, and the relation is better classed as a "premium relation," even though it occurs with respect to an old-crop future.

The "premium relation," often observed between the prices of cash wheat and of a future calling for delivery after the next harvest, is that in which the price of basic cash wheat stands at a premium over the future. It is usually much more complex in character than a discount relation. The general nature of premium relations is indicated by the premiums shown for cash wheat over the July and September futures, under hypothetical conditions, in Chart 2 (p. 85). Broadly, the premium is a reflection of relative scarcity of cash wheat prior to arrivals of new-crop supplies. But while the premium itself is in large part a reflection of scarcity, its general upward tendency into May or later (to June 30, according to the hypotheses of Chart 2) is in no proper sense a measure of *increase in scarcity* of cash wheat; rather, it is a measure of effective costs of carrying wheat.

The scarcity factor in cash premiums up to the first of May is ordinarily better measured in terms of premiums of the May future over new-crop futures rather than in terms of the cash premiums themselves, for this inter-option relation supplies a measure whose changes from week to week are unaffected by carrying costs. Price relations between the May and new-crop futures at Chicago have been treated at length in a recent issue of *WHEAT STUDIES*, and little more is necessary here than to note that the inter-option relations there discussed provide the chief basis for interpretation of relations between prices of cash wheat and those of new-crop futures.¹ One conclusion thus indicated, however, is worthy of special notice here. It is incorrect to suppose that the relation of the prices of new-crop futures to the price of cash wheat is affected in any great degree by expectations regarding the size of the new crop. If the new crop is expected to be large and to result, therefore, in low prices, prices of the old-crop May future and of cash wheat are depressed by this expectation quite as much as the prices of new-crop futures. The premium of cash wheat over new-crop futures depends directly on appraisals of the shortage of old-crop supplies, and on such other pertinent facts as prospects for a corner or squeeze, rather than upon separate appraisals of the effect of one group of influences bearing on cash prices and of the effect of a mainly independent group of influences bearing on the price of new-crop futures.

Although the typical relation between prices of cash wheat and of futures is that of a cash premium, cash discounts have occurred frequently even with reference to new-crop futures. This gives special pertinence to the comment, made earlier, that there exists no clear and sharp line of demarcation between the two types of relationship which we have designated respectively as discount relations and premium relations. Discounts are of course sharply distinguishable, arithmetically, from premiums; but between the conditions characteristic of a situation in which cash

¹ See "Price Relations between May and New-Crop Wheat Futures at Chicago since 1885," *WHEAT STUDIES*, February 1933, X, 183-228.

wheat stands at a discount equal to the "full carrying expense" and the conditions characteristic of a situation in which cash wheat stands at high premiums, lie an unlimited number of possible intermediate conditions along a scale marked by no sharp transition at the point where discounts give way to premiums, or at any other point. Moreover, a single factor—volume of supplies of old-crop wheat—is a major determinant of the size of either discounts or premiums. The distinction between discount relations and premium relations is nevertheless worthy of emphasis because of the important contrast between the economic considerations that dominate in typical examples of the two types of relations. In one, volume of supplies of old-crop wheat has its effect chiefly through its bearing on the effective cost of storage; in the other, cost of storage is of little importance—volume of supplies has its effect chiefly as a determinant of the degree of economy that must be effected in utilization of existing supplies and of the extent to which supplies for immediate consumption must be drawn from stocks that, under the influence of custom, inertia, caution, or expectation of higher prices, tend to be held in reserve.

The seasonal cycle.—The prevalent concept of seasonal tendencies in the movement of cash wheat prices is so inadequate, in its simple form, as to be definitely misleading. Any true seasonal tendency in cash wheat prices, however obscured in actual total price movements by other influences bearing on the price, should appear clearly in the movements of cash wheat prices relative to futures. Most discussions of the seasonal tendencies of cash wheat prices would lead one to expect a repetition, year after year, of changes in cash-future price relations following broadly the pattern illustrated in Chart 2 (p. 85). If this expectation were realized in fact, the curve corresponding to cash prices in Sections A of Plates I–III would exhibit a saw-tooth appearance, with a point and a notch for each year. Regularity of the "teeth" should not be expected, for under the influence of varying size of the harvests the inter-seasonal price decline must sometimes be large and sometimes small. But conventional reasoning with re-

spect to the seasonal tendencies of cash wheat prices leaves one scarcely prepared to observe such wide differences in size of the inter-seasonal price decline as appears in the curves of cash prices plotted in relation to the futures in Plates I–III, and quite unprepared to find the inter-seasonal price decline so often absent.

During the six years 1883–88 there was only one example of an inter-seasonal price decline. That was the abnormal one of 1887, when in June cash prices declined sharply relative to more distant futures with the collapse of the "Kershaw corner." In the absence of this corner, cash wheat would probably not have gone to a premium over the futures. Inter-seasonal price declines again failed to make their appearance in any of the four years 1893–96, or in the three years 1899–1901. Beginning with 1902 there came a period in which cash prices exhibited a tendency toward recurrence of the seasonal cycle with considerable regularity. During the sixteen years 1902–17 the inter-seasonal decline was wanting only in 1907, 1913, and 1916.

The upward phase of the seasonal cycle, however—the rise of cash prices relative to futures during the main part of the season—became less regular in the period 1902–17 than it had been prior to 1902. In several years it was weak or distorted, and in 1904–05 and 1909–10 was virtually absent.

The behavior of cash-future price relations during the first eight years after resumption of trading in wheat futures late in 1920 was broadly similar to their behavior during 1902–17. In 1928, however, there began another extended period in which there was no inter-seasonal price decline except that of 1931, which was a consequence of abandonment of price "stabilization" by the Federal Farm Board. Whether or not this new period of absence of inter-seasonal price declines will end with 1935 remains to be seen.

These observations gain significance when interpreted in the light of related facts. The occurrence of an inter-seasonal decline in the price of cash wheat relative to futures is dependent upon shortage of supplies of wheat for carryover at the end of the crop year. When the carryover is large, prices of new-crop futures stand at premiums over prices

of old-crop futures and of cash wheat, and the price of cash wheat continues steadily upward, relative to the futures, instead of exhibiting an inter-seasonal decline.¹

The concept of the seasonal cycle in cash wheat prices involves the assumption of annual alternation between moderate seasonal surplus and moderate seasonal deficiency. When the adjustment between supplies and consumption is moderately close, these conditions are satisfied and wheat prices exhibit a seasonal movement closely resembling the ideal seasonal cycle. In such "normal" cycles, however, the rate of advance during the upward phase of the cycle is rarely sufficient to cover the "full storage expense." The close adjustment between supplies and normal consumption which is requisite for appearance of the seasonal cycle in this ideal form is historically exceptional, rather than typical.

More commonly, supplies are either above or below the level of moderately close adjustment. When they are above such a level, the seasonal cycle is wholly suppressed. In its place there occurs a persistent upward trend of cash prices relative to futures. When supplies of wheat are conspicuously short, the upward phase of the seasonal cycle may be suppressed, but usually it remains in evidence. The inter-seasonal adjustment of cash prices relative to futures, following such shortage, has no quantitative relation, however, to the antecedent upward phase of the seasonal cycle, and little causal relation. It is an expression of the severity of the shortage of supplies during the season just closing.

What we have called the seasonal cycle in cash wheat prices, then, is in no sense a reflection of a uniform seasonal tendency. It reflects influences that vary greatly in force and even in direction from year to year. Nor is it, in the main, truly cyclical in the sense that movement in one direction tends to be followed by causally related movement in the opposite direction. It is a reflection of a cer-

tain tendency, by no means regular, for annual alternation in the effectiveness of two oppositely directed sets of forces. One is connected with the fact of surplus, is associated with an upward movement of cash prices relative to futures, and tends most regularly to operate during the interval between harvests. But it often operates uninterruptedly over periods of several years. The other set of forces operates only in a period about the time of harvest, and then only if there is no excessive carryover. It may include a tendency for reaction from an antecedent rise of cash prices relative to futures. Commonly it involves chiefly reaction from a condition of shortage that raised futures prices quite as much as cash prices. The principal inter-seasonal declines of cash prices relative to futures are associated, therefore, with conditions that either have no relation to the antecedent advance of cash prices relative to futures or have had a retarding influence on it.

TECHNICAL NOTES

In comparisons between prices of cash wheat and of different futures in the same markets it is often desirable to take account of features of the data the price significance of which is too small to warrant notice in examining the general price movement of any one of the series separately. The following notes on such technical features of the price series here presented may be of little interest to the general reader or to casual students of the data, but deserve to be put on record for the use of close students seeking the explanation of particular price relations shown by the record.

The classes and grades of wheat eligible for delivery at different times since before 1882 are shown in Table IV, together with premiums or discounts, if any, at which each was deliverable. Table V provides a record of the class and grade of wheat represented on each date from January 1883 in the series of quotations on basic cash wheat prices. In the few cases in which the prices used were for a wheat deliverable at a premium or discount, its listing is accompanied by a figure in parentheses showing the number of cents added to the actual quotations or subtracted from them

¹ These conclusions follow from the necessary connection between tendencies in cash premiums (and discounts) and inter-option price relations, and the demonstrated connection between year-end carryover of wheat and price relations between May and new-crop wheat futures (fully discussed in *WHEAT STUDIES*, February 1934, X, 183-228).

to arrive at the basic cash price (premiums are subtracted, as indicated by a minus sign, discounts added).

A change in the list of classes and grades of wheat tenderable on futures contracts and/or in the premiums and discounts applying has always been accompanied by a period during which both the old and the new delivery provisions apply—the old on “old style” contracts, the new on “new style.” In all such cases both sets of futures quotations are given in Table I. In the one case (in 1886) in which a change in storage rates resulted in trading in both “old style” and “new style” futures, the difference between the two sets of prices was so nearly constant that only one set is tabulated. In the graphic presentation in Plates I–III it is impossible to show quotations for both “old style” and “new style” futures, when both were being traded, without unduly complicating the charts.

In the cash price series some discontinuity may occur at such a time of transition from one set of delivery provisions to another, or it may not. Compilation of two series of cash prices during the transition period has seemed unwarranted even where the two series would differ. The cash quotations used have, so far as possible, been those appropriate for comparison with the “style” of future in which trading was the more active. In Table I the cash quotations are shown in conjunction with that set of futures quotations with which they are most appropriately comparable. If they are equally comparable with both sets of futures quotations, the fact is emphasized by duplication of the cash price series during one month.

The following paragraphs, dealing with significant changes in the delivery provisions, give particular attention to their bearing on the prices of the futures and to the degree of the discontinuity, if any, which they introduced into the series of basic cash prices. In the preparation of most price series, maintenance of comparability of prices between different times is sought through the use of prices applying, as nearly as may be, to a commodity of the same characteristics throughout, as defined in physical terms. Internal comparability of Chicago futures prices, and of our Chicago

basic cash price series, is sought through definition of the commodity in terms of a rather wide range of physical characteristics, supplemented by application of an economic criterion. These prices apply always to that one of several different grades of wheat which can be delivered most cheaply on futures contracts. Application of this economic selection within a broad range of physical characteristics results in a price series which is probably more uniform and internally consistent from an economic standpoint than one based on a commodity definition running wholly in physical terms. Changes in delivery requirements have from time to time altered the range of physical characteristics to which the economic criterion has been applied. Broadly, these changes have been in the interests of adjusting the definition of contract wheat to new economic conditions, so as to maintain greater uniformity in the character, from an economic standpoint, of the wheat represented by the futures contracts. These, and certain other changes in the terms of the contract, have inevitably resulted at times in slight discontinuities in the price series. Only three of these changes have broken the continuity of the price series by more than a fraction of one cent per bushel.

