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#### HOLBROOK WORKING\*

### TESTS OF A THEORY CONCERNING FLOOR TRADING ON COMMODITY EXCHANGES<sup>†</sup>

#### Abstract

Recent studies of the behavior of futures prices have given reason to believe: (a) that the short-lived price dips and bulges occasioned by hedging orders are commonly larger than economists have ordinarily supposed, and of considerably longer duration, sometimes extending over as much as three or four days; and (b) that professional scalpers on futures markets, who aid in the absorbtion of hedging orders and profit from the service thus rendered, tend to lose money, on balance, to other speculators and to depend for their incomes on their services to hedgers.

To the extent that hedging orders affect the price, hedgers tend to sell on price dips and to buy on price bulges, and therefore tend to lose money on their transactions in futures. The consequent losses, being incurred for the sake of obtaining prompt execution of orders, may be called the execution cost of hedging. If the dips and bulges occasioned by hedging orders are as large as has been indicated by the recent price studies, execution cost may be a major fraction of the total cost of hedging, and a major source of income to speculators in futures. If so, three major consequences follow, each serving to explain a hitherto unexplained fact concerning the relation between speculation and hedging. These consequences, and the explanations to which they lead, are:

(1) The income flow from hedgers to speculators is much larger than has previously been estimated, and has been positive and substantial even in markets and during periods in which the seasonal trend of futures prices by itself has afforded no income, or has been a source of loss, to speculators as a group. The well-established fact that the amount of speculation on a futures market is closely dependent on the amount of hedging is thus rendered generally explainable.

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<sup>&</sup>lt;sup>+</sup> This paper owes much to the kindly efforts of many people to assist in supplying information. Members of the exchanges who were especially helpful include George A. Jones, George J. McKerr, Joseph Klein, Paul F. McGuire, and Richard F. Uhlmann. W. Edwards Beach provided the list of floor traders required for compilation of Table 1. Most of the information was gathered under a grant (1949–1952) from the Merrill Foundation for the Advancement of Financial Knowledge, and that grant supported also the earlier part of the work of Claude S. Brinegar that is cited in the text. Major contributions of Brinegar and of Arnold B. Larson toward the foundations of the present study are summarized in the text.

(2) An increase or decrease in the volume of hedging transactions tends to produce an immediate and substantial increase or decrease in the income of speculators as a group. This allows explanation of the previously unexplained fact that changes in the amount of hedging on a futures market have been found uniformly to tend to induce corresponding changes in the amount of speculation with great promptness, and under circumstances that do not allow attributing the increase or decrease in amount of speculation to speculators' expectations regarding the amount of hedging (for example, when the amount of hedging, varying seasonally, has taken an unusual course, the amount of speculation has tended to do so likewise).

(3) The income of speculators, as a group, depends in a large part on the total amount of hedging, short plus long, rather than merely on the net amount of hedging, short minus long (as should be expected, for example, from the theory of normal backwardation). The fact that thus becomes explainable has appeared in two forms, mutually consistent, but with differing implications. All studies of the relation between amounts of speculation and of hedging, in markets with a substantial amount of long hedging, have shown the amount of speculation, as measured by open contracts, to be much more closely related to the amount of short hedging,  $H_s$ , than to the net amount of hedging,  $(H_s - H_L)$ . The meaning of that fact was eventually clarified through study of the relationship between amounts of hedging, long and short, and the amount of "excess" speculation, with results that may be summarized as follows:

The relationship between the amounts of speculation and of hedging in a futures market, as measured by open contracts, is subject to the constraint that, as the amount of short speculation,  $S_s$ , approaches zero, the necessary equality between total long and total short contracts, requires that,

$$S_L + S_s \to H_s - H_L \qquad (S_s \to 0; H_s > H_L).$$

The existence of this constraint is properly recognized if we write, as a general expression for the relation between speculation and hedging,

$$S_L + S_s = (H_s - H_L) + f(H_s, H_L)$$
  $(H_s > H_L).$ 

The term  $f(H_s, H_L)$  may be said to measure "excess" speculation, in the sense only of excess over a mathematically minimum value of  $S_L + S_s$ . In amount, it equals  $2S_s$ . The form of the function,  $f(H_s, H_L)$ , may be inferred from theory, or derived statistically.

Theories that have ignored the execution cost of hedging, yet regarded speculation as a gainful occupation, supported by income from hedgers, have implied expectation that,

$$f(H_{s},H_{L}) \simeq B(H_{s}-H_{L}).$$

But direct statistical derivation of the relationship yielded,<sup>a</sup>

$$f(H_s, H_L) \simeq B(H_s + H_L).$$

<sup>&</sup>lt;sup>a</sup> Holbrook Working, "Speculation on Hedging Markets," Food Research Institute Studies, Vol. I, No. 2, May 1960, p. 196. For the purposes of that study "speculation" was defined to exclude spreading, and the largest values of B were found for soybeans (B = 0.56) and cotton and potatoes (B = 0.54); if spreading contracts had been included as speculative, substantially higher values of B would

Such a result is to be expected if execution cost provides the chief source of income for speculators in futures. It may also be explainable if execution cost is no more than a substantial source of speculative incomes, not the chief source.

The facts summarized above strongly support the theory that the execution cost of hedging is a major source of income to speculators in futures, and is perhaps their chief source of income; yet the theory deserves to be tested otherwise, if possible. The accompanying paper makes a test on the basis of evidence that is largely independent of any considered above, namely, evidence on the nature and extent of floor trading on commodity exchanges.

Scalpers on futures markets operate almost wholly as floor traders, and derive income from hedgers through temporarily absorbing hedging orders that are not immediately absorbed otherwise. If the price dips and bulges occasioned by hedging orders are commonly of such size and duration as has been indicated by recent price studies, much scalping must involve the holding of positions for considerably longer intervals of time than has been implied by the traditional description of scalping; and scalping must involve more risk than has been implied by those descriptions, and more effort at anticipating the larger price movements on which the dips and bulges are superposed. In short, most floor trading may be scalping.

The results of testing that hypothesis were uniformly favorable to it, as may be seen from the accompanying paper. Some of the results were, to me, quite unexpected. In accordance with the obvious inference that scalping of large dips and bulges, would be a more speculative business than the scalping of very small ones, we find that on a large futures market, where there is opportunity for scalpers to choose whether to concentrate on either the less speculative or the more speculative types of scalping, such specialization does occur. In addition to specialization according to length of holding interval, we find many scalpers restricting risks in connection with dips and bulges of comparatively long duration by specialization in a combination of scalping and spreading.

We find that scalpers necessarily act in a manner that tends to give an observer the mistaken impression that they are trend traders rather than scalpers. Even a scalper who was engaged in the least speculative type of scalping, held that ability to recognize price "trends" is the most important requirement for success at scalping. And analysis of a two-month trading record of a professional "day trader" produced evidence, not only that his profits were being derived wholly from scalping dips and bulges, but that his financial results, day by day, resulted chiefly from price trends, and that he was losing money, on balance, in connection with the trends.

