

“Volume and Open Interest”

Analysis as an Aid to Price Forecasting

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The technical analysis of commodity futures prices is basically a study of market action for the purpose of determining probable future price trends. By definition, the word technical pertains to a mechanical art while analysis refers to a method of proving propositions by assumptions and reasoning back to already established principles.

The primary elements of commodity futures market action are price movements, and volume and open interest changes. From the standpoint of technical significance, price movement is by far the most important. Any number of mechanical systems are employed by market analysts to interpret price changes for their forecasting implications. The more popular ones are vertical line chart analysis, point and figure methods, moving averages, ratio studies and swing charts.¹ In our continuous technical analyses of commodity price movements (published weekly in “Commodity Chart Service”), we utilize all of the aforementioned systems, in some measure, but rely most heavily on our vertical line chart studies.

What is “Volume and Open Interest”?

The remaining two elements of commodity futures market action are “volume” and “open interest”. The term volume (volume of trading or sales) represents a simple addition of successive futures transactions. It is a barometer of trading activity and a measure of the intensity of supply and demand for certain periods of time.

“Open Interest” or “open contracts” are purchase or sale commitments which traders have entered into and which remain outstanding. When speaking about “open interest”, one refers to the number of unliquidated contracts and never to the joint total of sales and purchases. For example, a new purchase of 5,000 bushels of wheat which is satisfied by a new sale of 5,000 bushels of wheat would result in a rise in open interest of 5,000 bushels of wheat. Open interest only increases when new purchases are offset by new sales. If a new purchase is offset by the sale of a previously purchased contract, then there would be no change in “open interest”. Decreases in open interest occur when previous purchases are sold and are offset by the buying in of previously sold contracts. This would mean that both buyers

and sellers were closing out previous commitments. Open interest can help determine the character of the buying or selling.

Next to futures prices, figures on volume and open interest are the most widely circulated futures market statistics. The Commodity Exchange Authority issues daily, weekly, monthly and annual statistical reports of volume and open interest.² This data is disseminated in part by exchanges, newspapers, wire services and commodity publications. The New York Journal of Commerce and the Commodity News Service's ticker are noted for reporting complete daily figures. Commodity Chart Service (a publication of Commodity Research Bureau, Inc.) reports many of these statistics in chart form.

Although the basis of technical analysis of commodity futures markets is the study of price movements, or more specifically chart analysis, we have found that the proper interpretation of volume and open interest changes is an extremely valuable supplementary technique. Volume and open interest statistics must always be used with price movements, and preferably with price charts. In our analysis, we go a step further and coordinate our studies directly with our vertical line chart analysis work.

As barometers of trading activity and indications of the type of buying, volume and open interest can often disclose changing conditions within the futures markets which may not necessarily be connected with obvious developments in supply and demand fundamentals of the actual or “cash” commodity. For example, new export business may be reflected in the futures market before it is publicly announced and result in increased open interest. Hedge lifting might occur in the futures market (buying in of short positions by trade interests who own the physical commodity) and result in higher prices but it may merely mean that cash business has been concluded. In this case, open interest would decline. Volume changes can measure the buying and selling pressure, which may be significant when coordinated with open interest and price fluctuations. These conditions within the market are referred to as “technical” and can help determine how futures markets may respond to changes of supply and demand fundamentals at a later date.³

The interpretation of volume and open in-

* Commodity Chart Service—a weekly publication of Commodity Research Bureau, Inc.

terest changes and a list of principles as a guide to this interpretation are presented later in the article. But, before describing specific rules for analysis, it is of basic importance to know how to read volume and open interest and to make certain adjustments.

How to Read "Volume and Open Interest" Statistics

The New York Journal of Commerce reports volume and open interest for wheat on Nov. 30, 1964 as follows.