In 1886 the reduction of charges for the first ten days' storage from $1\frac{1}{4}$ cents to $\frac{3}{4}$ cent, made effective July 1 on only a few days' notice, resulted in simultaneous trading in “old style” and “new style” futures for delivery in months as late as May 1887. However, only a few contracts for delivery in December 1886 and May 1887 had been made prior to the change in the storage charge, and subsequent trading in these “old style” contracts was negligible. Because the change in storage charge simply lowered by $\frac{1}{2}$ cent per bushel the amount which a purchaser had to pay in addition to the contract price, the difference in prices on “old style” and “new style” contracts was substantially constant at about $\frac{1}{2}$ cent. Instead of quoting prices on both “styles” of contracts beginning on July 1, the *Daily Trade Bulletin* generally quoted prices only on “new style” contracts and added the comment that prices on “old style” contracts were about $\frac{1}{2}$ cent lower. The reduc-

tion in the storage charge resulted also in a premium of about $\frac{1}{2}$ cent for cash wheat on receipts dated July 1 or later, as compared with receipts dated earlier; and in a corresponding change in relation of prices of cash wheat received after July 1 to prices of "old style" futures.

For the record in Table I, all the price series have been changed from the "old style" to the "new style" basis at the beginning of July 1886. Prices of "old style" July wheat through July and of "old style" September wheat through September may be obtained, if desired, simply by subtracting $\frac{1}{2}$ cent from the prices given. The graphic presentation in Plate I shows these prices, with a break in the price curves at July 1 to emphasize the transition from one "style" of quotations to the other. No break is shown in the curves representing cash-future price spreads, however, because spreads between corresponding quotations may be regarded as identical for the two "styles" of quotations.

In 1897 the substitution of No. 1 Northern Spring for No. 2 Spring in the list of deliverable grades occasioned simultaneous trading in "old style" and "new style" futures for the December delivery only. Trading in the "old style" December future never became very active. Until the middle of August, "new style" December sold at a premium of only about 1 cent over "old style"; but its premium had reached $2\frac{1}{2}$ cents before the middle of September, and held close to 3 cents through most of October. Later it went to much higher premiums (10–15 cents and more) in connection with the corner in December wheat, which was run in the "new style" delivery.

For the basic cash price series, quotations on No. 2 Spring wheat, corresponding to the "old style" contract, have been used through September 1897; and quotations on No. 1 Northern Spring wheat, corresponding to the "new style" contract, have been used subsequently. The effect of this change on the level of the cash price series is particularly difficult to judge. At the end of September the difference between the prices of the two grades of wheat was about 3 cents, corresponding to the difference between the prices of the two "styles" of futures. This difference, however,

resulted largely from the fact that concentration of trading in the "new style" future required accumulation of stocks of No. 1 Northern and reduction of the large accumulated stocks of No. 2 Spring, tending temporarily to increase the price spread between the two grades. The effect of this tendency was considerably increased by the operations, already in progress, which led up to the corner in the "new style" December contract. The normal commercial difference in values between No. 2 Spring and No. 1 Northern is probably best reflected in the 1-cent difference that prevailed between the prices of the two "styles" of December contract up to about the middle of August.

In 1903 the addition of No. 1 and No. 2 Hard Winter wheat to the list of deliverable grades, at a discount of 5 cents per bushel, resulted in simultaneous trading in "old style" and "new style" futures for the July, September, and December deliveries. No. 2 Hard Winter wheat at no time during the year fell to a commercial discount sufficient to warrant its delivery; the "new style" contract rarely sold at a discount of more than $\frac{1}{4}$ cent under the "old style" for the same delivery month and the two quotations were often identical. The basic cash prices under the two "styles" of contract were always the same.

In 1904 the reduction of the discount at which No. 1 and No. 2 Hard Winter wheats were deliverable, from 5 cents per bushel to 3 cents per bushel, resulted in simultaneous trading in "old style" and "new style" contracts for the July and September deliveries. During most of the period of simultaneous trading in the two "styles" of contract the "new" sold at a discount of 1–2 cents under the "old." During July, however, the discount of the "new style" July future ruled less than 1 cent under the "old style." Only a small amount of hard winter wheat was delivered, on the "new style" contracts. With the beginning of September, the "new style" contract fell to about its maximum possible discount of 3 cents under the "old style" and ruled at that discount throughout the month. Deliveries were chiefly of hard winter, which was tendered on "old style" as well as on "new style" contracts.

The shift from the "old style" to the "new style" basis for the cash wheat quotations would, if possible, have been made at the end of July, when the two bases of quotation would have given identical figures. At this time No. 2 Red Winter wheat was being tendered on both styles of contract and its price, without premium or discount, represented the cash price corresponding to both styles of contract. The spreads between "old style" and "new style" September futures indicate that at some time during August basic cash wheat quotations on the "new style" basis should have become the price of No. 2 Hard Winter wheat in store, plus 2 cents (the discount at which it was deliverable on such contracts), instead of the price of No. 2 Red Winter. The only available quotations on No. 2 Hard Winter wheat, however, were for fresh arrivals, which commanded a price several cents higher than could have been obtained for such No. 2 Hard Winter as would have been delivered on futures contracts. Absence of appropriate quotations on No. 2 Hard Winter wheat compelled retention of the basic cash wheat price series on the "old style" basis for Table I. It was shifted to the "new style" basis on October 1, by which time the cash price on the "old style" basis had risen to about 3 cents over the cash price on the "new style" basis. During October–December the quotations on No. 2 Hard Winter continued to be given only for fresh arrivals, but quotations were always available on an expiring "new style" future, the price of which was substantially equivalent to the desired price of No. 2 Hard Winter wheat in store, plus its 2-cent discount. With the beginning of January 1905 quotations on No. 2 Hard Winter wheat in store became available.

In 1908 elimination of the discount previously applicable on deliveries of No. 1 and No. 2 Hard Winter wheat occasioned simultaneous trading in "old style" and "new style" contracts for the December delivery only. The "old style" December future sold generally at 1 cent or less over the "new style" and was never very actively traded. The discount on "new style" December indicated expectation that No. 2 Hard would be delivered on the "new style" contracts and be worth slightly

less than the No. 2 Red expected to be tendered on the "old style" contracts. The available cash price quotations, however, showed No. 2 Hard as slightly the higher priced wheat except for a brief period during December when the price of the "new style" December future (reasonably to be regarded as equivalent to cash wheat during the delivery month under the existing circumstances) was above that of No. 2 Red Winter wheat. In these circumstances the best quotations for use to represent basic cash wheat under the terms of the "new style" contract (from September 1) are the quotations on No. 2 Red Winter wheat during September–December, or the quotations on the "new style" December future when, during the delivery month, they were below those for No. 2 Red.

An amendment adding No. 1 Velvet Chaff wheat to the list of deliverable grades was adopted on September 17, 1912, effective July 1, 1913. All contracts for the July 1913 and earlier deliveries were necessarily on the "old" basis and for the September 1913 and later deliveries on the "new" basis. Since cash price relations did not justify delivery of No. 1 Velvet Chaff at any time during 1913, the two styles of contract were effectively identical.

The numerous additions made to the list of deliverable grades in 1917 did not become practically effective as a basis for wheat futures contracts until trading was resumed after its suspension during the war. Beginning with July 1917, however, the new list has been utilized in determining which wheat would probably have been delivered and should accordingly be regarded as basic cash wheat for the purposes of the cash price series. Until 1919 the grade taken as basic was one included in both the new and the displaced lists.

In 1923 changes in grades eligible for delivery and in premiums were made, effective after the end of the last delivery month for which trading was in progress. Trading for July and earlier deliveries was entirely on the basis of the "old style" contracts and for September and later deliveries on the basis of the "new style" contracts. On either "style" of contract No. 2 Yellow Hard Winter wheat, deliverable at contract price, was to have been regarded as the basic cash wheat.

The change in delivery specifications that became effective in 1925 resulted in simultaneous trading in both "new style" and "old style" contracts for delivery in December 1925 and in May 1926. The difference between the two contracts that had chief significance prior to late May concerned the provision for delivery of No. 2 Northern Spring wheat. Under the "old style" contract it was deliverable at contract prices, but under the "new style" at a discount of 3 cents per bushel. The price spread between the two "styles" of contract rested in general upon the interpretation that the "old style" contracts would in effect call for delivery of No. 2 Northern Spring, at the contract price; the "new style" contracts, for No. 1 Northern Spring. During October the price spread between the two "styles" of contract was approximately 1 cent. Thereafter, it ranged mostly between 1 and 2 cents until the end of May, when it exceeded 10 cents on a few days. These extreme differences reflected influences different from those that had earlier governed the price spread between the two styles of contract. They were conditioned by the fact that No. 3 Northern and No. 3 Dark Northern Spring wheat were not deliverable on "new style" contracts, but were deliverable on "old style," though at an 8-cent discount. Less than 60 thousand bushels of these two grades were in store in Chicago public elevators at the end of May, but enough of it was tendered on the "old style" contracts to relieve the squeeze in that contract as the squeeze in the "new style" contracts was not relieved.

Almost immediately upon the initiation of trading in the "new style" contracts in October 1925, they attracted a volume of trading far in excess of that in the "old style" contracts. This fact, primarily, recommends shift of the quotations for basic cash wheat from the "old style" to the "new style" basis at the beginning of October.

In the revision of delivery requirements in

1930, the elimination of provision for delivery of any wheats previously tenderable at a discount was of no immediate importance. The changes of current significance were the dropping of No. 1 and No. 2 Yellow Hard wheats from the list of deliverable grades and restriction of car-lot deliveries (permitted during the last three days of the delivery month) in such a way as substantially to limit them to country-run grain. The December 1930 and the March and May 1931 futures were traded in on both the "old style" and the "new style" bases. For all three delivery months trading centered chiefly in the "old style" contracts. These sold most of the time at a discount of about $\frac{1}{2}$ cent under the "new style" contracts, but for the May delivery sold after January mostly at larger discounts. The best available quotations for basic cash prices appear most directly related to the "old style" contracts through May, although they make no use after December of prices on No. 2 Yellow Hard Winter wheat, which was unquoted from January 1, 1931.

The limitations with regard to source of car-lot deliveries, which became effective in 1930 with the change in provisions for deliverable grades, were removed under a rule adopted January 7, 1931, effective on all contracts for delivery on and after August 1, 1931. Since trading in the September future had not started at the time the new rule affecting car-lot deliveries was passed, the change required no special designation of contracts as "old style" and "new style."

No. 1 and No. 2 Yellow Hard Winter wheats were restored to the list of deliverable grades in 1932, with consequent simultaneous trading in "old style" and "new style" contracts for July and September delivery. Trading was chiefly in the "old style" contracts at prices frequently the same as for "new style" contracts, although usually fractionally lower. The basic cash wheat series has been kept on the "old style" basis through September.