In sum, all of the evidence on floor trading that we find tends to support the view that the dips and bulges occasioned by hedging orders are commonly larger and of much longer duration than has ordinarily been supposed, and that the execution cost of hedging, in consequence, provides a major source of income to speculators in a futures market. Most floor trading on futures markets appears

have been obtained. Though spreading is a form of speculative trading, it is so much less speculative than "outright speculation" as to require separate treatment, which was not undertaken in the study cited.

to be scalping, contributing to the fluidity of the markets, and making hedging less costly than it would otherwise be.

#### Introduction

The theory that this paper undertakes to test is that most floor trading on commodity exchanges is scalping, which has the economically important effect of restricting the costs of hedging.<sup>1</sup>

We begin by examining data on the amount of floor trading, and some of its characteristics, to learn the leading facts that a theory of floor trading must account for. Then follows a functional classification of speculation, a summary of significant known characteristics of the behavior of futures prices, and a description of the chief known forms that scalping takes. The summary of price characteristics includes recent statistical evidence that gave clear plausibility to the theory being tested. The description of differing forms of scalping rests on direct observation of the forms of trading described, but their classification as scalping is in part hypothetical. Consequently the description is in part an elaboration of the theory that we undertake to test.

Next we look at a brief concrete example of the clearest and simplest form of scalping, and find that careful discrimination is needed to distinguish between scalping and trend-trading. We examine the problem critically because floor trading on commodity exchanges must consist chiefly either of scalping or of trend-trading, and if we cannot distinguish between those two, we can neither confirm, nor successfully contradict, the theory that we have undertaken to test.

The tests that are made include detailed analysis of a two-month trading record of a "day trader," and some further analysis of data on the amounts of floor trading in different markets.

#### 1. Amount of Floor Trading

The only complete tabulation that I know of business done by floor traders on a commodity exchange is summarized in Table 1, and shows that floor traders accounted for a full one-half of all the transactions in wheat futures at Chicago on that day. But they held only about 14 per cent of the open contracts. As a record of floor trading, that tabulation is somewhat overcomplete. Some part of the trading recorded consisted of transactions executed by brokers for persons who were not then present on the floor of the exchange, yet who were listed as floor traders because they did occasionally choose to execute their own transactions. Data for such occasional floor traders presumably appear chiefly in categories I, 4 and II, 2.

The 10-month record of floor trading that is summarized in Table 2 is incomplete chiefly in the respect that it omits data for those floor traders who never, during the 10 months of the record, dealt in as much as 200,000 bushels of a single future (100,000 bushels at Kansas City) on any one day. This limitation resulted

<sup>1</sup> The theory emerged in my mind as a possible solution to the problem of explaining the observed close dependence of speculation on hedging in futures markets. Its effectiveness in that respect is indicated by the three major consequences stated in the accompanying abstract of the paper.

## TABLE 1.—CLASSIFICATION OF TRANSACTIONS AND OPEN CONTRACTS OF TRADERS IN CHICAGO WHEAT, SEPTEMBER 18, 1947\*

|  |             |                            |                     | Amount of | trading            | Floor<br>tracling as |
|--|-------------|----------------------------|---------------------|-----------|--------------------|----------------------|
|  | Number      | Initial open               | contracts           | Apparent  | _                  | per cent             |
| Class of floor traders                               | traders     | Long                       | Short               | daya      | Other <sup>b</sup> | trading              |
| I. With transactions, total                          | 133         | 11,295                     | 10,401              | 11,031    | 700                | 50.3                 |
| 1. Zero over night position <sup>o</sup>             | 35          | 0                          | 0                   | 1,900     | 0                  | 8.1                  |
| a. Sold 100,000 bu. or more                          | 5           | 0                          | 0                   | 1,100     | 0                  | 4.7                  |
| b. Sold less than 100,000 bu.                        | 30          | 0                          | 0                   | 800       | 0                  | 3.4                  |
| 2. Overnight position even <sup><math>d</math></sup> | 23          | 4,270                      | 4,270               | 2,870     | 0                  | 12.3                 |
| 3. Small overnight net position                      | e 31        | 3,336                      | 3,242               | 4,964     | 129                | 21.8                 |
| 4. Others  | 44 <i>1</i> | 3,689                      | 2,889               | 1,297     | 571                | 8.0                  |
| II. Without transactions, total                      | 490         | 4,126                      | 2,787               | 0         | 0                  | 0                    |
| 1. Overnight position, even                          | 31          | 1,300                      | 1,300               | 0         | 0                  | 0                    |
| 2. Others  | 18          | 2,826                      | 1,487               | 0         | 0                  | 0                    |
| Grand total  | 182         | 15,421 <sup><i>h</i></sup> | 13,188 <sup>h</sup> | 11,031    | 700                | 50.3                 |

\* Data compiled from mimcographed reports of Commodity Exchange Authority (CEA) to Senate Committee on Appropriations, November 24, 1947, and January 5, 1948, supplemented by a list of floor traders supplied by the CEA.

<sup>a</sup> Purchases accompanied by an equal amount of sales during the day, but not necessarily for the same delivery month-hence includes spreading transactions.

<sup>b</sup> Purchases plus sales, divided by two.

<sup>c</sup> No open contracts at either the beginning or the end of the trading session.

<sup>d</sup> Equal long and short positions in different futures, at both the beginning and the end of the trading session.

<sup>o</sup> Net position, at both the beginning and the end of the session, not over one-tenth of the maximum volume of trading on that or either of the two following days.

<sup>1</sup> Includes 17 with net position exceeding 20,000 bushels long or short, 2 of whom each had a net position exceeding 100,000 bushels.

g Of these, 24 had transactions in wheat on at least one of the next two days.

 $^{h}$  These totals represented 14.7 and 12.5 per cent, respectively, of total open contracts.

in excluding data for most of those floor traders whose trading was subsidiary to their main occupation, as brokers executing transactions for others.<sup>2</sup>

The result approximates a record of professional floor trading, by people for whom such trading was their principal source of livelihood.