	<i>Open Interest Wheat (1,000 Bushels)</i>	<i>Sales Wheat (1,000 Bushels)</i>
December	14,165	5,714
March	53,866	3,855
May	28,560	1,406
July	11,097	323
September	2,431	85
Total	110,119	11,383

Each line shows the total open interest and total volume for each of the wheat deliveries being traded. From the standpoint of technical analysis, the important figures are the totals — open interest 110,119 (in 1,000 bushels or 110,119,000 bushels), and volume 11,383 (1,000 bushels or 11,383,000 bushels). This means that on November 30, 1964 the total number of outstanding contracts in wheat amounted to 110,119,000 bushels (110,119,000 bushels were held by longs and an equal number were committed by shorts). The limited life of each delivery and rapid changes within each delivery render the study of volume and open interest changes of individual deliveries useless from the standpoint of our analysis techniques. Now, the open interest figures must be compared with totals on previous or later dates to find open interest changes. For example, on December 31, 1964 total open interest for wheat was 92,824,000 bushels as listed in the Journal of Commerce, and therefore, total open interest decreased from 110,119,000 to 92,824,000 or a net loss of 17,295,000 bushels for the period November 30, 1964 to December 31, 1964. In the same fashion, changes can be computed for each day by comparisons with the previous day.

Volume changes are different inasmuch as they refer to the total number of transactions for that particular day. Volume changes for a period are compared by adding each day's figures and then by comparing this with total volume of a similar period. For the purpose of analysis, volume considerations are much more important when studied as patterns of daily changes for a particular period. Some publications show these

daily changes as well as total figures. We have found that it is a mistake, however, to try to interpret day-to-day changes in both volume and open interest unless the changes for a particular day are extremely exceptional. Changes in volume and open interest are "on balance" figures for the day as a whole, and do not necessarily show trends within the day or the situation at the close. On a given day, heavy buying in the first hour of trading may so increase the level of open contracts and the price that, statistically speaking, new buying will be reflected as the dominant force in the market for the day. Later, in the trading session, however, a reversal of trend may launch new selling, liquidation, or covering, as the major trend at the close. Also, the price change on the exact day or days of significant changes in open interest may not be as important as subsequent price action immediately following the shifting of positions. We like to watch technical changes for periods of time ranging from a few days to a month and especially while important price chart formations are taking shape.

Seasonal Patterns

Once the actual figures are obtained, there are several considerations and adjustments that have to be made before applying the statistics to general rules of use. In the first place, open interest and volume changes follow certain seasonal patterns. These patterns do not vary much over the years so that changes can be anticipated fairly closely. The seasonal changes are very substantial for open interest, and any observed changes in open interest must be compared with the expected seasonal change. Volume changes also follow seasonal patterns, although they are not as wide and as significant as the open interest changes.

We have drawn a series of seasonal studies for the nineteen most active commodity futures traded on United States markets. These appear on pages 67 through 73. They are drawn on a percentage scale so that they may be better utilized for comparison purposes. Total open interest in a particular commodity can vary appreciably from one season to the next, but we have found that percentage changes during the season keep close to expected patterns.

Referring back to our example on reading open interest changes on this page, we will show how this can be adjusted for the seasonal variation. We showed that open interest decreased from 110,119,000 bushels on November 30, 1964 to 92,824,000 on December 31, 1964 or a loss of 17,295,000 bushels for the month of December, 1964. Percentage-wise, this amounts to $\left(\frac{17,295,000}{110,119,000}\right)$, 15½

percent. On the wheat seasonal chart on page 67, we note that the open interest in December normally declines about 12% (110% to 98%). Therefore, since it decreased 15½% instead of declining

12%, in effect this change amounted to a net effective decrease of roughly 3½ percent.

In order for an effective net increase to occur in wheat open interest for the month of January, actual open interest would have to decrease by less than 12 percent.

Volume changes can be compared similarly, but we have found that it is more important to compare volume in relation to previous periods of time. For instance, if volume has been running about 8 million per day and suddenly increases to a 12 or 13 million rate, the increase may be significant. Seasonal volume changes are usually not wide enough to be concerned with a seasonal adjustment.

Commodity Chart Service, a weekly publication of Commodity Research Bureau, Inc. features charts of total open interest and total volume updated on a daily basis. In addition seasonal charts (latest five year averages) are superimposed on the charts for a quick visual comparison which shows effective net changes at a glance.

The Significant Statistics

In summarizing, the important open interest and volume statistics are total open interest and total volume. Open interest changes must be adjusted for seasonal variations and effective net changes are the significant statistics. Volume changes are important from the relative viewpoint with minor adjustments for seasonal volume. And finally both open interest and volume for a particular commodity must be compared to the precise price changes for that commodity for the corresponding periods studied.