PLATE I. - PRICES OF BASIC CASH WHEAT AND OF FUTURES AT CHICAGO AND CASH-FUTURE SPREADS, WEEKLY, MAY 1883 - APRIL 1901

(Cents per bushel)

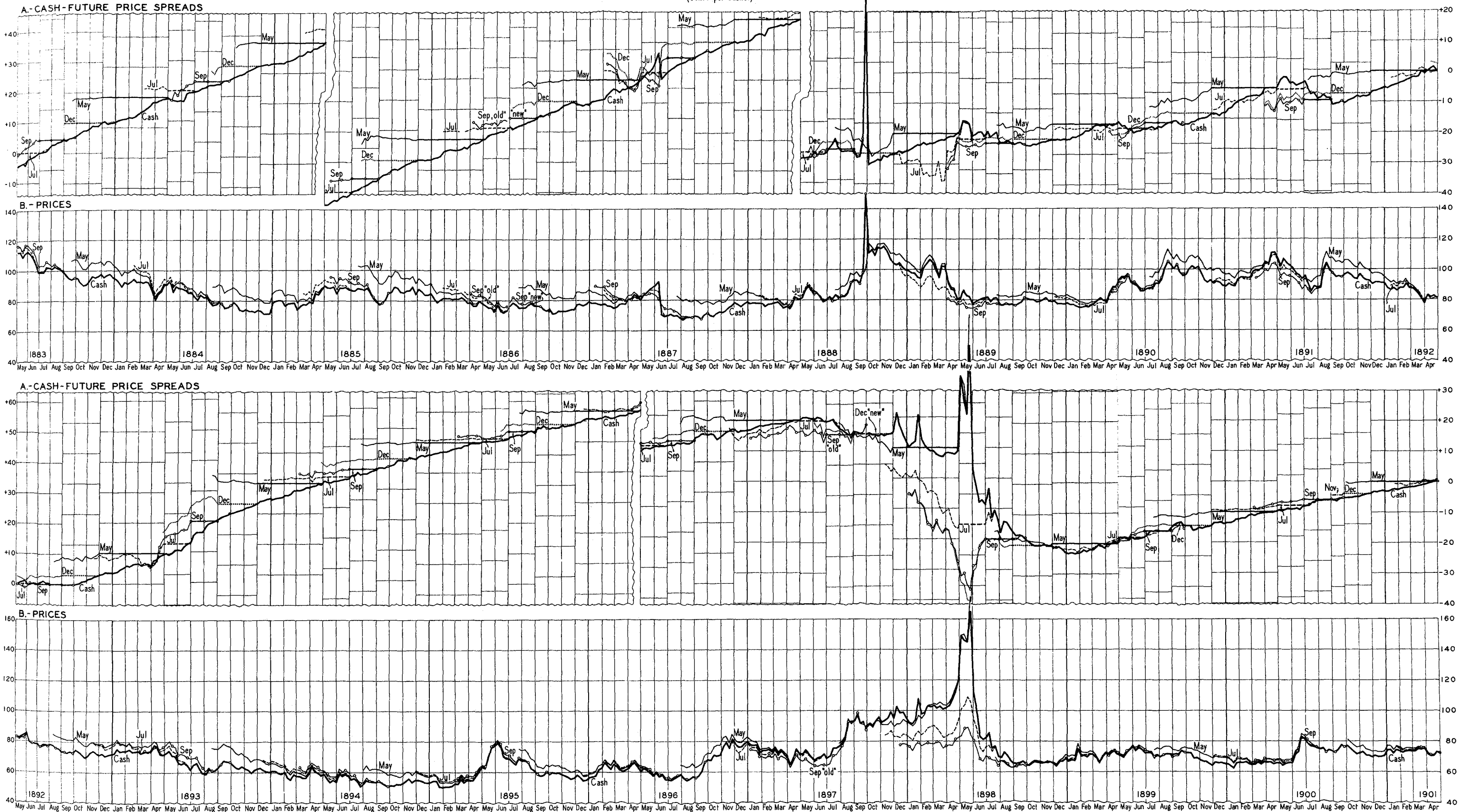


PLATE II.-PRICES OF BASIC CASH WHEAT AND OF FUTURES AT CHICAGO AND CASH-FUTURE SPREADS, WEEKLY, MAY 1901 - APRIL 1919

(Cents per bushel)

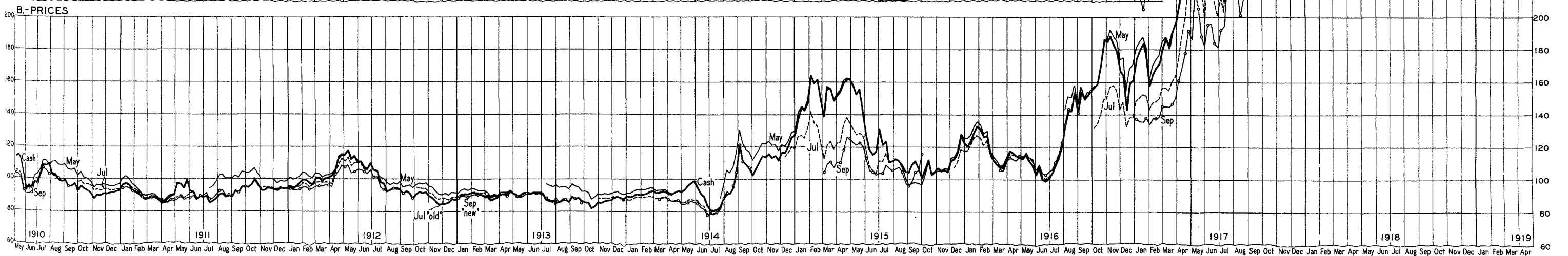
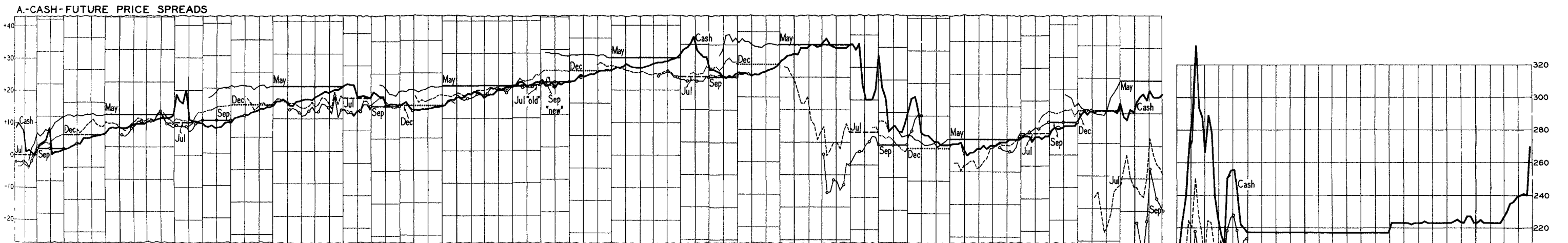
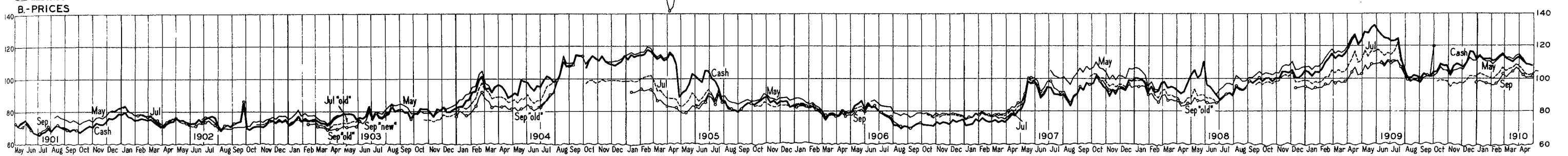
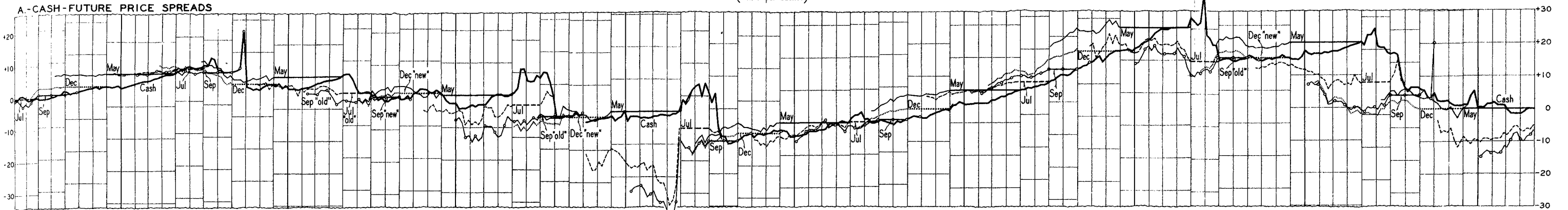
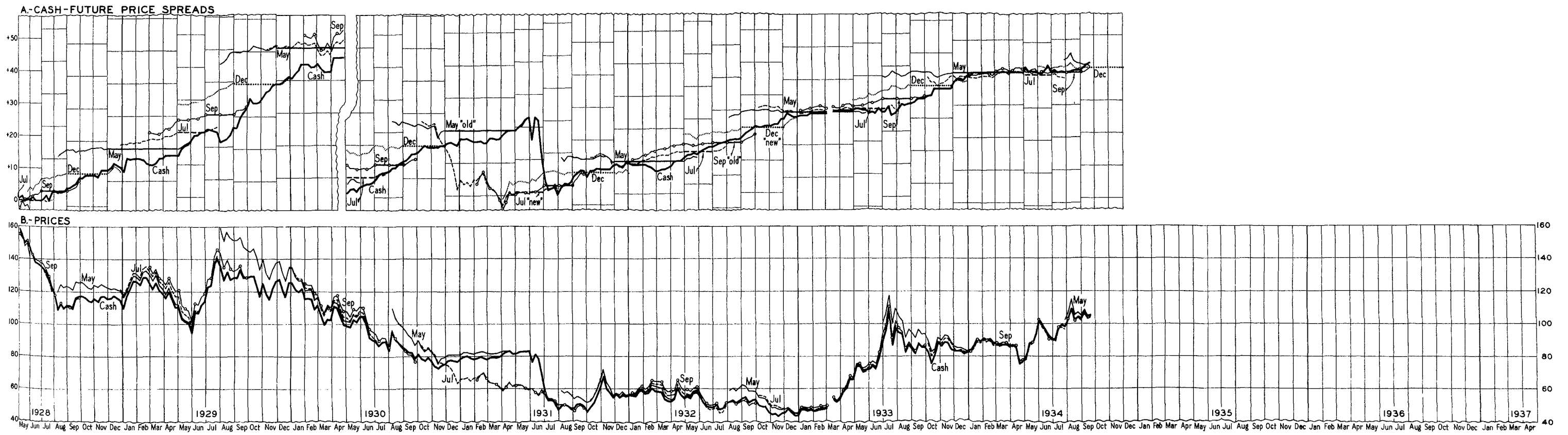
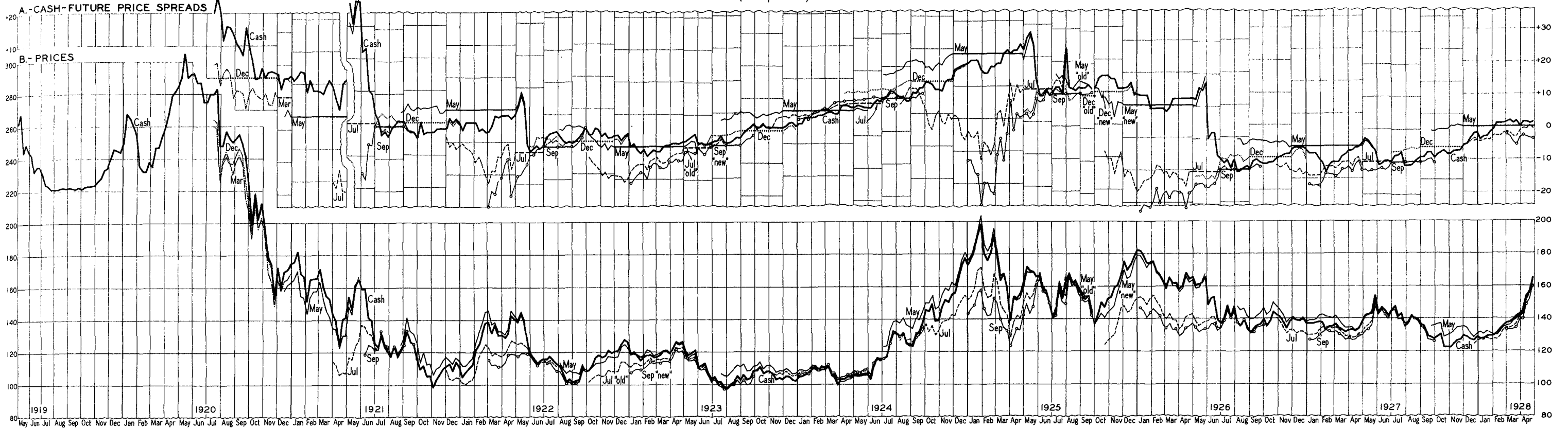


PLATE III.- PRICES OF BASIC CASH WHEAT AND OF FUTURES AT CHICAGO AND CASH - FUTURE SPREADS, WEEKLY, FROM MAY 1919

(Cents per bushel)



PRICES OF CASH WHEAT AND FUTURES AT CHICAGO

TABLE I (Continued)

Main table containing price data for cash wheat and futures from 1887 to 1890. Columns include Date, Futures (May, July, Sept., Dec.), Cash, and Spread. Data is presented in multiple columns for each year.