But Table 2 fails to cover all full-time professional floor trading. Those included are described as "scalpers or pit traders...who buy and sell during the trading session, often in large quantities, but who are practically always 'even' at the close of the session" (11, p. 12). (The latter part of that characterization might better have read "practically always 'even' or nearly so, at the close.") The chief class of professional floor traders omitted are those who devote themselves

<sup>2</sup> Slightly less than half of the floor traders in Table 1 were brokers. A sample of about three-fifths of them (whose names began with letters A to M), showed the following distribution among the categories of Table 1:

|                 |     |     | I |   |   |    | II | Total |
|-----------------|-----|-----|---|---|---|----|----|-------|
| Category:       | 1,a | 1,b | 2 | 3 | 4 | 1  | 2  |       |
| No. of brokers: | 1   | 10  | 0 | 4 | 8 | 10 | 7  | 40    |

Among these 40, there were 3 who bought and sold as much as 100,000 bushels during the day, and 3 others who had open contracts of as much as 100,000 bushels, with equal amounts long and short.

| Market and commodity | Number<br>of<br>traders <sup>a</sup> | Average<br>daily amount<br>of trading <sup>b</sup> | Open<br>contracts <sup>o</sup> | Per cent of<br>total trading | Per cent of<br>open<br>contracts |
|----------------------|--------------------------------------|--|--------------------------------|------------------------------|----------------------------------|
| Chicago              |                                      |  |                                |                              |                                  |
| Wheat                | 63                                   | 7,342  | 357                            | 23.2                         | .4                               |
| Corn                 | 45                                   | 2,282  | 188                            | 10.9                         | .2                               |
| Kansas City          |                                      | •  |                                |                              |                                  |
| Wheat                | 3                                    | 162  | 33                             | 11.1                         | .2                               |
| Corn                 | 3                                    | 79   | 18                             | 11.0                         | .3                               |

#### TABLE 2.---STATISTICS OF LARGE-SCALE SCALPING IN WHEAT AND CORN, 1927\* (Thousand bushels, except as otherwise indicated) A. Average Daily Amounts, January through October

#### B. Monthly Averages of Daily Amounts, Chicago

|           | Wh               | neat                 | Corn             |                      |  |
|-----------|------------------|----------------------|------------------|----------------------|--|
| Month     | Amount<br>bought | Per cent<br>of total | Amount<br>bought | Per cent<br>of total |  |
| January   | 5,364            | 22.2                 | 1,111            | 11.6                 |  |
| February  | 4,911            | 21.9                 | 1,345            | 11.0                 |  |
| March     | 6,524            | 22.3                 | 1,336            | 11.6                 |  |
| April     | 6,046            | 21.2                 | 917              | 8.0                  |  |
| May       | 9,850            | 22.5                 | 2,810            | 10.8                 |  |
| June      | 9,715            | 24.3                 | 3,180            | 9.2                  |  |
| July      | 7,598            | 22.0                 | 2,368            | 11.0                 |  |
| August    | 8,699            | 24.5                 | 3,617            | 12.3                 |  |
| September | 7,136            | 25.5                 | 3,575            | 11.4                 |  |
| October   | 7,295            | 25.2                 | 2,640            | 12.0                 |  |
| Average   | 7,341            | 23.2                 | 2,282            | 10.9                 |  |

#### C. Daily Trading and Day-End Positions, Chicago Wheat, First 12 Trading Days of January

|        | Purcl  | ases     |        |          |  |
|--------|--------|----------|--------|----------|--|
|        |        | Per cent | Open c | ontracts |  |
| Date   | Amount | of total | Long   | Short    |  |
| Jan. 3 | 3,721  | 24.2     | 247    | 480      |  |
| 4      | 10,532 | 20.2     | 273    | 705      |  |
| 5      | 4,948  | 23.1     | 371    | 540      |  |
| 6      | 5,065  | 24.4     | 296    | 369      |  |
| 7      | 8,242  | 20.5     | 464    | 333      |  |
| 8      | 7,324  | 25.5     | 368    | 198      |  |
| 10     | 3,584  | 21.9     | 399    | 305      |  |
| 11     | 3,459  | 23.0     | 300    | 430      |  |
| 12     | 8,760  | 21.3     | 541    | 188      |  |
| 13     | 5,729  | 23.0     | 736    | 488      |  |
| 14     | 3,670  | 20.0     | 571    | 451      |  |
| 15     | 3,092  | 22.7     | 592    | 443      |  |

\* Data from Reports by Members of Grain Futures Exchanges, Part 2 (U.S. 71st Cong., 2d Sess., Senate Document No. 123), pp. 13, 117, 132, 159, 227, 246, 302, 307, 316, and 321. <sup>a</sup> Number of floor traders with transactions on at least one day aggregating 200,000 or more bushels at Chicago, or 100,000 or more bushels at Kansas City, in a single wheat or corn future. <sup>b</sup> Purchases plus sales, divided by two.

<sup>o</sup> Long plus short open contracts, divided by two.

primarily to spreading (arbitrage) between options or between markets. Table 2 consists mainly of data for such floor traders as, in Table 1, would fall in the categories I, 1, a, and the larger-scale traders of category I, 3. Apart from the fact that Table 2 is restricted to fairly large-scale floor trading, the difference in coverage between the two tables is most clearly reflected in the fact that, whereas the traders in Table 1 accounted for some 14 per cent of total open contracts, those of Table 2, in the case of Chicago wheat, accounted for only 0.4 per cent of total open contracts.

A particularly noteworthy feature of Table 2 is its evidence that the kind of trading which it covers varied widely in amount from day to day, and considerably from month to month, and that this variation was in rough proportion to that of total trading in the market. Other features of the data in the foregoing tables will receive attention on subsequent pages, especially in Sections 4 and 11.

#### 2. Classes of Speculation

Speculative trading in commodities may be classified functionally into the following four categories: (1) price-level trading; (2) news trading; (3) scalping; and (4) other speculation.

The first two of these categories comprise trading based on information concerning current and prospective supply and demand for the commodity. The price-level trader tends to concern himself especially with information that favors judging reliably what level of price is warranted.<sup>3</sup> The news trader concerns himself with information that gives early indications of the changes that are continually occurring in prospects for supply and demand. The kinds of information that can give useful indications of future supply or future demand are extremely varied, and differ considerably from one situation to another; news traders must give a great deal of their attention, continuously, to discovering what currently available information deserves to be regarded as significant.

The activities of news traders, and of agencies gathering information particularly for them, may often cause a change in economic prospects to be recognized, and the price to change correspondingly, some weeks or even months before the change in prospects would have been recognized by price-level traders. But the leading news traders tend to be quick to share their ideas on the significance of new information, and to publicize information that they may have been the first to acquire. Consequently, a news trader who has been among the first to acquire significant new information, or to recognize its significance, rarely has to wait long before taking profits from the purchase or sale that he has made on the basis of that information. News trading characteristically involves much shorter holding intervals than does price-level trading.

A considerable amount of speculation in commodities is based on observation (or sometimes mistaken belief) that certain economic conditions tend to result in an upward price tendency, or a downward price tendency. An example is spec-

<sup>&</sup>lt;sup>8</sup> Few, if any, experienced speculators confine themselves to either price-level trading or news trading; the sentence above is to be understood as meaning "A speculator, when doing price-level trading, tends to concern himself..." In trade practice, *position trading* is the term ordinarily used to designate what is here called *price-level trading*. The judgments formed in connection with such trading are rarely expressed, or thought of, as precise estimates of the price level that is warranted; they tend instead to take the form of a judgment that the current level of the price is higher than, lower than, or close to, the level warranted.

ulation based on the belief that prices tend to be relatively depressed at about harvest time, and to rise gradually thereafter. Such speculation is clearly not news trading, and it is not typical price-level trading. It might be put in a category of its own, but I choose instead to regard it as a somewhat atypical kind of pricelevel trading.