In the paragraphs that follow, we present general rules which should help one to understand what the net effective changes in volume and open interest may indicate and how they are used in price analysis.

How Volume and Open Interest Changes Can Reveal Forthcoming Price Trends

Considering price and volume changes alone, we have observed the following general behavior characteristics, or tendencies.

1. In a major price advance, volume increases on rallies and declines on reactions.

2. Conversely, in a major price decline, volume increases on price weakness and declines on rallies.

3. As prices decline towards a major bottom, volume becomes reduced, and then expands very sharply as prices make a major bottom.

4. When prices are rising towards a major top, volume becomes reduced near the top and then increases sharply at the top.

Price and open interest changes can often reveal the technical condition of the market, and if gauged correctly, can foretell how prices will respond to further buying or selling pressure.

5. If prices advance, and open interest increases more than seasonally, it means that aggressive

new buying has occurred. This would indicate a *technically strong* market.

6. If prices advance, and open interest decreases more than seasonally, it means that shorts have actively covered, leaving the market *technically weak*.

7. If prices decline, and open interest increases more than seasonally, it means that aggressive new selling has occurred. This would leave the market *technically weak*.

8. If prices decline, and open interest decreases more than seasonally, it means that active liquidation by longs has occurred, thus indicating a *strong* market condition.

Volume changes also tend to follow open interest in the four points above, but there can be notable diversions. For example in point 5 above, while volume may tend to decrease with open interest as prices advance and thus indicate a weak technical condition, it sometimes increases sharply with the price advance. Yet, if it is accompanied by a sharp drop in open interest, we would still regard the condition of the market as inherently weakened. The combining of the general rules for price, volume and open interest in diagram form would show up as follows.

Price Up	{	Volume and O.I. Up—Strong
		Volume and O.I. Down—Weak
Price Down	{	Volume and O.I. Up—Weak
		Volume and O.I. Down—Strong

(O.I.—open interest)

The general rules described above seem to work in the majority of situations we have studied covering a span of the past six years. However, this behavior was merely a tendency and definitely not a requisite for advancing or declining markets. A number of both "bull" and "bear" markets we studied did not conform to the so-called rules of volume and open interest behavior, and in some cases, prices acted quite contrary to expectations drawn from volume and open interest studies.

In order to improve our analytical techniques, we found that a close coordination of volume and open interest studies with price chart analysis was almost a necessity. When using our chart analysis techniques⁴ with volume and open interest, we found the most practical utilization of these rules occurred in the following situations:

A. *Blow-off action at major tops.* After a long price advance, tops may form quickly as prices advance sharply on high volume and a sharp drop in open interest.

B. *Climax selling characterizes some major bottoms.* After a long decline, prices drop sharply on heavy volume and a sharp drop in open interest.

C. *Anticipation of the force of a move underway.* Price moves out of consolidations will be

exceptionally great if open interest increased sharply in the consolidation.

D. *Validation of significant chart development.* A break-through of a critical chart level accompanied by increased volume and open interest is usually valid. If volume and open interest do not expand on the breakthrough, the move should be viewed with suspicion.