INTRA-OPTION SPREADS ON LAST TRADING DAY BEFORE BEGINNING OF NEARBY DELIVERY MONTH

Summary table showing intra-option spreads for futures contracts. Columns include Futures, 1887, 1888, 1889, and 1890. Rows include May-July, July-Sept., Sept.-Dec., and Dec.-May.

TABLE I (Continued)

1891						1892						1893						1894					
Date	Futures				Cash	Spread	Date	Futures				Cash	Spread	Date	Futures				Cash	Spread			
	May	July	Sept.	Dec.				May	July	Sept.	Dec.				May	July	Sept.	Dec.			May	July	Sept.	Dec.
Jan. 2...	96½	92¼	88½	-8	Jan. 2...	94%	88%	-6¼	Jan. 6...	78%	77%	72½	-6¾			
9...	97	93½	90%	-6%	9...	93	87½	-5½	13...	81%	80%	75%	-6			
16...	95%	91	89½	-6%	16...	91¼	89	86%	-5	20...	79%	78½	73%	-5¾			
23...	94	89%	88%	-5¼	23...	92¼	90¼	87%	-4¼	27...	78%	78%	74	-4%			
30...	97%	92%	93	-4%	30...	90¼	88½	86	-4¼	Feb. 3...	86	86	74	-4			
Feb. 6...	98%	95	94%	-4	Feb. 5...	91%	90½	87%	-3¾	10...	79%	79¼	75	-4¾			
13...	98%	93%	94%	-3½	13...	91¼	90¼	87%	-3%	17...	77%	76¼	73%	-3%			
20...	97%	93¼	94%	-3	20...	93¼	91%	90½	-3	24...	77	75½	73½	-3½			
27...	97¼	93	94%	-2%	27...	90¼	88%	87%	-2½	Mar. 3...	87%	77½	75%	...	74	-3½			
Mar. 6...	100%	96½	98¼	-2½	Mar. 5...	89%	88	87%	-2	10...	76½	72%	72½	-4			
13...	102	98½	99½	-2½	12...	87½	86½	85½	-2	17...	77½	74½	74	...	73%	-3¾			
20...	102	99½	99½	-2½	19...	85¼	85%	83½	-1¾	24...	77	73	73½	...	73½	-3½			
26...	102%	100%	97	...	100%	-2	26...	80%	81%	80%	-½	30...	78¼	73¼	73%	...	74¼	-4			
Apr. 3...	105	103%	99½	100¼	105	0	Apr. 2...	78½	79	77%	-¾	Apr. 7...	80%	76¼	76%	...	77¾	-2¾			
10...	103%	102%	98%	99½	103%	0	9...	82%	83%	82%	0	14...	79	76¼	76%	...	77	-2			
17...	110%	108%	103½	104½	110%	0	16...	80¼	80¼	79%	83¼	81¼	+1	21...	72	73%	73%	...	72	-¾			
24...	111%	107½	103½	103%	111%	0	23...	80%	80%	80%	83%	82¼	+1½	28...	71¾	74¼	76¼	78%	71¼	-½			
May 1...	107¼	106¼	101½	102%	107¼	+1	30...	81¼	81¼	81¼	83%	81¼	0	May 5...	72½	75%	78	80½	72½	-1			
8...	101%	98%	95¼	97%	101%	+3¼	May 7...	82%	82%	82%	85¼	82%	0	12...	74¼	77½	80½	84	74	-3¼			
15...	106%	102%	97%	99¼	106%	+4	14...	82¼	81%	81¼	83%	82¼	+½	19...	71¼	74¼	77½	81¼	71	-3¼			
22...	104	100	95%	97%	104	+4	21...	83%	83	82¼	84%	83%	+½	26...	70%	73	76¼	80%	70¾	-2½			
29...	102%	100%	95%	97½	102%	+2½	28...	84¼	83¼	82¼	84%	84¼	+1	June 2...	68¼	71¼	75%	78¼	66¼	-2			
June 5...	98¼	94¼	96¼	100%	98¼	+2%	June 4...	86	85¼	87%	85%	85%	-½	9...	67%	72%	76%	65%	62½	-2¼			
12...	96	95	95	97¼	97¼	+1¼	11...	79½	79%	82¼	79%	79%	-½	16...	67	71½	76%	66	66	-1			
19...	94½	90%	92%	96%	94½	+1%	18...	78½	78½	81	78%	+½	23...	65	69½	74¼	64%	61½	-¾				
26...	91%	80%	88%	93%	93%	+2	25...	78%	78%	80½	78%	+¾	30...	61½	69	74	61½	0					
July 2...	93%	89½	91¼	95%	93%	+6¼	July 2...	78%	78%	81	78½	0	July 7...	65	69¼	75	65	-4¾					
9...	93¼	90¼	86%	88½	90¼	+3%	9...	77	76¼	79%	77	+¾	14...	65%	69%	76%	65%	-3%					
17...	91%	85%	83%	86½	85%	+2	16...	77%	76%	79%	77%	+1	21...	62%	66%	72½	62%	-3¾					
24...	93%	88%	86%	88½	88%	+2%	23...	78¼	77%	80¼	78¼	+½	28...	59¼	63	70¼	59¼	-3¾					
31...	95¼	88	87¼	89%	88	+4	29...	77½	77	79%	77½	+½	Aug. 4...	60%	68¼	68¼	58¾	62	-2½				
Aug. 7...	95%	87	90	88%	90	+¾	Aug. 5...	78	80%	78	0	11...	63	70%	62	-1							
14...	105½	98	99%	99%	105½	+1%	12...	85¼	77½	80	77½	0	18...	76	61	68¼	60¼	-¾					
21...	111%	103½	105½	104	111%	+¾	19...	83%	75%	78%	75%	0	25...	75¼	60%	67%	60½	-½					
28...	107	99%	101%	101%	107	+¾	26...	83%	75¼	77%	75%	0	Sept. 1...	75¼	62%	67%	60½	-5					
Sept. 4...	107%	97½	101	97½	107%	-3½	Sept. 2...	82%	73%	76%	73%	-3¼	8...	76%	65¼	69%	65	-4%					
11...	105	94%	98¼	94%	105	-3½	9...	82	73%	76%	73%	-3¼	15...	79%	67%	72	67	-1¼					
18...	105½	95½	98%	95½	105½	-3½	16...	81¼	72%	75%	72%	-3	22...	78	67%	70%	67	-3¾					
25...	104	95	97½	95	104	-2½	23...	81½	73%	76%	73%	-3	29...	77¼	66%	69%	66½	-3%					
Oct. 2...	106	99%	96½	96½	106	-2½	30...	81	72%	75%	72%	-3¼	Oct. 6...	75%	67%	64%	64%	-2%					
9...	106¼	...	100¼	97%	106¼	-2½	Oct. 7...	83¼	...	77½	74½	-3	13...	72%	...	65%	62%	-2%					
16...	104½	...	98¼	96¼	104½	-2	14...	81¼	...	75%	73¼	-2½	20...	72	...	64%	62¼	-2%					
23...	102	...	95%	94	102	-1%	22...	78%	...	74	72	-2	27...	73%	...	66	64	-2					
30...	100%	...	94¼	93¼	100%	-1%	28...	77%	...	71½	69½	-2	Nov. 3...	71%	...	64	62½	-1½					
Nov. 6...	104%	...	97%	96%	104%	-1%	Nov. 4...	77%	...	71%	70½	-1¼	10...	70¼	...	63	61¾	-1¼					
13...	101%	...	94%	94¼	101%	-¾	11...	79%	...	74	73	-1	17...	67%	...	60%	59%	-¾					
20...	100%	...	93¼	92½	100%	-¾	18...	79%	79%	73%	74	+¾	24...	68½	...	61%	61½	-¾					
27...	99%	...	93	92½	99%	-¾	25...	79	78¼	72%	72½	+¾	Dec. 1...	68%	...	62¼	62¼	-5%					
Dec. 4...	97	...	90½	90½	97	-6½	Dec. 2...	78½	78	71%	71%	-7¼	8...	68%	...	62%	62%	-6¾					
11...	98	...	91½	91½	98	-6½	9...	78%	77%	72	72	-6%	15...	67½	68½	61%	61%	-5%					
18...	97½	...	91¼	91¼	97½	-6¼	16...	76%	75%	70¼	70½	-6¼	22...	65%	66%	60%	60½	-5%					
24...	96%	...	90%	90%	96%	-5%	23...	77%	75%	71%	71½	-6%	29...	65%	66½	60%	60%	-5					
30...	...	...	...	...	...	...	30...	78¼	76%	71%	71%	-6½						

INTER-OPTION SPREADS ON LAST TRADING DAY BEFORE BEGINNING OF NEARER DELIVERY MONTH

Futures	1891	1892	1893	1894
May July...	-¾	+¼	+3¼	+2½
July Sept...	-3½	-¼	+7½	+2½
Sept Dec...	+2¼	+3	+5¾	+3½
Dec May...	+7¼	+7¼	+6¾	+5¼

PRICES OF CASH WHEAT AND FUTURES AT CHICAGO

TABLE I (Continued)