Scalping is sometimes defined narrowly, to include only scalping of the smallest dips and bulges that occur in futures prices; but the term is used here to cover any trading that is concerned primarily with buying on price dips and selling on price bulges. The "dips and bulges," however, are defined as small and brief price disturbances. The duration of most of them, in an active futures market, is measured in minutes, and the longest of them may last no more than a few days. Many of them arise from speculative buying or selling, but the larger ones are produced chiefly by hedging orders.<sup>4</sup> Hedging is commonly done through "market" orders, for immediate execution. These market orders tend always to have some immediate price effect; but they are ordinarily not associated with a corresponding change in economic prospects, and the price effect of a hedging order tends therefore to be transitory, the price soon recovering, or falling back, toward its prior level.

Scalping serves to restrict the size of dips and bulges. Because of the presence of scalpers in a futures market, hedgers can use market orders more freely than they otherwise could; and when hedgers use market orders, as they ordinarily do, they buy a little more cheaply, and sell at slightly higher prices than they could do in the absence of scalping. And to the extent that hedging is responsible for the price dips and price bulges from which scalpers draw their profits, hedgers are the immediate source of scalping incomes.

"Other trading" is a mixed category of uncertain size and composition. Opinions regarding the amount of speculation that remains for inclusion in this final category, and the nature of that speculation, depend heavily on opinions regarding the nature and causes of speculative price movements. The first two classes of speculation listed above comprise all speculation based on relevant supply and demand information. The second two classes, then, comprise trading based on tendencies for a price to move in certain more or less predictable patterns. The prediction must be, for the most part, either prediction of continuation in a given direction, which involves trends, or prediction of reversal in the direction of price movement. Present evidence seems to me to indicate that the only important reversal tendency present in futures prices is that associated with the dips and bulges from which scalpers make their profits. If so, the only "other" kind of trading that seems to hold much opportunity for speculative profit in a modern, well-conducted market, is trend-trading, which seeks profits from "riding" price trends.

When we come to assign recognized kinds of speculation to the appropriate category in the foregoing classification, some speculation must tend to fall into

<sup>&</sup>lt;sup>4</sup> Note that a bulge, for example, is a price advance of such nature that it tends to be followed quickly by a price decline of similar magnitude; the term is often used also to designate the course of the price through the entire interval from beginning of advance to termination of the subsequent decline. I use the term in the latter sense when speaking of the duration of a bulge. Speculative buying presumably tends to promote price advance at least as strongly as does an equal amount of hedge buying, but an appreciable price advance induced by speculative buying normally does not carry with it a probability of quick subsequent decline, as does a price advance induced by hedge buying.

the "other" category simply because we do not know enough about its nature to classify it more specifically. So-called chart-trading is an example. Yet it may be that a substantial fraction of chart-trading deserves to be regarded as a form of scalping.

Nearly all floor traders, in my experience, deny that they do either price-level trading or news trading. Moreover, it is not to be expected that a price-level trader or a news trader would choose to work on the floor of the exchange. The information needed for either sort of trading can be gathered and studied more conveniently and effectively in an office than on the exchange floor. And if a professional news trader worked on the floor of the exchange, the nature of his trading would soon become known to his associates. When he sought to buy, for example, on the basis of new information, not yet publicized, none of his associates on the floor of the exchange would want to sell to him, and some would follow his lead and seek also to buy. His news-trading efforts would thus be largely frustrated.<sup>6</sup>

A scalper, on the other hand, must be present on the exchange floor, and must execute his own transactions in order to work to best advantage. Dips and bulges are produced by "market" orders, and the scalper who profits from a dip, for example, is the one who is able to absorb the selling order that produced the dip. The broker handling a selling order ordinarily tries first to make the sale at the same price as that of the last transaction, or perhaps at a slightly higher price. Immediately, scalpers and other brokers try to buy at a price somewhat below that sought by the seller. If the order is a "market" order, to be filled immediately at the best price obtainable, the sale goes to whichever scalper or broker was first among those bidding highest.<sup>6</sup> Professional scalpers, therefore, must work on the floor of the exchange in order to obtain a satisfactory proportion of the scalping purchases and sales for which there is opportunity. If this were not a sufficient reason for scalpers to work as floor traders, they would be forced to do so for another reason. The average profit margin on most scalping is so narrow that the scalper would be left with a net loss if he had to pay brokerage fees on his trading.

#### 3. Significant Characteristics of Price Behavior

The hypothesis that we have undertaken to test had its origin in a series of comparatively recent discoveries regarding the behavior of futures prices, and was directly suggested by one of them.

The first of these discoveries was that the movements of futures prices, and of other "speculative" prices, correspond closely to random walk. That is to say, the *changes* in such prices are very nearly random, in the sense that, if they were strictly random, knowledge of the level and course of such a price, up to a given moment, would afford no help toward predicting any part of its future course.

<sup>&</sup>lt;sup>5</sup> A large-scale speculator may find it advantageous, however, to do a part of his trading in person on the trading floor. When he wishes to buy heavily, for example, he may place appropriate buying orders with brokers and, by doing some selling in person, frustrate the efforts of those who seek to profit by following his lead.

<sup>&</sup>lt;sup>6</sup> In some markets that basic rule is supplemented by an additional rule, or convention, to cover instances in which two or more identical bids appear to have been made simultaneously.

This statistical discovery was presently recognized to mean that the "fluctuations" of futures prices have been, for the most part, economically warranted responses to new information (itself unpredictable) on relevant economic prospects. Recognition of that fact required a substantial change in economic thought regarding significant price influences, and regarding the nature and usefulness of quick-turn speculation. In particular, it required recognition: (1) that price changes warranted by new information on economic prospects tend to be much larger and more frequent than had ordinarily been recognized in economic theory; and (2) that "news trading"—buying or selling in expectation of quick price response to new information bearing on economic prospects—can be a major economically useful form of speculation.<sup>7</sup>

Though few floor traders ever engage in news trading, we shall find much reason to keep news traders in mind, because they deal in large part with price changes of the same durations as those from which floor traders seek their profits. Opportunities are therefore frequent, either for floor traders to profit at the expense of news traders, or for news traders to profit at the expense of floor traders. The news trader, acting usually on information that the floor trader does not possess, tends to have the advantage in such instances.

The second major discovery that we need to notice came after much unsuccessful search, by many persons, for statistically significant evidence of structure (anything but randomness) in the movements of futures prices. Claude S. Brinegar (1), using a new statistical technique, discovered that the leading nonrandom characteristic in the movements of futures prices was a weak, but statistically significant, tendency toward "continuity" in price movements.<sup>8</sup> This implied the existence of weak positive autocorrelations; but he was not able to estimate either their magnitudes or the range of time lags for which positive autocorrelations existed.