Illustrations

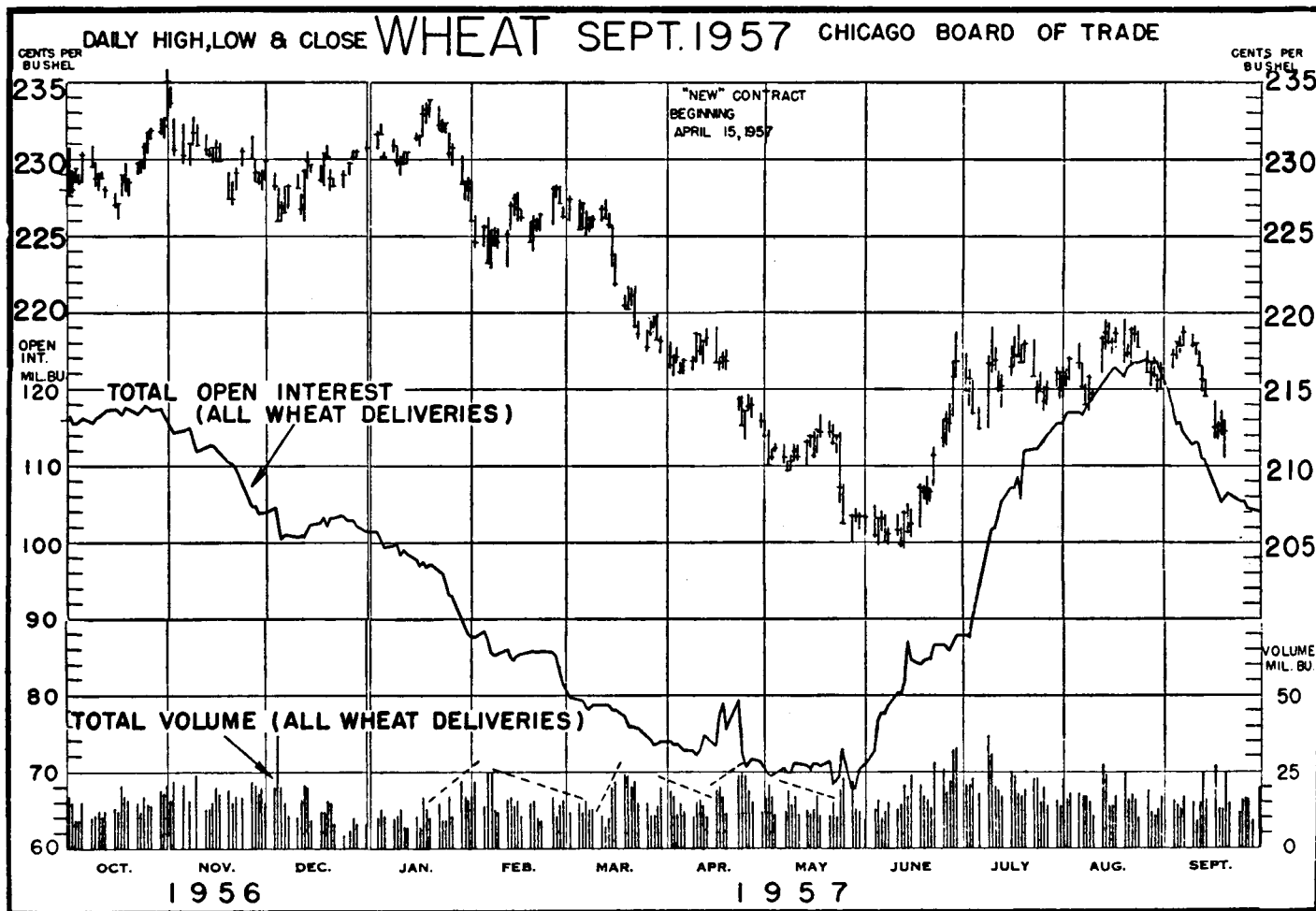
For the purpose of illustration, random choices of these commodities, all in the year 1957, were chosen. No attempt was made to find situations to exactly conform to the various rules enumerated previously. Seasonal open interest charts at the end of this article were updated beyond 1957, but studies have shown little percentage variations with seasonal patterns of earlier years.

Sept. 1957 Wheat

The chart showing daily high, low and closing prices for Sept. 1957 wheat is depicted below. It also indicates total open interest and total volume (all contracts).

The absolute top for this wheat delivery of

\$2.35 $\frac{3}{4}$ was established on Oct. 31, 1956, although a secondary top also occurred at 233 $\frac{7}{8}$ on Jan. 18. An examination of the volume and open interest for the periods when these tops were made show that the rallies to these highs were accomplished on relatively very light volume. The decline from the first top (Oct. 31) also was characterized by similar volume, which was an indication that a major bear market was not beginning. However, the decline from the second top on Jan. 18, was accompanied by increasing volume which pointed to a major top and conformed with rule 4 on page 63. The open interest change for the period Oct. 1 to Jan. 8 showed a net decrease of about 18 percent. From our seasonal chart on page 67, we would expect a drop of 30 percent for that approximate period. This means that, in effect, open interest increased a net 12 percent. The net buildup occurred in the price range of \$2.26-\$2.35 $\frac{3}{4}$. We know that this unusual buildup of open interest in this area has changed the complexion of the market, but we do not know whether it means that the market is technically strong or weak. This was resolved when prices broke below \$2.26, thus leaving the market greatly weakened and ripe for the subsequent major decline which followed. (See rule C on page 63.)