Date	Futures				Cash	Spread	Date	Futures				Cash	Spread	Date	Futures				Cash	Spread
	May	July	Sept.	Dec.				1895	May	July	Sept.				Dec.	1896	May	July		
Jan. 4...	57½	58¼	...	...	58½	-4	Jan. 3...	59¼	59%	...	...	56%	-2½ ^m	Jan. 8...	81	76½	74%	...	77%	-3½ ^m
11...	58¼	58¼	...	...	54%	-3¾	10...	59¾	60¼	...	...	57½	-2½	15...	80	75%	74½	...	77½	-2½
18...	57¾	58¼	...	...	54¼	-3½	17...	60¼	60¾	...	...	57½	-2¾	22...	79¾	75%	74¼	...	77¾	-1%
25...	53¾	54½	...	...	50½	-3¼	24...	64¼	64¼	...	...	61¾	-2¼	29...	74¾	71%	70¼	...	73	-1¾
Feb. 1...	53¼	54	...	...	50	-3¼	31...	65	65	...	...	62¾	-2¼	Feb. 5...	75¾	71¾	70¼	...	74	-1¾
8...	53½	54½	...	...	50½	-3	Feb. 7...	68¼	67%	...	...	66¼	-2	11...	75½	71½	69%	...	74	-1½
15...	53¾	54¼	...	...	50½	-2¾	14...	66¼	65¾	...	...	64¼	-2	19...	75¾	73	71¼	...	74¾	-1¾
Mar. 1...	54¾	55¾	...	...	51	-2¾	21...	64%	64%	...	...	62¼	-2¾	26...	74¾	71½	69%	...	73½	-1
8...	54½	55½	56%	...	52%	-1¾	28...	67%	67%	...	...	65½	-2¼	Mar. 5...	76%	73%	72	...	75%	-1
15...	57½	58	58¾	...	55%	-1¾	Mar. 6...	65%	66¼	...	...	64	-1¾	12...	73	70¾	68%	...	72	-1
22...	54¾	55½	56%	...	53%	-1	13...	62½	63¼	...	...	61	-1½	19...	75	73	70%	...	74	-1
29...	55%	57½	58	...	54%	-1	20...	62½	62¾	...	...	60%	-1½	26...	72%	71%	69%	...	71½	-1
Apr. 5...	55%	56¾	57	...	54%	-½	27...	63%	63½	...	...	61%	-1½	Apr. 2...	71	70¼	68½	...	70¼	-¾
11...	54%	55%	57	...	54%	-¼	Apr. 2...	63½	64	...	...	62¾	-¾	9...	64%	64½	63¼	...	64½	-¾
19...	58½	59¼	60¼	...	57%	-¼	10...	65%	66%	66%	...	65½	-¾	15...	69%	69¼	67¼	...	69%	0
26...	61¼	62½	63¼	...	61	-¼	17...	66¾	67¾	68¼	...	66½	-¼	23...	75	74%	71	...	74%	-¼
May 3...	63¾	64%	64¾	...	63¾	-¾	24...	63%	65¼	65%	...	63%	-½	30...	72	71¾	68¾	...	72	0
10...	62¾	63¾	64	...	62%	-1	May 1...	60%	62¾	63½	...	60%	-½	May 7...	71½	70½	67¼	69	71½	+1
17...	69¼	70¼	70¼	...	69¾	-1	8...	62¾	63¼	64	...	62%	-¾	14...	74¾	73¼	68%	71¼	74%	+1¼
24...	76	77	77¼	...	76	-1	15...	61¼	62¼	63%	...	61½	-¾	21...	71¾	70%	68¼	67¾	71%	+1
31...	77%	78%	79	...	77%	-¾	22...	59%	60%	61¼	...	59%	-¾	28...	69%	68%	65¼	65%	69%	+¾
June 7...	...	80¼	81¼	...	79½	-¾	29...	57%	58%	60%	...	57¼	-¾	June 4...	...	67¾	64	65%	67½	+½
14...	...	77½	78%	80%	77	-½	June 5...	59%	60¼	61¾	...	59¼	-¾	11...	...	68%	63%	65	69%	+1¼
21...	...	70%	72%	74%	70½	-¾	12...	57½	58	59%	...	57½	0	18...	...	69	65	66¼	70	+1
28...	...	69½	71¾	74%	69¼	-¼	19...	58	58%	60½	...	58	0	25...	...	71%	64%	65%	71%	0
July 5...	...	68%	70%	72%	68%	-1¾	26...	55½	56¼	58½	...	55	-¼	July 2...	...	68¾	64¼	65%	68¾	+4½
12...	...	66¾	68¼	70%	66¾	-1½	July 3...	54%	56%	58½	...	54%	-1¼	9...	...	70%	66%	66%	70%	+4½
19...	...	65	66¼	68%	65½	-1½	10...	54%	55¾	57%	...	54¾	-1	16...	...	75½	70¼	70%	75½	+5
26...	75%	68%	69%	71%	68%	-1	17...	55%	57¼	59¼	...	55%	-1¾	23...	...	75¼	71¼	71½	75¼	+4
Aug. 2...	74½	...	68½	70%	67½	-1	24...	57½	57¾	59%	...	57½	-¾	30...	...	76%	74½	74%	76¼	+2¼
9...	75%	...	68%	70%	67%	-¾	31...	64%	58%	58%	...	61	58%	-¾	Aug. 6...	...	77½	77¼	79¼	+2
16...	73	...	66½	68%	66½	0	Aug. 7...	64	56%	59¼	...	55¾	-¾	13...	...	...	81½	79%	82½	+1
23...	69¼	...	62½	64%	62%	+¼	14...	63	55	58¾	...	54¼	-¾	20...	...	...	93	91¼	93	0
30...	68	...	61¾	63½	61%	-¼	21...	63%	55	59¼	...	55	-¾	27...	...	...	93	88½	93	0
Sept. 6...	63%	...	58%	59%	58%	-1	28...	65½	57¼	60%	...	57	-¼	Sept. 3...	...	...	93%	91	93%	+¾
13...	63%	...	57%	59¼	57%	-1¾	Sept. 4...	62%	56¼	58¼	...	56	-2¼	10...	...	...	98½	95½	98½	+½
20...	62%	...	58¼	58%	58%	-¾	11...	63%	57%	59½	...	57¾	-1¾	17...	...	...	92	89½	92	0
27...	64%	...	60½	61¼	60%	-1½	18...	65½	60%	61½	...	60%	-¾	24...	...	...	93½	89%	92½	0
Oct. 4...	64¼	...	60%	61¼	60%	-1½	25...	70%	66¼	67%	...	66¼	-¾	Oct. 1...	...	...	...	88	...	
11...	65	...	61	60	60	-1	Oct. 2...	72½	...	69%	...	69%	-1	8...	...	...	...	88%	...	
18...	64½	...	60%	59%	59%	-1	8...	72½	...	68%	...	68	-¾	15...	...	...	...	88½	...	
25...	64¾	...	60%	59%	59%	-1	16...	76%	...	72%	...	71½	-1	22...	...	...	...	91½	...	
Nov. 1...	63%	...	59	58½	58%	-¾	23...	77%	...	73%	...	70½	-2%	29...	...	...	...	...	...
8...	63	...	58½	57%	57%	-¾	30...	77%	...	73	...	71	-2	Nov. 5...	...	...	...	88%	...	
15...	61%	...	57%	56%	56%	-½	Nov. 6...	82%	...	78	...	76¾	-1¼	12...	...	...	...	...	...
22...	60½	...	56¼	55%	55%	-¾	13...	83½	...	80%	...	79%	-¾	19...	...	...	...	...	...
29...	60%	...	56¼	56%	56%	-¾	20...	79¼	76%	75%	...	75%	+¼	26...	...	...	...	...	...
Dec. 6...	61%	...	58¼	58¼	58¼	-3¼ ^m	27...	84%	80¼	81%	...	81%	+¾	Sept. 3...	...	...	...	...	...
13...	60½	...	56%	56%	56%	-3%	18...	81	75%	77%	...	78%	-2¾ ^m	10...	...	...	...	89½	...	
20...	57½	58¼	...	54½	54½	-3	11...	79%	73¼	76	...	76½	-3%	17...	...	...	...	...	...
27...	57%	58¼	...	54%	55%	-2½	24...	81%	76¾	78%	...	78%	-3¼	24...	...	...	...	...	...
							31...	83¼	78%	79%	...	80	-3¼	31...	...	...	...	...	...

INTER-OPTION SPREADS ON LAST TRADING DAY BEFORE BEGINNING OF NEXTER DELIVERY MONTH

Futures	1895	1896	1897 "Old"	1897 "New"
May-July..	+1¼	+2	-¼	...
July-Sept..	+2%	+1½	-4½	...
Sept.-Dec..	+2¼	+3¼	...	+¾ ^b
Dec.-May..	+4½	+3½	...	-4%

^a Spread relative to the new December.

^b Spread between old September and new December.

TABLE I (Continued)

Date	Futures				Onsh	Spread	Date	Futures				Cash	Spread	Date	Futures				Cash	Spread	
	May	July	Sept.	Dec.				May	July	Sept.	Dec.				May	July	Sept.	Dec.			May	July	Sept.	Dec.
1910							1920							1921							
Jan. 3...	223	...	Jan. 2...	...	...	...	...	250	...	Jan. 7...	164%	...	...	175%	+11		
10...	225	...	9...	...	...	...	...	268	...	14...	170%	...	...	182%	+12 1/2		
17...	223	...	16...	...	...	...	...	265	...	21...	154%	...	...	168%	+13%		
24...	223	...	23...	...	...	...	...	260	...	28...	154	...	...	167%	+13%		
31...	223	...	30...	...	...	...	...	255	...	Feb. 4...	144%	...	...	151%	+7 1/2		
Feb. 7...	223	...	Feb. 6...	...	...	...	...	235	...	11...	154%	...	...	165%	+11%		
14...	223	...	13...	...	...	...	...	232	...	18...	157%	...	...	165%	+7 1/2		
21...	223	...	20...	...	...	...	...	232	...	25...	157%	...	...	165%	+11%		
28...	226 1/2	...	27...	...	...	...	...	238	...	Mar. 4...	163%	...	...	171%	+7 1/2		
Mar. 7...	230	...	Mar. 5...	...	...	...	...	235	...	11...	153%	...	...	160%	+6%		
14...	235	...	12...	...	...	...	...	247	...	18...	145%	...	...	154%	+9%		
21...	236	...	19...	...	...	...	...	247	...	24...	141%	...	...	153	+11 1/2		
28...	239	...	26...	...	...	...	...	254	...	Apr. 1...	134%	114%	...	143%	+9		
Apr. 4...	240	...	Apr. 1...	...	...	...	...	260	...	8...	134%	111%	...	139%	+5		
11...	241	...	9...	...	...	...	...	268	...	15...	122%	106%	...	124%	+2		
17...	240	...	16...	...	...	...	...	279	...	22...	130%	107%	...	140%	+10		
25...	270	...	23...	...	...	...	...	282	...	29...	130%	107	...	141%	+11		
May 2...	262	...	30...	...	...	...	...	285	...	May 6...	148%	117%	...	154%	+37 1/2		
9...	268	...	May 7...	...	...	...	...	230	...	13...	143%	115%	...	146%	+30%		
16...	244	...	14...	...	...	...	...	305	...	20...	159%	124	...	161%	+37%		
23...	249	...	21...	...	...	...	...	290	...	27...	166%	127%	...	164%	+37 1/2		
31...	245	...	28...	...	...	...	...	292	...	June 3...	...	137%	...	159%	+22		
June 6...	242	...	June 4...	...	...	...	...	293	...	10...	...	136%	118%	159%	+23		
13...	232	...	11...	...	...	...	...	287	...	17...	...	131%	124%	141%	+10		
20...	235	...	18...	...	...	...	...	287	...	24...	...	130%	123%	139%	+9		
27...	235	...	25...	...	...	...	...	275	...	July 1...	...	122%	121%	122 1/2	125%	+3 3/4	
July 3...	230	...	July 2...	...	...	...	...	275	...	8...	...	122%	121%	124%	123%	+1 3/4	
11...	224	...	9...	...	...	...	...	280	...	15...	...	130%	132%	136%	129%	-2%	
18...	223	...	16...	280	...	22...	...	122%	124%	125%	128%	123%	-1 1/2
25...	221	...	23...	...	...	...	...	283	...	29...	...	122	123%	126%	120%	-3%	
Aug. 1...	221	...	30...	248	...	Aug. 5...	118%	121%	117%	- 3/4
8...	221	...	Aug. 6...	248	...	12...	123%	125%	124%	+ 1/2
15...	221 1/2	...	13...	257	...	19...	116%	117%	118%	+1 1/2
22...	222	...	20...	...	...	...	...	252 1/2	...	26...	124%	...	119%	121%	121%	+ 1/2	
29...	221 1/2	...	27...	250	...	Sept. 2...	129%	...	124	125%	125 1/2	125%	+ 1/4
Sept. 5...	222	...	Sept. 3...	...	...	...	...	252	...	9...	141%	...	133	135%	133 1/2	+ 2%	
12...	221 1/2	...	10...	...	...	...	...	255	...	16...	133%	...	126 1/2	129 1/2	126	-3 1/4	
19...	221	...	17...	...	...	...	...	249	...	23...	131%	...	125	127%	125	-2%	
26...	222	...	24...	...	...	...	...	240 1/2	...	30...	125 1/2	...	116 1/2	120%	116%	-4 1/2	
Oct. 3...	221	...	Oct. 1...	...	...	...	...	221	...	Oct. 7...	113%	...	...	109%	109%	0	
10...	222 1/2	...	8...	...	...	...	...	199	...	14...	119%	...	...	115%	111%	-3 1/2	
17...	223	...	15...	...	...	...	...	218	...	21...	112%	...	...	108%	105%	-3	
24...	223	...	22...	...	...	...	...	202	...	28...	113%	...	...	108 1/2	105 1/2	-3	
31...	223 1/2	...	29...	...	...	...	...	203	...	Nov. 4...	106	...	...	101	98	-3	
Nov. 7...	226	...	Nov. 5...	...	...	...	...	198	...	10...	109%	...	...	104 3/4	102%	-2	
14...	228	...	12...	...	...	...	...	177 1/2	...	18...	111 1/2	...	...	108 1/4	106%	-2	
21...	233	...	19...	...	...	...	...	174	...	25...	115	...	...	112	110	-2	
28...	234	...	26...	...	...	...	...	154 1/2	...	Dec. 2...	117%	109	...	113 1/2	111%	-5 1/2	
Dec. 5...	240	...	Dec. 3...	...	...	...	...	172 1/2	...	9...	115	103 1/2	...	111 1/2	112 1/2	-2 1/2	
12...	246	...	10...	...	...	...	...	160 1/2	...	16...	112%	102%	...	107%	108%	-4	
19...	245	...	17...	158 1/4	...	...	...	170	...	23...	116%	104 1/2	...	113	114	-2 3/4	
26...	244	...	24...	161%	...	...	...	171	...	30...	115	104	...	110 1/2	111	-4	
							31...	162%	...	...	...	175	...							