Brinegar's evidence of the presence of positive autocorrelations among changes in futures prices tended to further discredit the supposition, long widely held, that the "fluctuations" of futures prices have prominent cyclical characteristics. They do not, in any degree that has yet been found measurable.<sup>9</sup> Moreover, an obviously plausible economic interpretation of Brinegar's evidence sug-

<sup>7</sup> Citations 15, 16, 18, and 19 reflect the slow emergence of these ideas in my own mind. It is remarkable how long a known fact can in effect remain unknown, for lack of sufficient thoughtful attention to it; the near randomness of speculative price movements has long been widely recognized, in the limited form of recognition that no simple method was known for reliable prediction of speculative price movements. Thanks to Mandelbrot (9) it is now known that Louis Bachelier made extensive application of that observation as early as 1900, in a doctoral thesis that has been made available in translation by Cootner (2). M. G. Kendall's report, in 1953, on his efforts to detect autoregressive cycles in speculative prices ( $\beta$ , reprinted in 2) was especially influential in leading to widespread recognition by statisticians of the near randomness of speculative price movements.

cycles in speculative prices (8, reprinted in 2) was especially influential in leading to widespread recognition by statisticians of the near randomness of speculative price movements. <sup>8</sup> Cowles and Jones, some 17 years earlier, had published evidence of a similar tendency in stock price index numbers (3); but the true significance of that evidence was obscured until later, when Cowles (4) was able to suggest a probable explanation for a peculiarity in the earlier results that had tended to monopolize attention. Daniels (5) subsequently confirmed that means of high and low prices have the property required for validity of Cowles' explanation. <sup>8</sup> Though no expand tendency toward english memory for any future price has been detected

<sup>9</sup> Though no general tendency toward cyclical movement of any futures price has been detected, the occasional occurrence of "cropscare and related cycles" in Chicago wheat prices, prior to World War II, was demonstrated by the present writer (14, pp. 18-27). I was unable, however, to find evidence of any similar cycles in either corn or oats prices, and they ceased to occur in wheat prices after 1939. Their occasional occurrence in United States wheat prices during the previous half century appears to me attributable to a tendency of traders in the United States to underestimate the extent to which the wheat market during those years was international, leading on occasion to excessive price response to North American crop developments. gested that the price movements might be regarded as the effects of random impulses, modified in form by a moving average process.

Arnold B. Larson (6, 7), then undertook to test this moving average hypothesis through estimating its parameters and finding how good a fit to the observed data was thereby obtainable. Two principal conclusions emerged, namely: (1) the original hypothesis, which supposed all nonzero autocorrelations to be positive, gave a rather poor fit; and (2) an excellent fit was obtainable by so modifying the hypothesis as to yield small negative autocorrelations at lags of three to four days and less, and positive autocorrelations at all longer lags, up to lags of some 30 to 50 days of trading.

The data used by Larson were day-to-day changes in corn prices for two 10year periods, 1922–31 and 1949–58. The autocorrelation coefficients implied by the moving average process which gave the best fit for each period are shown in Table 3. Whether the indicated differences between the two periods reflect true differences in price characteristics of the two periods, or are mere sampling fluctuations, is not yet known. As regards their chief features, the two periods are alike. At lags of up to three or four days, the autocorrelations are negative, and of an order of magnitude approximating  $r_i = -0.012$ . At all longer lags, up to some 30 to 50 days, the autocorrelations are positive, and of an order of magnitude approximating  $r_i = +0.008$ .

Prior to this work of Larson's, the only firm evidence of a general tendency toward negative autocorrelation among the movements of futures prices had been evidence that successive price changes of the smallest size tend to alternate in direction. While that situation existed, it was hard to support the supposition

|   | Magnitude by | 10-year periods |
|---|--------------|-----------------|
| Parameters  | 1922-31      | 1949–58         |
| Estimated $r_1 = r_2 = r_8^a$                               | 016          |                 |
| Estimated $r_1 = r_2 = r_3 = r_4^a$                         |              | 0086            |
| Estimated $r_4 = r_5 = \dots r_{34}^a$                      | +.0077       |                 |
| Estimated $r_5 = r_6 = \dots r_{52}^a$                      |              | +.0084          |
| Minimum estimate of $\sigma c^2/\sigma \Delta^{2b}$         | .0475        | .0327           |
| Minimum estimate of $\sigma_{\epsilon}/\sigma_{\Delta}^{b}$ | .218         | .181            |

TABLE 3.—Estimated Autocorrelations Among Day-to-Day Changes in Corn Prices, and Estimated Magnitude of the Disturbance Component in Those Changes\*

\* Computed from results of statistical analyses by Arnold B. Larson (6).

<sup>a</sup> These autocorrelation coefficients are implied results of fitting a model in which the corresponding parameter was a percentage effect, which was assumed equal for all lags in this group. The assumed equality of percentage effect carries with it slight inequalities among the implied autocorrelation coefficients, but these inequalities are negligibly small, and both the intent of the model and the available evidence are best represented by presenting the autocorrelation coefficients in the group as equal, so far as is known.

<sup>b</sup> In the variance subscripts,  $\Delta$  indicates day-to-day price changes (between closing prices), and  $\epsilon$  the disturbance component in those changes. The estimates of relative size of the disturbance component rest in part on suppositions: (1) that equality exists between amount of disturbance and amount of subsequent reaction reflected in the negative autocorrelation coefficients shown above; and (2) that in the absence of disturbances, the autocorrelations shown as negative would instead have been positive, and equal to the autocorrelations found to be positive. These estimates of the disturbance component are designated as minimal because there is reason to believe that any error which may exist in either of the foregoing suppositions must be such as would lead to underestimation of the disturbance component.

that there existed larger dips and bulges than those of the smallest size, from which scalpers might profit. Economic reasoning suggests that the larger hedging orders should be expected to produce fairly large dips and bulges, of considerable duration. Experience of hedgers seems to bear out that reasoning. But Larson's evidence was the first to indicate clearly, from the behavior of prices, that these larger dips and bulges existed and could be a source of profit to scalpers. His evidence allowed supposing that dips and bulges occurred frequently, in a large range of sizes and durations, their durations extending often to three or four days.10

This inference from Larson's analysis of corn prices has subsequently received support from a study of soybean prices by Seymour Smidt. The latter's results allow two further inferences, and will be considered in the next section.