Rule 1 on volume behavior is very well illustrated in the major decline which followed. Volume increased on each declining step and decreased on the rally phases. Rule 3 helps to describe the "saucer" bottom that occurred in June. Prices were relatively light on the bottom and then for the first time in almost six months, rallied on heavy volume. Note how open interest increased sharply in the saucer.

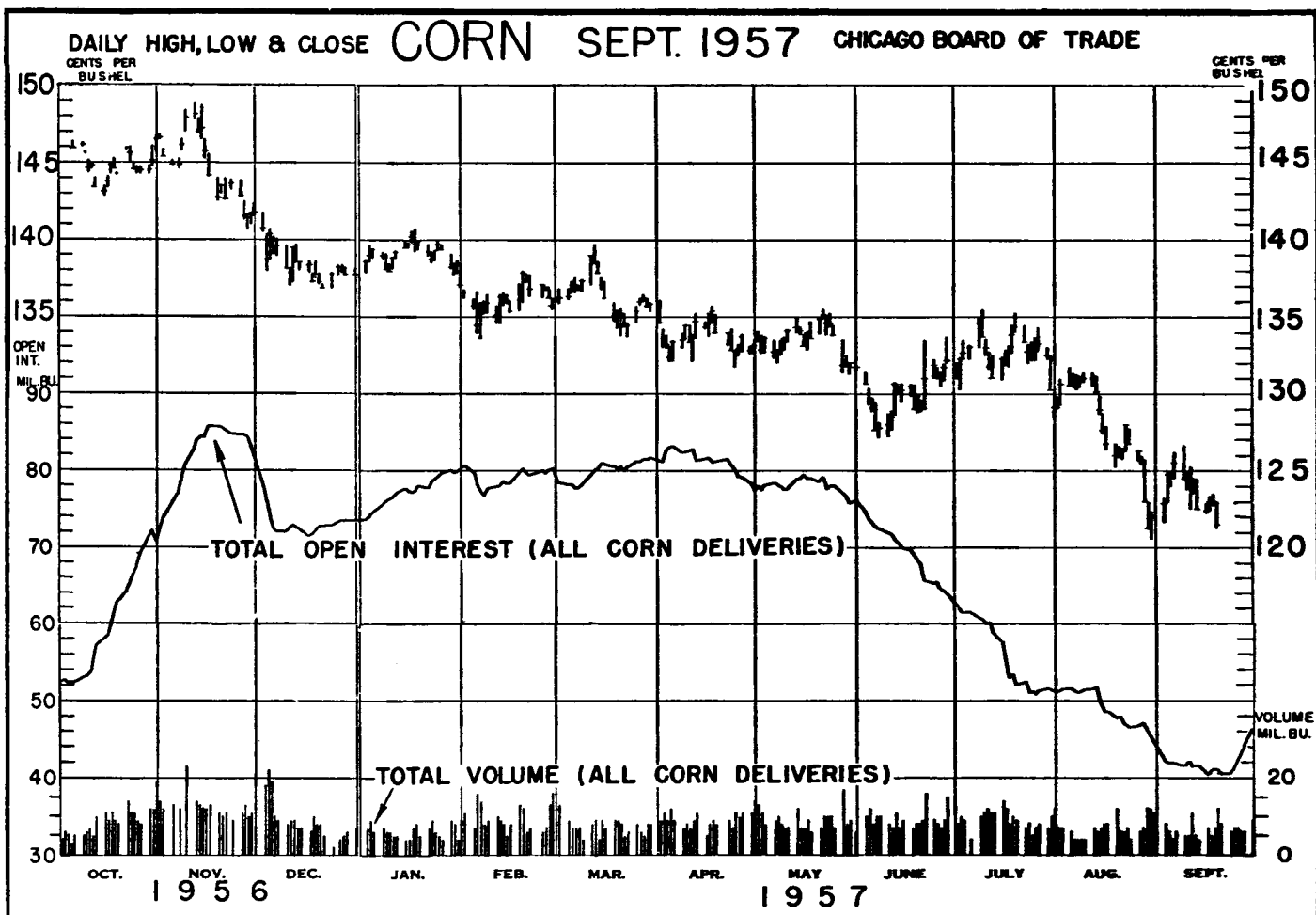
The chart development between July 1 and Sept. 10 is especially interesting from the technical view. The chart pattern is extremely bullish, but the breakthrough to new highs in August was not supported by volume and open interest theory. Notice how volume on the rally to new highs in mid-August was well below the previous volume peaks. Open interest increased only about 4 percent in the period Aug. 1-Aug. 20. According to seasonal expectations, open interest should have increased about 7 percent; thus, the net effective change was a minus 3 percent. From the diagram on page 64. Price up,—vol. & open int. down, therefore, technical condition of the market would be expected to be weak.