INTER-OPTION SPREADS ON LAST TRADING DAY BEFORE BEGINNING OF NEARER DELIVERY MONTH				
Futures	1910	1920	1921	1922
May-July...	-23%	-13%
July-Sept...	-1	+1%
Sept.-Dec...	+1 1/4	+17%
Dec.-May...	...	-6%	+4	-1%

* Spread relative to March future.

† December-March spread on November 30; the March-May spread on December 31 is -6 cents.

TABLE I (Continued)

Table with columns for Date, Futures (May, July, Sept., Dec.), Cash, Spread, and a sub-section for Inter-Option Spreads (1900-1932) with sub-columns for 'Old', 'New' and '1901', '1931', '1932'.

* Spread between old May and new July.

PRICES OF CASH WHEAT AND FUTURES AT CHICAGO

TABLE II.—MONTHLY AVERAGE PRICES OF BASIC CASH WHEAT AT CHICAGO, 1883-1934*

(Cents per bushel)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1883.....	99.0	107.4	107.7	106.7	111.3	107.2	100.6	101.2	95.3	92.0	95.7	96.3
1884.....	92.2	92.8	90.9	85.5	89.4	86.4	82.4	79.0	76.6	75.5	73.2	71.9
1885.....	79.1	77.2	77.8	83.5	88.1	88.2	87.2	83.6	80.5	86.8	86.6	85.3
1886.....	80.6	81.3	80.5	77.9	75.0	73.6	76.4	76.5	74.9	72.6	73.6	77.7
1887.....	77.8	76.4	77.2	82.0	85.7	80.6	69.5	68.0	69.4	70.5	73.9	77.5
1888.....	77.7	76.9	76.7	78.4	85.6	82.1	81.7	86.4	107.1	112.2	110.2	102.1
1889.....	97.2	101.4	100.4	86.2	82.0	80.1	80.5	77.0	78.3	79.8	79.6	77.5
1890.....	76.3	75.6	79.2	84.9	94.1	87.4	88.2	98.3	99.2	100.0	93.5	90.8
1891.....	90.0	94.6	99.4	107.7	104.4	96.9	89.6	98.1	95.7	95.6	94.0	91.0
1892.....	87.2	88.4	84.2	81.1	83.2	80.7	77.8	76.7	73.2	72.3	72.5	71.4
1893.....	74.0	74.0	73.6	74.5	72.1	64.8	63.1	60.4	65.8	63.4	61.3	61.5
1894.....	60.2	57.6	57.5	60.4	56.0	57.3	54.1	53.5	52.6	51.6	54.4	54.0
1895.....	53.1	50.5	53.7	57.0	69.9	74.1	67.3	65.0	58.8	59.4	57.1	56.2
1896.....	59.2	64.6	61.8	64.5	60.3	57.4	56.2	55.5	60.2	69.7	78.5	77.8
1897.....	76.6	74.0	73.4	70.2	71.8	69.7	73.3	86.9	94.1	92.4	95.2	98.0
1898.....	96.4	100.6	102.4	108.8	151.4	94.0	77.9	70.1	65.8	65.6	66.2	66.2
1899.....	69.2	70.6	69.5	72.6	72.7	74.7	71.8	71.0	72.2	70.7	66.7	65.7
1900.....	64.5	65.9	65.6	65.9	65.5	74.9	77.2	74.4	75.6	74.1	71.3	70.3
1901.....	73.8	73.3	74.6	71.4	73.0	68.8	67.3	70.0	68.7	69.2	72.0	76.5
1902.....	77.0	75.0	72.8	72.4	74.1	73.2	76.2	70.5	76.4	70.0	72.9	74.0
1903.....	73.9	74.9	72.6	75.6	77.7	77.9	77.0	80.5	78.5	80.3	79.5	81.0
1904.....	85.1	96.5	94.2	91.4	94.7	95.1	98.8	104.7	111.9	111.4	111.3	110.3
1905.....	113.6	115.9	112.7	106.9	96.2	102.0	94.9	82.3	82.8	86.2	86.5	84.9
1906.....	83.5	81.5	74.2	79.4	83.6	82.7	77.3	70.9	71.6	71.5	72.9	74.2
1907.....	72.6	74.4	74.0	78.0	92.5	92.1	91.3	88.1	95.7	98.8	92.4	96.6
1908.....	98.0	94.2	95.7	93.4	104.2	93.4	89.4	94.0	99.1	99.7	103.2	102.8
1909.....	103.5	110.9	114.1	123.0	130.2	126.6	118.0	101.6	101.9	107.0	107.1	112.5
1910.....	112.8	113.3	112.0	110.2	110.4	95.6	105.4	100.5	96.4	93.4	89.7	91.8
1911.....	95.9	89.6	87.6	88.4	97.1	90.2	87.4	90.1	92.8	96.9	93.7	94.0
1912.....	95.7	98.4	100.4	108.7	113.9	108.3	101.3	93.7	90.6	91.4	86.3	86.1
1913.....	90.0	90.5	87.7	91.0	90.6	91.4	87.6	86.1	87.7	84.2	86.1	88.3
1914.....	89.7	91.5	91.9	91.3	95.6	89.7	82.9	96.0	112.1	109.4	113.8	121.2
1915.....	142.9	158.5	150.2	157.8	151.8	119.3	119.5	109.2	107.8	105.2	105.6	118.1
1916.....	126.2	125.2	109.9	115.4	112.1	101.7	111.4	142.4	150.2	167.7	183.6	158.6
1917.....	178.4	165.6	187.0	238.1	300.8	259.8	232.5	230.8	217.0	217.0	217.0	217.0
1918.....	217.0	217.0	217.0	217.0	217.0	217.0	223.0	222.8	223.2	223.0	223.7	225.0
1919.....	223.4	223.9	235.0	247.8	253.6	236.0	224.5	221.4	221.6	222.6	230.2	243.8
1920.....	259.6	234.2	245.8	274.8	294.2	285.5	273.2	251.9	249.2	210.4	176.5	169.8
1921.....	173.7	162.0	159.8	137.9	156.8	149.9	124.6	120.4	125.2	108.0	104.2	111.5
1922.....	108.7	129.0	133.5	135.9	136.6	115.6	115.4	105.8	105.0	113.7	118.8	124.0
1923.....	117.8	117.6	119.3	125.2	119.7	109.1	101.3	101.4	105.2	108.3	104.7	103.6
1924.....	105.8	109.0	105.0	103.8	106.2	111.2	123.2	128.2	130.8	143.7	151.0	167.5
1925.....	184.9	182.4	167.0	150.1	167.7	157.8	151.8	162.5	151.2	145.7	159.8	175.6
1926.....	177.2	167.9	161.8	163.3	162.2	148.5	142.7	136.5	134.1	139.8	137.8	138.9
1927.....	137.4	135.1	133.8	133.7	145.4	144.1	142.2	139.2	131.2	125.7	124.9	127.9
1928.....	128.4	132.1	139.5	154.6	153.4	139.8	128.5	111.9	113.6	115.4	115.9	116.2
1929.....	119.0	126.8	122.4	115.4	102.0	110.0	131.0	130.0	129.4	124.7	121.1	122.6
1930.....	120.7	112.7	102.4	106.1	101.1	96.5	88.5	88.7	82.0	78.6	73.9	77.0
1931.....	79.0	78.6	79.2	82.2	82.6	75.8	52.8	49.4	49.7	52.3	60.1	55.9
1932.....	57.4	58.5	55.4	55.5	57.0	51.3	49.4	52.6	53.6	48.6	44.4	45.4
1933.....	47.0	47.0	52.0	62.8	73.2	77.7	97.1	89.6	85.1	81.7	86.8	83.0
1934.....	87.6	90.1	87.1	81.0	87.4	96.1	96.6	104.4	105.4			

* Averages of the four or five weekly quotations in each month, from Table I.

TABLE III.—STORAGE CHARGES ON GRAIN IN "REGULAR" ELEVATORS AT CHICAGO, 1883-1934*

(Cents per bushel)

FIRST STORAGE

Storage charge	Period through which effective	
1¼ cents for 10 days.....	1883 ^a	to June 30, 1886 ^b
¾ cent for 10 days.....	July 1, 1886 ^b	to June 30, 1910 ^c
1 cent for 10 days.....	July 1, 1910	to December 31, 1919
1¼ cents for 10 days.....	January 1, 1920	to

LATER STORAGE

Storage charge	Period through which effective	
½ cent for 10 days ^d	1883 ^a	to February 12, 1888
¼ cent for 10 days.....	February 13, 1888	to June 30, 1890
⅓ cent for 10 days.....	July 1, 1890	to August 13, 1894 ^e
¼ cent for 10 days.....	August 14, 1894	to May 14, 1900
1/40 cent per day.....	May 15, 1900	to December 31, 1900
1/50 cent per day.....	January 1, 1901	to December 31, 1903
1/40 cent per day.....	January 1, 1904	to June 30, 1910
1/30 cent per day.....	July 1, 1910	to June 30, 1917
1/25 cent per day.....	July 1, 1917	to December 31, 1919
1/20 cent per day.....	January 1, 1920	to

* Based on a compilation of announcements and news items published contemporaneously in the *Chicago Daily Trade Bulletin* and on "Rules and Regulations" of the Chicago Board of Trade as published in its successive *Annual Reports*. The rates here shown are applicable to all grains and to flaxseed.

^a We have not ascertained when this charge first became effective, but merely that it was in effect at the beginning of 1883.

^b This date pertains to the making of the contract for future delivery rather than to the actual purchase at the time of delivery. Contracts for delivery of wheat as late as October had been made before July 1, 1886, and so long as deliveries continued to be made on such old contracts the earlier rate remained in effect to that extent. All other dates referring to first storage pertain to the actual purchase of the grain. Dates under "later storage" pertain to the time when the grain was actually in store.

^c From July 1 to August 20, 1890, rates of 1 cent per bushel for the first ten days and ⅔ cent per bushel for each ten days thereafter were in effect, but on August 21 the rates shown above were published, effective as of the previous July 1, with agreement to refund on application any amounts that had been collected in excess of those due under the revised rates.

^d Subject to the qualification in effect until April 15, 1888, that total charges, including first storage, should not exceed 4 cents per bushel for carrying grain from November 15 to April 15, or for any shorter included period.