#### 4. Classes of Professional Scalpers

Scalping of at least the larger dips and bulges can be done with some success by merely following a simple set of trading rules. The best published evidence of this fact that I know appears in a study by Smidt (10). He tested, on soybean prices, a scalping rule that made use only of closing prices on successive days. Stated in simplest form, the rule was: selling following any price advance, closeto-close, of more than 1 per cent per bushel; buy following any close-to-close price decline of more than 1 per cent per bushel. The initial purchase or sale in any year was to be of x bushels, and each subsequent one, until the final closing transaction, was to be of 2x bushels. The rule, therefore, kept the trader continuously either long or short x bushels. The calculated result for a 10-year period was a gain, before commissions, of nearly nine-tenths of a cent per bushel purchased.<sup>11</sup>

Study of Smidt's calculated results by years shows that the rule worked well in five of the ten years, yielding an average calculated gain of 1.26 cents per bushel for those years. In the other five years, as shown below, gains and losses were almost equally balanced.

| Characteristic  | Five effective<br>years <sup>a</sup> | Five ineffective<br>years |
|---|--------------------------------------|---------------------------|
| Number of transactions                                      | 253                                  | 131                       |
| Aggregate net gain in cents per bushel of continuous holdir | ng                                   |                           |
| (alternately long and short)                                | 318                                  | 18                        |
| Gain per bushel bought, cents                               | 1.26                                 | 0.014                     |

<sup>a</sup> Classed by the criterion that the trading rule produced an average holding interval of less than four days. The years were 1952-55, inclusive, and 1961.

and the remainder, not significantly different from zero. Such a set of results is incompatible with the supposition that any sort of "oscillatory movement" was involved. They correspond, instead, with what should be expected from random walk in the presence of permeable barriers.

<sup>11</sup> My calculation from 10, Table 5, p. 126.

<sup>&</sup>lt;sup>10</sup> The character of price dips and bulges, from a mathematical standpoint, merits further study. I assumed initially that they were at least broadly similar to the irregular autoregressive cycles that were first dealt with by G. U. Yule (20), and later by H. Wold (12) and M. G. Kendall (8). But it seemed clear to me that, if such cycles existed in speculative prices, it would be necessary to estimate their autoregression coefficients from serial correlations among first differences of the price series, rather than from serial correlations among the successive terms of the original series, as had been done by Yule and others. After having derived the necessary expressions for estimating autoregression coefficients from serial correlations of first differences (17), I calculated the requisite serial correlation coefficients for an 1100-term series of 1/8 -cent changes in wheat prices for a period, January 17-23, 1930, during which their first-order serial correlation had remained fairly stable. The first five serial correlations among ½-cent changes were:  $r_i = -0.470; +0.142; -0.030; -0.004; -0.010; (i = 1, 2 - . -5)$ . Inasmuch as  $\sigma_r \simeq 0.031$  in this instance, the first two coefficients above appear statistically significant,

For purposes of the above tabulations, years were classed, not by the financial results, but according to the average length of holding interval produced. The years in which the tested rule served well as a scalping rule, leading to holding intervals of less than four days, were years in which the price was higher, and "fluctuated" more widely, than in the other years. Presumably the 1-cent rule was a net with too large a mesh to effectively catch the dips and bulges of the years of relatively small price movements. A  $\frac{1}{2}$ -cent or  $\frac{3}{4}$ -cent rule might have served well to catch the largest dips and bulges of those years.

Scalping rules similar to that tested by Smidt have gained some popularity among amateur speculators at various times in the past. But such rules, though they give admirable bases for testing the feasibility of scalping, are of little value in professional scalping, for two principal reasons. The professional scalper, when he buys "on a dip," must buy while the dip is forming. It is only through buying at such times and through selling similarly while bulges are forming, that he can do any large amount of buying and selling at favorable prices; and a large volume of business is essential to a professional scalper because his profit margin is very narrow. Efforts to buy after a dip has formed, as contemplated in simple scalping rules, serve to speed recovery from the dip, but tend to result in few purchases at prices favorable to the scalper. So it is also with selling on bulges.

Secondly, the use of any simple scalping rule necessarily results in the occasional accumulation of a very large loss per commodity unit. Large windfall gains also accumulate, tending to offset the windfall losses; but a trader of limited financial means, using such a simple scalping rule, must sharply restrict the scale of his trading to avoid risk of bankruptcy. In order to make a living from scalping, a trader must find means to "cut his losses" sufficiently to permit his taking fairly large speculative positions at times.

Two leading characteristics of professional scalping, therefore, are: (a) purchases and sales must be made directly against the market orders that produce dips and bulges, and consequently have the effect of limiting the size of those price disturbances; and (b) because of the need to "cut losses," scalpers are forced to deal as best they can with price movements other than dips and bulges.

The skills that are essential to success as a professional scalper appear to be describable only in broad and rather unspecific terms. I think it true, as one successful floor trader has told me, that such trading cannot be taught, but must be learned through experience.<sup>12</sup> But observation of scalping practice indicates that the specific skills required differ substantially according to the size and duration of the dips and bulges from which profits are sought. In markets with enough business to support several professional scalpers, these professionals tend to specialize in one or another of two, or sometimes three, distinguishable classes of scalping, each with a different length of the typical holding interval. Leading characteristics of these three classes of scalping are summarized in Table 4.

Scalpers who devote their attention primarily to the smallest dips and bulges make a great number of purchases and sales each day, tend to hold the resulting speculative positions for only brief intervals of time, and almost invariably end

<sup>&</sup>lt;sup>12</sup> Another very able floor trader, to whom I am especially indebted, took great pains to try to explain to me his thinking in connection with each of a long series of his own transactions. I learned thus the kinds of information that provided the basis for his decisions, but I acquired no feeling of having learned how to reach similar decisions myself.

|   | Typical v                         | alues of                  |                                   |   |
|---|-----------------------------------|---------------------------|-----------------------------------|---|
|   | Average                           | Overnight                 | Characteristics of                | dips and bulges involved  |
| Category  | intervala                         | positions <sup>b</sup>    | Size                              | Chief cause   |
| Unit-change scalpers<br>Day-trading scalpers<br>Day-to-day scalpers | 1–10 min.<br>¼–1 hour<br>½–3 days | 0<br>0.05–0.10<br>0.8–1.0 | Smallest<br>Intermediate<br>Large | Speculative orders <sup>e</sup><br>Hedging orders<br>Hedging orders |

TABLE 4.—CLASSIFICATION OF PROFESSIONAL SCALPERS ACCORDING TO TRADING CHARACTERISTICS

<sup>a</sup> Concerning estimation of the holding interval when "spreads" are used, see pp. 18–19. <sup>b</sup> Overnight position expressed as a fraction of maximum position during the day.

e Small hedging orders are also a source of dips and bulges of the smallest size, but are not numerous enough to be regarded as more than a secondary source.

the day with zero speculative position. On the Chicago Board of Trade the term "scalper" is ordinarily understood to refer to this particular sort of scalper, of whom it has been said that he "stands always ready to either buy at 1/8 cent below the last price, or sell at 1/8 cent above it." That characterization applies specifically to scalpers in a market where the usual minimum price change is 1/8 cent. That sort of trader is here classed as a "unit-change scalper," meaning by "unit" the minimum price change commonly occurring at that time in the market where the scalper is operating.