Sept. 1957 Corn

The corn chart presents an excellent illustration of how volume and open interest changes

revealed exceptionally weak technical conditions of the market during a declining phase and later on following or sharp rallying phase.

From the chart below, you will note that prices trended very gradually lower Jan. 1 to June 7. Through this entire period, open interest showed little or no change. According to the seasonal pattern, open interest should have decreased about 26 percent. This resulted in a net effective buildup of 26 percent while prices were declining; thus leaving the market in a major weak technical condition. Then, the technical condition of the market was further weakened during a rally phase of development. Prices rallied from a low of 127½ on June 7 to 135¼ on July 19. During this period, volume was heavy on specific days especially near the high of the move but it was down for the period as a whole in relation to previous periods. On the other hand open interest declined approximately 27 percent. From the seasonal open interest pattern for corn on page 69, it can be seen that open interest would be expected to drop about 11 percent. Therefore, the net effective change in open interest was a decline of about 16 percent. Using the diagram on page 65, we note that price up—volume and O.I. down, the condition of the market is weak. Actually, prices were up sharply, (other



deliveries registered gains of 11 cents) open interest was off sharply and volume only off slightly which makes for an exceptionally weak technical condition and prices declined from 135½ to 120½. Subsequently, other deliveries continued to decline after the expiration of the September contract. The March 1958 contract, which was quoted at \$1.28 on Sept. 19, eventually dropped to a low of \$1.08½ on Jan. 31, 1958.

Sept. 1957 Soybeans

The Sept. 1957 soybean chart discloses an unusual market picture. In the space of just four months, prices completed what amounted to a major move upward and a major move downward. The small saucer bottom completed in June is an excellent illustration of rule 3 on page 63. The bottom was formed between May 28-June 21. Volume for the period was clearly the lowest of the year up until that point, and then expanded sharply as prices turned higher. Later, prices reached levels 30 cents from the low. Open interest increased at the bottom, but just about in line with seasonal expectations.