TABLE IV.—CLASSES AND GRADES OF WHEAT DELIVERABLE ON REGULAR FUTURES CONTRACTS AT CHICAGO, FROM 1883*

1883-97	1897-1903	1903-04	1904-08	1908-17
Effective: Prior to January 1883	Effective: A. 10/1/97 B. 1/1/98 C. 6/1/97	Effective: A. 7/1/03 B. 1/1/04 C. 6/3/03	Effective: A. 7/1/04 B. 10/1/04 C. 2/16/04	Effective: A. 10/1/08 B. 1/1/09 C. 5/19/08
Grades	Grades	Grades	Grades	Grades
No. 2 S No. 2 R W and "higher"	No. 1 R W No. 2 R W No. 1 N S	No. 1 R W No. 2 R W No. 1 N S No. 1 H W (-5) No. 2 H W (-5)	No. 1 R W No. 2 R W No. 1 N S No. 1 H W (-2) No. 2 H W (-2)	No. 1 R W No. 2 R W No. 1 N S No. 1 H W No. 2 H W No. 1 V C ^a

1917-23	1923-25	1925-30	1930-32	1932-34 and 1934-...."
Effective: A. 7/1/17 ^b B. 12/1/20 C. 7/15/20 ^b	Effective: A. 8/1/23 B. 8/1/23 C. 1/2/23	Effective: A. 12/1/25 B. 6/1/25 C. 10/1/25	Effective: A. 12/1/30 B. 6/1/31 C. 10/14/30	Effective: A. 7/1/32 B. 10/1/32 C. 3/12/32
Grades	Grades	Grades	Grades	Grades
No. 1 D H W No. 2 D H W No. 1 H W No. 2 H W No. 1 Y H W No. 2 Y H W No. 1 R W No. 2 R W No. 1 N S No. 2 N S No. 1 D N S No. 2 D N S No. 1 R S No. 2 R S No. 3 D H W (-5) No. 3 H W (-5) No. 3 Y H W (-5) No. 3 R W (-5) No. 1 H W h (-5) No. 2 H W h (-5) No. 3 D N S (-8) No. 3 N S (-8) No. 3 R S (-8)	No. 1 D H W (+1½) No. 1 D N S (+1½) No. 2 D H W (+½) No. 2 D N S (+½) No. 1 H W No. 2 H W No. 1 Y H W No. 2 Y H W No. 1 R W No. 2 R W No. 1 N S No. 2 N S No. 3 D H W (-5) No. 3 H W (-5) No. 3 Y H W (-5) No. 3 R W (-5) No. 3 D N S (-8) No. 3 N S (-8)	No. 1 H S (+2) No. 1 D H W (+1½) No. 1 D N S (+1) No. 2 D H W (+½) No. 1 H W No. 2 H W No. 1 Y H W No. 2 Y H W No. 1 R W No. 2 R W No. 1 N S No. 2 D N S (-2) No. 2 N S (-3) No. 3 D H W (-5) No. 3 H W (-5) No. 3 Y H W (-5) No. 3 R W (-5)	No. 1 H S (+2) No. 1 D H W (+1½) No. 1 D N S (+1) No. 2 D H W (+½) No. 1 H W No. 2 H W No. 1 R W No. 2 R W No. 1 N S	No. 1 H S (+2) No. 1 D H W (+1½) No. 1 D N S (+1) No. 2 D H W (+½) No. 1 H W No. 2 H W No. 1 Y H W No. 2 Y H W No. 1 R W No. 2 R W No. 1 N S

* Data compiled chiefly from annual Reports of the Chicago Board of Trade and from information recorded in the Chicago Daily Trade Bulletin.

To gain the convenience of a condensed record, abbreviations have been used as follows: D = Dark; H = Hard; N = Northern; R = Red; S = Spring; W = Winter; Wh = White; Y = Yellow; V C = Velvet Chaff. Numerals following the class designations indicate, in cents per bushel, premiums (+) or discounts (-) at which the wheats were deliverable. Absence of such a numeral indicates that the wheat was deliverable at the contract price.

Dates on which the rule became effective making a stated set of grades deliverable are indicated by the number of the month (counting from January), the number of the day, and the last two digits of the number of the year. Three dates are given in each case: (A) the date stated in the rules, which is the first date on which deliveries might be made under the revised form of the rule—on this date the revised rule becomes effective only as regards "new style" contracts, entered into under its terms; (B) the date on which the rule became fully effective owing to expiration of the last delivery month for which futures contracts had been regularly made under the previous form of the rule; and (C) the date, normally prior to both the others, on which trading began in contracts subject to the revised rule.

^a No. 1 Velvet Chaff did not become a contract grade until July 1, 1913, in consequence of an amendment adopted September 17, 1912.

^b The revised rule, adopted May 22, 1917, gave two lists of deliverable grades, a shorter one to become effective July 1 and a longer one to become effective August 1, the only difference being that the list to become effective July 1 included no spring wheats except No. 1 Northern Spring, deliverable at contract price. The revised rule failed to become operative as a basis for futures contracts, however, until futures trading in wheat was resumed after the war.

Immediately after its adoption measures were taken to prevent the making of new futures contracts and thus facilitate the early discontinuance of trading in wheat futures.

^a A change in standards for the deliverable grades became effective in 1934 through promulgation of revised federal grading standards; the effect on futures contracts was that of a change in grades specified for delivery, although the grade names remained unchanged. The dates on which the change became (or will become) effective are: (A) 7/2/34; (B) 1/1/35; (C) 7/2/34.

TABLE V.—PERIODS DURING WHICH VARIOUS CLASSES AND GRADES OF WHEAT WERE BASIC TO THE CHICAGO FUTURES*

Class and grade	Period
No. 2 Spring	Jan. 5, 1883—July 29, 1892
No. 2 Red Winter	Aug. 6, 1892—Sept. 3, 1892
No. 2 Spring	Sept. 10, 1892—Apr. 6, 1894
No. 2 Red Winter	Apr. 13, 1894—Sept. 20, 1895
No. 2 Spring	Sept. 27, 1895—Sept. 24, 1897
No. 1 Northern Spring	Oct. 1, 1897—June 3, 1898
No. 2 Red Winter	June 10, 1898—Sept. 23, 1898
No. 1 Northern Spring	Sept. 30, 1898—July 18, 1902
No. 2 Red Winter	July 25, 1902—Oct. 23, 1903
No. 1 Northern Spring	Oct. 30, 1903—July 22, 1904
No. 2 Red Winter	July 29, 1904—Sept. 30, 1904
No. 2 Hard Winter	Oct. 7, 1904—June 2, 1905
No. 2 Red Winter	June 9, 1905—Dec. 1, 1905
No. 2 Hard Winter	Dec. 8, 1905—July 20, 1906
No. 2 Red Winter	July 27, 1906—Dec. 31, 1908
No. 2 Hard Winter	Jan. 8, 1909—Sept. 24, 1909
No. 1 Northern Spring	Oct. 1, 1909—Oct. 29, 1909
No. 2 Hard Winter	Nov. 5, 1909—Aug. 26, 1910
No. 2 Red Winter	Sept. 2, 1910—May 31, 1912
No. 2 Hard Winter	June 7, 1912—Feb. 21, 1913
No. 1 Northern Spring	Feb. 28, 1913—June 20, 1913
No. 2 Hard Winter	June 27, 1913—Dec. 31, 1914 ^a
No. 2 Red Winter	Jan. 8, 1915—Sept. 3, 1915
No. 1 Northern Spring	Sept. 10, 1915—Dec. 31, 1915
No. 2 Hard Winter	Jan. 7, 1916—June 22, 1917
No. 2 Red Winter	June 29, 1917—Sept. 20, 1918
No. 2 Northern Spring	Sept. 27, 1918—June 20, 1919 ^b
No. 2 Red Winter	June 27, 1919—July 18, 1919
No. 2 Yellow Hard Winter	July 25, 1919—Oct. 10, 1919
No. 2 Red Winter	Oct. 17, 1919—Jan. 16, 1920
No. 2 Hard Winter	Jan. 23, 1920—June 4, 1920 ^a
No. 2 Northern Spring	June 11, 1920—Mar. 24, 1921 ^{ab}
No. 2 Red Winter	Apr. 1, 1921—Aug. 19, 1921
No. 2 Yellow Hard Winter	Aug. 26, 1921—May 29, 1925
No. 2 Northern Spring	June 5, 1925—July 31, 1925
No. 2 Yellow Hard Spring	Aug. 7, 1925—Oct. 9, 1925
No. 1 Northern Spring	Oct. 16, 1925—Jan. 22, 1926 ^c
No. 1 Dark Northern Spring	Jan. 29, 1926—May 21, 1926
No. 1 Northern Spring	May 28, 1926—June 18, 1926
No. 2 Red Winter	June 25, 1926—June 24, 1927
No. 2 Yellow Hard Winter	July 1, 1927—Oct. 21, 1927
No. 1 Northern Spring	Oct. 28, 1927—July 20, 1928
No. 2 Yellow Hard Winter	July 27, 1928—Dec. 26, 1930 ^{bd}
No. 2 Hard Winter	Jan. 2, 1931—Apr. 17, 1931
No. 2 Red Winter	Apr. 24, 1931—Aug. 19, 1932 ^b
No. 2 Yellow Hard Winter	Aug. 26, 1932—Jan. 19, 1934 ^b
No. 1 Dark Northern Spring	Jan. 26, 1934—Mar. 16, 1934
No. 2 Yellow Hard Winter	Mar. 23, 1934—June 29, 1934
No. 2 Red Winter	July 5, 1934—

* This table constitutes a record of the classes and grades of wheat on which quotations were taken for the series of basic cash prices in Table I. Frequently contract grades not here listed as basic were quoted at the same price as the grade listed.

^a Quotations on No. 2 Red Winter wheat were used for a few dates within this period.

^b Quotations on No. 2 Hard Winter wheat were used for a few dates within this period.

^c Quotations on No. 2 Yellow Hard Winter wheat were used for a few dates within this period.

^d Quotations on No. 1 Northern Spring wheat were used for a few dates within this period.

TABLE VI.—STOCKS OF PRINCIPAL CONTRACT GRADES OF WHEAT IN CHICAGO PUBLIC ELEVATORS, MONTHLY, 1883-1917 AND 1920-34*

(Thousand bushels)

Month	1883			1884			1885			1886			1887		
	No. 2 Red	No. 2 Hard ^a	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring
Jan.	731	104	3,858	166	500	10,645	313	326	12,219	123	64	12,978	1,565	49	10,922
Feb.	744	92	4,080	156	644	11,456	311	327	13,439	122	57	12,929	1,490	48	11,440
Mar.	760	85	4,235	151	644	11,695	314	325	14,022	134	52	12,765	1,409	48	11,138
Apr.	779	103	4,585	126	515	11,180	326	323	14,785	186	52	12,180	1,515	55	10,628
May	715	88	4,732	69	317	8,310	200	293	14,200	128	48	10,124	1,605	57	12,138
June	409	89	4,974	41	119	6,723	68	218	13,087	129	46	7,489	827	68	13,280
July	278	64	5,346	40	82	4,279	109	192	14,423	83	44	6,900	160	187	10,508
Aug.	154	55	5,009	105	80	1,906	75	156	14,330	818	34	6,638	304	121	8,080
Sept.	142	12	4,605	258	82	2,927	122	127	13,200	1,252	18	5,803	544	42	5,243
Oct.	170	14	6,077	143	84	2,779	118	94	12,274	1,635	17	6,112	308	7	4,374
Nov.	173	27	7,157	290	172	5,542	121	90	12,371	1,691	18	7,179	7	4	3,587
Dec.	124	126	8,981	309	262	8,401	122	74	12,477	1,487	20	8,785	225	8	3,528

Month	1888			1889			1890			1891			1892		
	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring
Jan.	212	3	4,520	935	1	2,571	676	1	3,438	1,639	...	4,270	518	17	5,426
Feb.	211	3	4,670	936	1	2,556	610	...	3,583	1,470	...	4,632	541	17	5,898
Mar.	229	3	4,810	1,034	1	2,490	541	...	3,232	1,294	...	4,791	314	11	6,206
Apr.	117	2	4,953	1,296	...	2,198	486	...	3,058	1,261	...	4,573	127	2	6,907
May	69	2	4,765	1,250	...	1,720	487	...	3,068	682	...	4,088	105	2	5,550
June	85	11	4,411	1,083	...	1,506	558	...	3,507	188	5	2,747	132	2	4,729
July	57	1	4,543	819	...	1,208	495	...	3,760	49	...	672	110	1	3,176
Aug.	62	1	4,638	1,160	...	586	750	...	3,015	2,105	39	227	456	66	1,658
Sept.	130	1	2,651	643	...	354	1,019	1	2,789	521	70	131	1,211	799	1,066
Oct.	328	1	2,868	572	...	867	1,362	1	2,556	439	57	937	1,584	1,236	1,137
Nov.	581	1	2,559	672	2	1,022	1,516	...	2,699	373	65	2,238	1,789	1,468	1,640
Dec.	881	1	2,574	626	1	2,455	1,578	...	3,254	521	38	3,534	2,179	1,263	2,554