"Day traders" are scalpers, in the general sense of the term, who give much or most of their attention to dips and bulges of more than unit size, yet such as normally occur fairly often within the course of a day. Such a scalper, having taken a speculative position on a dip or bulge that has occurred near the end of a trading session, often decides to hold at least part of it overnight. But the positions carried overnight are always small by comparison with maximum positions taken during the trading session. Though individuals differ in their practice, it seems to be typical for a day trader to avoid holding more than about one-tenth as large a position overnight as he would willingly assume at times during a trading session.

Day-to-day scalpers give their attention largely to dips and bulges of such size and duration that the speculative positions taken must usually be carried into the next trading day, and may need to be carried through two or three successive days. Consequently, their overnight positions are often nearly, if not quite, as large as those assumed at any time during the trading session.

A competent day trader can easily do unit-change scalping also (the reverse is not necessarily true); and a competent day-to-day scalper may do both of the other sorts of scalping. Hence, unit-change scalping emerges as a specialized professional occupation only in markets with enough business to support several professional scalpers.

The designations of average holding intervals in Table 4 are somewhat rough approximations, partly owing to lack of full information on my part, but also in considerable part because of a problem in defining the length of holding interval. Suppose that a unit-change scalper buys one contract<sup>13</sup> of September wheat and a minute later, sells one contract of July wheat; then 10 minutes later (having

<sup>13</sup> The standard size of contract in wheat and other grains at Chicago is 5,000 bushels, and "one contract" in May wheat is uniformly referred to there as "5 May wheat."

meanwhile done other business, perhaps in the May future), he sells September and buys July, thus offsetting the two contracts that were entered into 11 and 10 minutes earlier. On the surface, it may appear that the average holding interval on the transactions described should be calculated at 10.5 minutes. But the scalper himself will normally have regarded the sale of July wheat as very nearly offsetting the prior purchase of September, after a holding interval of only one minute. This one-minute interval needs logically to be averaged in with the 10-minute interval over which he held a spread position, long September and short July, but the two intervals should not be averaged with equal weighting inasmuch as the risk involved in holding a spread position is only a small fraction of that involved in holding a net position.

It will serve well enough, in the foregoing example, to regard the holding interval as having been one minute; but because like instances occur frequently in scalping, estimates of average holding intervals for a scalper must be regarded as rough approximations. That is especially the case with a scalper who is dealing in two or more commodities, as some do on an exchange where several commodities are traded. Such a scalper may buy corn, for example, and shortly afterward sell soybeans, or wheat, in appropriate quantity, and regard that sale of a different commodity as having provided an adequate temporary offset to the earlier purchase of corn.

The foregoing classification of scalping allows a sharpening in statement of the problem before us. Floor trading with holding characteristics like those of unit-change scalping, if done sporadically, might conceivably be based on breaches of confidence by brokers to help a floor-trading friend; but done in great volume, as it is in the largest futures markets, it must be largely, if not almost wholly, scalping that contributes to the fluidity of the market. If there is any considerable amount of floor trading on commodity exchanges that is not scalping, it is to be found among floor traders whose holding practices are like those of either daytrading scalpers or longer-interval scalpers.

We may now revert to Table 1 and get a rough idea of how much of the floor trading in Chicago wheat, on the day covered by that table, may have been scalping of one or another of the classes considered above.

The floor traders who bought and sold during the day, but held zero overnight positions at both the beginning and the end of the day (Class I, 1) may be identified confidently as all, or virtually all, unit-change scalpers. They bought and sold 1,900 thousand bushels, which was nearly one-sixth of the total amount of floor trading. Nearly three-fifths of this trading was done by five persons who bought and sold at least 100 thousand bushels each. These five made unit-change scalping their chief or sole business on the exchange.<sup>14</sup> Of the other 30, all those of whom I have knowledge were brokers. The amounts of trading done for their own accounts varied widely among them. A number of them, presumably, were striving to develop their scalping skills to such a point that they could discontinue working for others and trade wholly for their own accounts.

The 23 floor traders in Class I, 2, all with overnight positions equally long and short, may have acquired their spread positions chiefly as an aid to the conduct of scalping; the ratio of aggregate spread position to total trading for the group, suggesting that the spread positions were held, on the average, for only 1.5 days,

<sup>14</sup> One of them operated a prosperous automobile sales and service business off the exchange.

is consistent with that interpretation. If some members of the group deserve to be classed as primarily spreaders, they may nevertheless have been doing effective scalping at the same time, as we shall see in the next section. The group accounted for nearly one-fourth of the floor trading in wheat on that day.

Class I, 3 accounted for more trading than any other two categories in the table—43 per cent of the total. It is also the class with the largest amount of trading per person (apart from the Subclass I, 1, a), namely, 160 thousand bushels per trader. Virtually all the "day traders" fall into this class, and it includes a number of traders who held fairly large spread positions.

Day-to-day scalpers, who commonly hold positions for a day or more, presumably fall chiefly into Class I, 4, or, if they did no trading on September 18, into Class II, 2. The amount of trading done by members of Class I, 4, slightly less than one-sixth of the recorded floor trading, may therefore be taken as an approximate upper limit for any estimate of the amount of day-to-day scalping being done in Chicago wheat at that time.

#### 5. Incidental Scalping

It seems likely that nearly all speculators make some attempts at scalping. Price-level traders appear to try rather commonly to make their purchases on dips and their sales on bulges, seeking thus to improve their chances of profit in connection with their price-level judgments. News traders, when taking a speculative position on new information, commonly need to act quickly, without awaiting a dip or bulge; but they doubtless try often to close out short positions through buying on dips, and to close out long positions through selling on bulges.

Such efforts at incidental scalping can easily fail of their purpose. Consider, for example, the case of a price-level trader who has decided, correctly, that a price advance is to be expected. If he places a buying order "at the market," it will be executed immediately, perhaps at a price very slightly above that on the previous transaction. If he seeks to buy on a dip, and sets his buying price too low, the immediate effect tends to be that the desired purchase is not made. If, then, the anticipated price advance gets under way, the speculator must either lose all opportunity to profit from his correct price judgment, or make a belated purchase at a less advantageous price than was possible earlier.

Scalping, done by itself, requires a high degree of special skill in order to succeed. Does the fact that a speculator is aiming chiefly at some other sort of trading make it easy for him, without special scalping skill, to actually succeed in buying on dips and selling on bulges? I incline to think that speculators who, without special knowledge of scalping, try to buy on dips and to sell on bulges, probably tend to lose rather than to gain by those efforts. Their practice tends toward the establishment of "resistance and support levels" which, while they hold, tend effectively to restrict the size of dips and bulges. But it might be better for hedgers, nevertheless, if resistance and support levels based on inept scalping attempts did not form; when a large hedging order causes the price to break through such a temporary barrier to price movement, an excessively large dip or bulge tends to result.