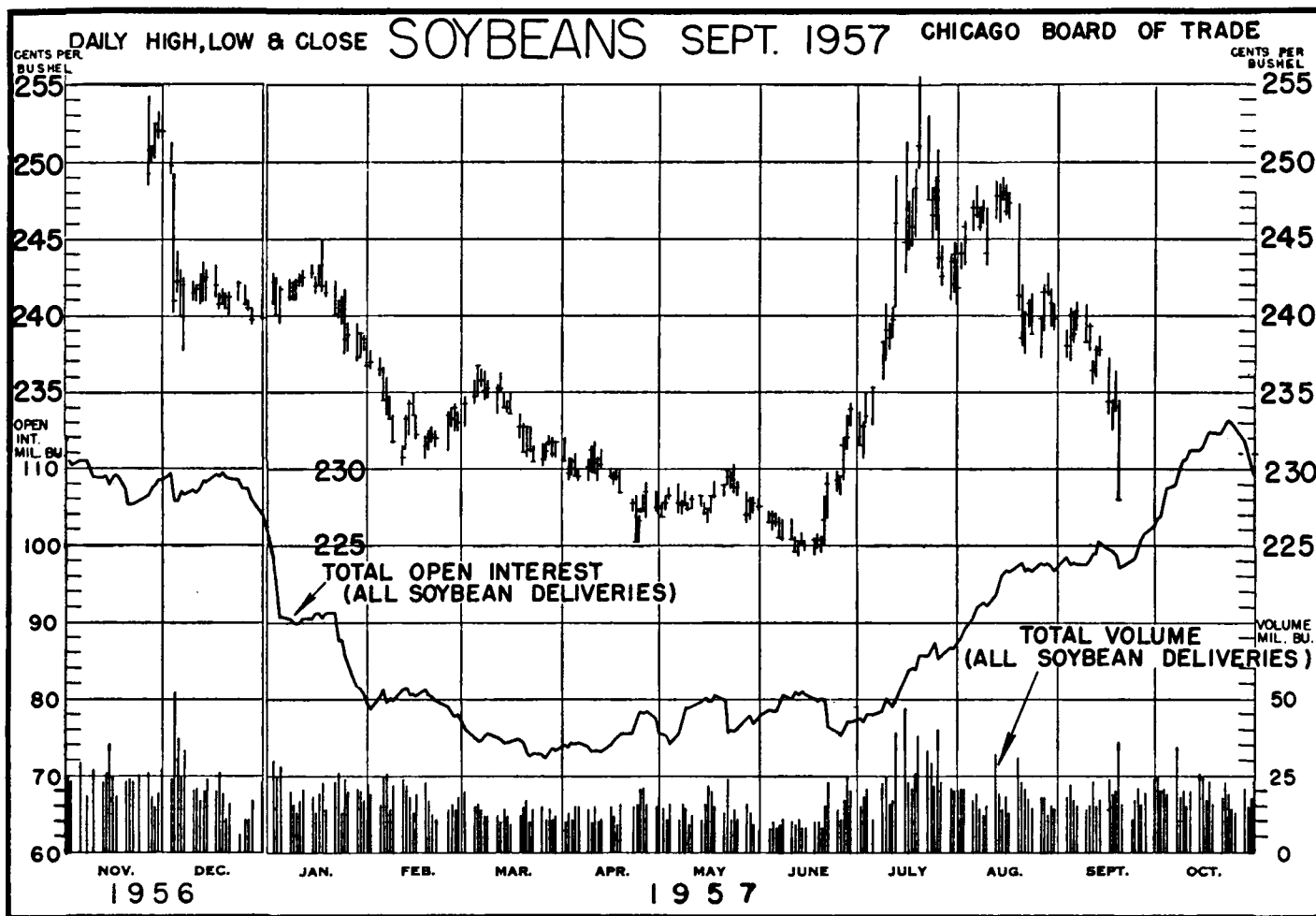
It is of interest to note that the subsequent top did not closely follow rule 4 which described volume action at the top. In this case, volume built

steadily to a peak at the very top. However, it confirmed the top when it decreased sharply on the rally back from August 1 to August 13.

Close independent study of the examples shown on the preceding pages should reveal that open interest and volume changes do not always conform to the expected behavior patterns. It should also be obvious that day-to-day changes, and frequently, changes for substantial periods of time can be meaningless. And, even when significant developments occur, it is not always easy to assess their bearing on prices. This is especially true when one is following price action as it develops and not neatly drawn for study in retrospect.

Conclusion

There are undoubtedly many systems in use by commodity market analysts which utilize volume and open interest studies, but for the most part, such work remains unpublished. The rules and methods described herein are not basically original although the adoption of some of the rules and the refinements are based on research and the experience of day to day study. The author is especially indebted to the late Mr. Victor Lea, whose own original work and guidance were par-



ticularly stimulating to this line of technical research.

It can be seen from just the few examples of how volume and open interest is used that their proper analysis can be a useful tool for the technical analysis of commodity futures prices. In our continuous analysis of commodity price trends, we have found that volume and open interest is invaluable as a corroborative technique for our other technical studies.