Month	1892			1894			1895			1896			1897		
	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring	No. 2 Red	No. 2 Hard	No. 2 Spring
Jan.	2,275	1,277	3,519	5,478	655	12,085	22,055	275	3,126	8,163	123	6,107	260	58	9,022
Feb.	2,620	1,074	5,966	5,709	742	12,929	21,384	243	2,957	7,350	123	6,325	231	58	7,705
Mar.	3,131	1,031	6,862	5,831	788	12,890	21,501	226	2,670	5,533	118	6,884	200	49	7,447
Apr.	3,340	989	8,336	5,918	813	12,202	20,616	203	2,434	2,744	116	7,592	128	32	6,115
May	3,802	927	10,976	6,388	824	11,860	18,660	202	2,135	1,061	33	7,659	102	2	4,607
June	3,761	876	12,805	7,046	463	10,700	16,242	227	1,735	466	20	7,445	101	2	3,085
July	3,778	692	13,067	7,190	69	10,016	14,906	221	1,672	283	16	7,090	100	2	2,064
Aug.	4,076	518	12,574	9,014	161	8,127	13,368	104	1,389	816	87	6,780	494	74	2,166
Sept.	4,295	572	12,253	17,418	265	6,635	12,010	136	1,159	731	66	6,636	386	96	316
Oct.	4,705	630	12,225	19,498	257	5,186	11,569	151	2,190	782	55	7,496	382	186	1 ^b
Nov.	5,047	662	12,285	20,287	248	3,774	11,041	148	3,702	561	92	8,768	353	181	178 ^b
Dec.	5,295	669	12,341	21,195	267	3,273	9,708	135	5,236	278	59	8,646	326	197	2,559 ^b

Month	1898			1899			1900			1901			1902		
	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.
Jan.	621	204	8,095	24	1	2,505	671	15	12,934	1,892	282	7,856	595	343	4,385
Feb.	649	205	7,097	64	7	2,702	637	15	12,020	1,851	283	7,754	351	289	4,748
Mar.	773	204	6,144	131	13	3,022	632	10	11,929	1,828	283	7,849	158	276	4,817
Apr.	1,302	48	3,819	148	11	3,252	582	1	11,240	1,857	178	7,772	89	150	4,960
May	1,420	5	1,533	68	11	3,975	289	1	10,271	1,845	5	7,136	9	44	5,135
June	562	4	695	167	...	3,831	219	...	8,825	1,517	...	4,346	2	4	3,536
July	53	4	350	175	9	4,515	190	...	10,053	1,277	...	3,185	2	6	1,859
Aug.	83	2	55	183	9	4,683	382	232	9,039	1,545	57	1,751	612	...	1,370
Sept.	64	...	22	204	9	4,708	1,091	543	8,584	2,210	223	1,691	383	3	510
Oct.	130	2	576	291	12	6,229	1,481	685	8,773	1,457	421	2,035	1,210	1	980
Nov.	80	1	558	331	15	7,830	1,968	516	8,917	917	162	2,850	1,174	1	1,284
Dec.	46	...	1,123	557	15	11,292	1,980	333	7,494	949	324	3,922	1,067	...	2,260

* Stocks as of the Saturday nearest the first of the month, compiled from the Chicago Daily Trade Bulletin. Dots (...) indicate less than 500 bushels.

^a No. 2 Hard Winter wheat was not deliverable before 1903, but is included for comparison.

^b No. 1 Northern Spring wheat; No. 2 Spring was not deliverable on "new style" contracts.

TABLE VI (Continued)

Month	1903			1904			1905			1906			1907		
	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.
Jan.	1,158	...	3,056	412	18	1,456	272	1,161	2	2,377	2,486	686	8,588	808	47
Feb.	1,133	...	2,482	374	62	1,378	272	1,065	2	1,948	2,265	801	8,338	948	33
Mar.	1,173	...	2,507	476	73	1,240	273	1,004	2	1,463	2,434	801	8,250	942	8
Apr.	1,179	...	1,949	340	64	855	300	996	2	689	2,720	674	8,146	927	8
May	1,275	...	1,768	257	47	402	500	1,368	270	212	2,438	435	7,891	905	8
June	1,340	...	1,736	194	109	697	302	669	113	160	1,887	1,015	7,713	918	50
July	986	...	963	184	95	473	232	290	27	32	1,475	743	7,422	1,148	45
Aug.	1,038	10	167	433	196	362	1,131	167	2	4,043	845	474	7,489	1,003	10
Sept.	2,001	38	37	410	839	14	3,130	147	...	7,504	573	64	10,171	1,035	85
Oct.	2,247	2	...	297	1,162	...	3,303	137	...	8,007	705	19	10,308	1,022	26
Nov.	793	14	295	297	1,176	2	3,018	711	86	7,832	706	88	7,335	627	5
Dec.	469	...	1,395	282	1,126	2	2,533	1,892	412	7,713	478	100	5,584	587	25

Month	1908			1909			1910			1911			1912		
	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.
Jan.	5,023	628	121	2,135	2,619	234	77	757	2,297	3,650	1,530	21	8,625	744	61
Feb.	4,597	699	...	1,983	2,318	201	72	723	1,768	3,251	1,527	13	7,754	906	48
Mar.	3,678	720	...	1,438	2,161	204	42	717	1,462	3,160	1,809	2	7,914	1,004	40
Apr.	2,831	703	41	991	3,335	158	38	789	1,048	3,178	1,624	3	8,206	1,036	39
May	2,647	583	29	214	3,149	87	29	646	863	3,229	1,473	1	7,632	1,165	32
June	2,955	553	143	9	2,124	1,015	202	1,480	1,484	5,210	2,914	33	5,345	1,701	11
July	2,639	277	17	...	185	374	27	797	221	5,337	2,796	24	4,365	1,217	7
Aug.	2,532	99	25	780	155	22	1,411	736	79	8,911	2,377	5	2,914	1,687	1
Sept.	2,348	390	...	433	32	5	3,661	1,641	1	10,416	2,026	5	919	547	...
Oct.	3,099	575	115	447	183	726	4,111	1,653	58	10,136	1,492	5	733	1,318	3
Nov.	2,221	1,465	334	260	150	868	3,834	1,632	67	10,521	1,043	12	575	958	760
Dec.	2,246	2,211	312	135	443	1,587	3,746	1,569	22	8,967	888	11	465	1,294	2,913

Month	1913			1914			1915			1916			1917		
	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.	No. 2 Red	No. 2 Hard	No. 1 N.S.
Jan.	328	1,213	2,671	600	1,823	59	659	743	...	4	821	2,558	1	3,006	...
Feb.	289	1,147	2,278	593	1,434	68	141	119	...	8	1,351	1,332	...	2,373	...
Mar.	288	1,398	2,370	557	2,461	43	65	10	...	4	1,186	696	...	2,091	...
Apr.	184	1,377	2,164	469	2,357	9	27	8	...	29	1,437	556	...	1,470	...
May	122	1,190	2,994	171	1,854	2	598	428	...	26	1,825	190	...	241	...
June	36	653	2,632	112	3,295	2	1,424	779	...	18	3,957	22	...	5	9
July	7	180	1,176	28	6	...	31	38	...	16	4,761	2	...	10	...
Aug.	1,224	415	292	951	425	...	725	6	...	11	4,850	2	9	...	...
Sept.	1,581	5,138	16	988	891	...	50	...	...	23	4,942	2	13	...	...
Oct.	1,277	3,984	43	666	565	...	6	4	79	1	4,034	...	4	...	...
Nov.	1,106	3,608	71	583	677	...	5	4	60	1	3,731	...	11	...	...
Dec.	810	3,366	64	1,180	2,056	...	5	27	1,689	1	3,884	...	4	5	6

Month	1920			1921			1922			1923			1924		
	No. 2 Red	No. 2 Hard ^o	No. 2 N.S.	No. 2 Red	No. 2 Hard ^o	No. 2 N.S.	No. 2 Red	No. 2 Hard ^o	No. 2 N.S.	No. 2 Red	No. 2 Hard ^o	No. 2 N.S.	No. 2 Red	No. 2 Hard ^o	No. 2 N.S.
Jan.	1,713	408	...	...	...	191	5	1,164	...	28	1,241	...	1,435	3,381	4
Feb.	1,420	333	...	...	...	135	5	1,121	...	3	418	...	1,281	2,751	4
Mar.	994	305	...	...	...	74	5	1,101	...	2	206	...	1,219	2,736	4
Apr.	878	214	1	9	172	...	5	1,097	...	...	874	...	1,198	2,902	4
May	731	205	2	...	1	...	5	2,055	...	...	1,533	1	1,321	2,976	4
June	336	55	3	5	78	...	589	4,496	...	...	1,926	23	1,251	2,737	4
July	14	5	1	1	...	7	372	1,266	...	...	894	8	1,145	2,133	4
Aug.	1	...	...	422	441	5	760	288	...	122	1,212	4	1,036	2,025	4
Sept.	...	...	1	75	229	...	170	216	...	1,062	4,140	4	1,044	5,107	4
Oct.	...	...	1	36	624	...	150	427	...	1,179	2,872	4	1,013	5,291	4
Nov.	...	...	1	24	654	...	118	162	...	1,292	3,506	4	651	4,025	...
Dec.	...	...	1	5	606	...	18	279	...	1,479	3,866	4	152	4,392	...

^o Including No. 2 Yellow Hard Winter wheat.

PRICES OF CASH WHEAT AND FUTURES AT CHICAGO

TABLE VI (Concluded)

Month	1925			1926			1927			1928			1929		
	No. 2 Red	No. 2 Hard ^c	No. 2 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.
Jan.	133	3,364	...	88	354	15	1,342	150	...	603	1,731	1,248	6	5,073	1,782
Feb.	246	1,629	...	38	253	36 ^d	1,132	51	...	336	1,290	890	6	4,768	1,553
Mar.	185	967	23	25	145	6 ^d	1,127	64	...	228	1,062	626	18	5,556	1,529
Apr.	51	441	69	25	20	...	989	7	...	86	1,180	705	18	6,331	1,500
May ....	...	101	382	25	32	...	1,291	6	...	20	1,631	540	18	7,046	1,444
June ....	...	360	845	177	739	...	1,570	31	...	9	1,078	3,813	4	6,570	1,381
July ....	...	83	477	167	382	1	711	6	...	1	725	3,469	2	8,442	1,370
Aug.	31	2,364	358	107	254	...	1,089	1,801	...	1	521	1,598	28	11,698	1,160
Sept.	125	1,398	252 ^c	1,443	264	2	2,145	1,974	200	3	2,927	1,472	102	13,235	1,181
Oct.	135	895	217 ^c	2,209	362	4	2,139	2,173	221	3	3,807	1,344	100	13,463	1,175
Nov.	114	755	45 ^c	1,704	201	4	1,544	1,949	199	16	5,007	1,840	102	13,458	1,175
Dec.	88	677	6 ^c	1,047	254	...	897	2,007	1,362	11	5,200	1,836	102	11,290	1,087

Month	1930			1931			1932			1933			1934		
	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.	No. 2 Red	No. 2 Hard ^c	No. 1 N.S.
Jan.	97	10,186	768	48	5,531	753	2,363	4,839	487	2,116	3,447	310	254	953	538 ^d
Feb.	94	9,827	705	46	7,876	782	2,343	4,628	487	1,925	3,495	296	241	657	506 ^d
Mar.	74	9,811	681	63	10,051	802	2,371	4,766	487	1,660	2,637	200	207	559	422 ^d
Apr.	29	9,849	661	308	11,850	1,023	2,372	4,814	487	1,206	2,637	200	179	441	93
May ....	...	9,905	665	303	12,707	1,111	2,722	4,917	482	445	3,802	267	154	476	95
June ....	...	8,818	668	304	13,428	1,060	2,860	4,484	354	105	3,036	247	208	1,116	95
July ....	...	6,118	617	304	10,886	1,062	3,034	4,861	354	48	2,568	247	139	497	33
Aug.	10	5,641	748	546	8,384	800	3,440	4,963	354	140	2,586	242	1,936	139	33
Sept.	46	6,866	848	1,345	7,914	788	3,649	4,504	330	319	3,121	317	3,020	61	26
Oct.	46	4,955	801	1,663	7,465	484	3,368	4,035	310	537	2,163	209			
Nov.	58	4,314	747	2,123	7,121	484	3,206	4,061	297	420	1,543	185			
Dec.	72	4,631	735	2,431	4,740	484	2,513	3,580	294	269	1,038	164			

^c Including No. 2 Yellow Hard Winter wheat.^d No. 1 Dark Northern Spring wheat.^c No. 1 Northern Spring wheat; No. 2 Northern Spring carried a 3-cent discount.