However, as in any price forecasting method for commodity prices, there are several limitations to their reliability, and considerable allowance must be made for errors. The nature of the major factors that motivate commodity prices are often completely unpredictable. Dynamic and unexpected occurrences suddenly may reverse trends without warning. Rains or other weather developments, overnight governmental decisions, international tension, or strikes can disrupt completely any forecasts made on the basis of technical analysis.

Another limiting influence is that volume and open interest changes usually are not decisive and rarely do they conform exactly to the rules. Their proper analysis is subject to differences of

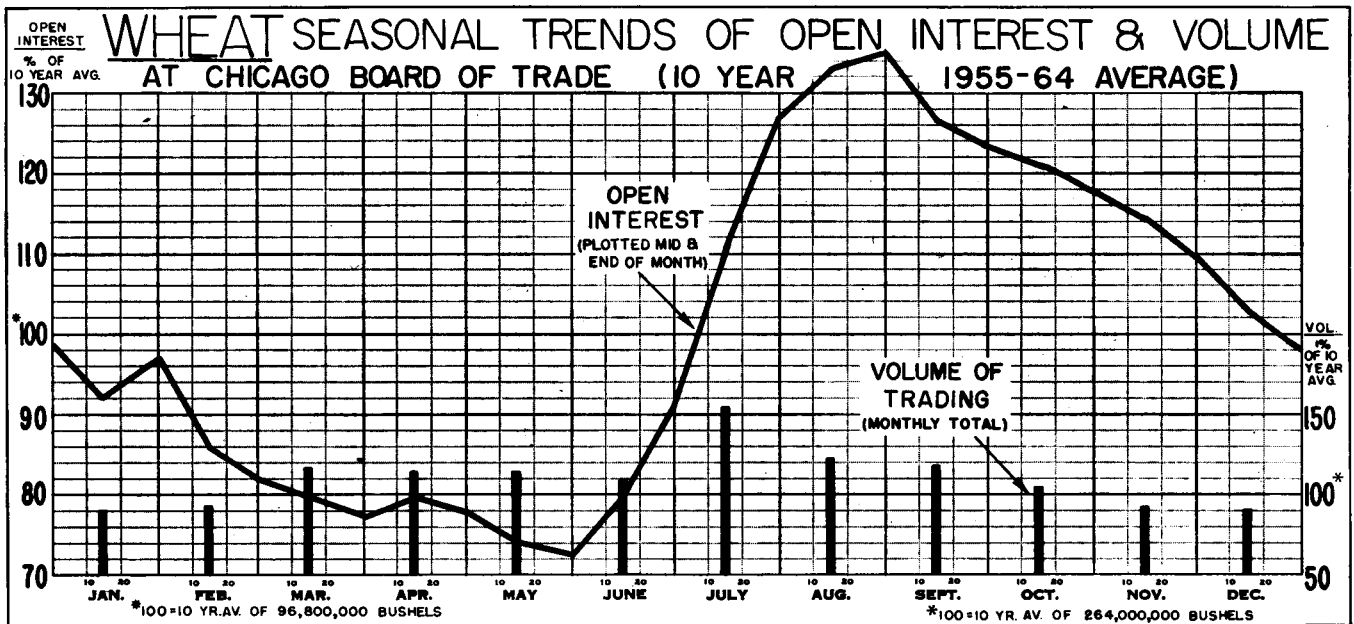
interpretation. We have found that the proper analysis requires skill that can only be gained by experience.

Placing the use of volume and open interest analysis in its proper perspective in the fields of technical analysis, we would label it a minor analytical technique. We believe that it should only be used as confirmation of price analysis such as chart interpretation and other trend following methods. For the price trend analyst, periodic examination of volume and open interest changes are usually sufficient to derive the maximum benefit of their forecasting value. Precise measurements and day-to-day study are not particularly necessary and they can distort and detract from other kinds of analysis.

Footnotes:

1. Trend-Following Methods In Commodity Price Analysis—please see page 48.
2. Reports and Statistical Services of the Commodity Exchange Authority—please see page 74.
3. The Significance of Open Interest in Commodity Futures Market—1954 Commodity Year Book.
4. Chart Analysis As An Aid to Commodity Price Forecasting—please see page 23.

CHART APPENDIX*



*Because of the major importance of wheat, we have listed it first. All other commodities are in strict alphabetical sequence.