Effective incidental scalping appears to be done principally by "spreaders." The spreader, seeking profits from changes in price relations, holds a long position in one future against an equivalent short position in another future. The two futures may be for different delivery months in the same market, for the same commodity in different markets, or for different commodities on the same exchange, or on different exchanges.<sup>15</sup>

In its simplest form, spread trading involves taking offsetting long and short positions simultaneously, and closing them out simultaneously. But any spreader with the skills necessary for successful scalping can augment his income by building up desired long and short positions somewhat unevenly, making his purchases on dips (when the future that he wishes to buy dips relative to the other future), and his sales on bulges. When the time comes to close out a spread position, he may proceed similarly. Because price spreads tend to change much less than do the prices themselves, a spreader with given financial means can safely deal in much larger quantities of the commodity than can an outright speculator who is similarly limited. Consequently a spreader has more reason than an outright speculator to develop skill as an incidental scalper.

Spreading is a type of speculation that is logically subject to classification into the same four categories as outright speculation; but in practice most spreading appears to be price-level trading (or, more precisely, spread-level trading). I have found no evidence of true scalping of spreads. Instead, one finds scalpers assuming spread positions as an aid to their scalping (pp. 18–19), and one finds spreaders who combine scalping with their spreading, as outlined above.

A professional spreader has strong reason to hold membership in the exchange, for the sake of lower commission charges, but if he is doing simple spreading, with little effort at scalping, he may better have his trades executed mainly by others rather than execute them himself. By dealing through brokers, he avoids attracting a following that would curtail his profit opportunities.

If, therefore, we find a spreader executing his own transactions, we may reasonably presume that he does so either because, as a broker, he is necessarily present on the floor of the exchange, or because he is combining scalping with his spreading. In the case of a broker, his presence on the floor of the exchange is an aid to scalping, and he is more likely than an "outside" spreader would be to effectively combine scalping with his spreading. We may reasonably infer, therefore, that most of the floor-trading spreaders in Table 1 were engaged in scalping.

Scalping spreaders in Class I, 2, with long and short positions exactly equal, were presumably scalping dips and bulges of about the same sizes and durations as the scalpers in Class I, 1, with zero overnight positions. Spreaders doing a day-trading type of scalping would fall mainly into Class I, 3, along with most outright day traders. And spreaders doing day-to-day scalping would fall mainly into either Class I, 4, or Class II, 2.

#### 6. Unit-Change Scalping

Unit-change dips and bulges are the ones most easily detected statistically. Their presence is indicated by a tendency for successive price changes of the

<sup>&</sup>lt;sup>15</sup> For regulatory purposes, the Commodity Exchange Authority classes inter-commodity spreading as "speculation"; but from an economic standpoint, all spreading is simply a special form of speculation, with characteristics differing somewhat from those of "outright" speculation. The special characteristics of spreading tend to appear most strongly in inter-option and inter-market spreading, but are present to an important degree in most inter-commodity spreading also.

smallest size to occur more often in opposite directions than in like directions. In an early study of the "reversal tendency" among successive changes in prices of Chicago wheat futures, I took 143 samples, each comprising 100 successive price changes. In three of these 143 samples, the ratio of reversals to continuations was less than 65:35; in 83 of the samples (58 per cent) the ratio of reversals to continuations was 75:25 or larger; in 7 of the samples the ratio of reversals to continuations was 9:1 or more. The results are summarized in more detail below.<sup>10</sup>

| Percentage of reversals                        | 65  | 70  | 75  | 80  | 85  | 90  |
|--|-----|-----|-----|-----|-----|-----|
| Proportion of series having at least that per- |     |     |     |     |     |     |
| centage of reversals                           | .98 | .81 | .58 | .37 | .18 | .05 |

Dips and bulges of the smallest size are so numerous that they must be attributed in major part to buying or selling orders placed by speculators, rather than to hedging orders. Floor traders who specialize in scalping these smallest dips and bulges are the ones of whom it may most appropriately be said that they "stand always ready to either buy at  $\frac{1}{8}$  cent below the last price, or sell at  $\frac{1}{8}$  cent above it." It should be noted, however, that in a market where changes between successive differing quotations are normally always of  $\frac{1}{8}$  cent each, circumstances sometimes occur in which the price moves in larger steps. There have been some days during which the price of the most active Chicago wheat future moved almost wholly in steps of  $\frac{1}{4}$  cent per bushel; and on a very few days of exceptionally rapid price movement, virtually every price change between successive differing quotations has been  $\frac{1}{2}$  cent per bushel.<sup>17</sup>

The size of the smallest price changes that occur is determined mainly by scalpers.<sup>18</sup> They can operate profitably only if successive price changes occur in opposite directions more often than in like directions. When a price begins to move so rapidly that continuation of movement in  $\frac{1}{6}$ -cent steps would result in successive changes occurring more often in like direction than in opposite directions, scalpers can no longer hold the price steps to  $\frac{1}{6}$  cent.

An example of trading by a unit-change scalper is shown in Chart 1. At the time, this scalper, Mr. A, was giving his attention primarily to the March future.<sup>19</sup>

<sup>16</sup> The prices sampled were those of the May future, primarily in January of 13 different years, but with the samples sometimes extending slightly into December or February. At that time of year it often happens that a day goes by without news of much price significance, and on such a day the price movement may consist principally of dips and bulges. January was chosen as the month from which to take samples because, recognizing the close interdependence between prices for different delivery months, I thought it best to take the samples at a time of year when the trading would be concentrated so far as possible in a single future. The unintended result was to produce samples showing an exceptionally large proportion of high reversal ratios. But it is also true that reversal ratios taken at times when trading is not concentrated mainly in one future tend to be "too low" in the sense of tending toward underestimation of the prevalence of small dips and bulges. <sup>17</sup> One such day was September 18, 1947. The extreme price movements of that and two subse-

<sup>17</sup> One such day was September 18, 1947. The extreme price movements of that and two subsequent days prompted a special investigation by the Commodity Exchange Authority, which led to publication of the detailed information that permitted compilation of Table 1 above.

<sup>18</sup> Most, if not all, exchanges prescribe a minimum unit for price quotations. It tends to be set in accordance with the minimum size of price step that scalpers can ordinarily maintain. Two interesting exceptions have occurred on the Chicago Board of Trade. For many years it was often feasible for scalpers in Chicago grains to operate on price steps of only  $\frac{1}{16}$  cent. Use of such steps was permitted (until June 29, 1933) without reducing the minimum quotation unit by allowing "split transactions," in which half of the quantity was sold at one price and the other half at a price  $\frac{1}{8}$ cent higher. The other notable exception concerns soybeans. There have been long periods during which soybean prices almost never moved in steps smaller than  $\frac{1}{4}$  cent; though soybeans are classed as a "grain" to which the  $\frac{1}{6}$ -cent quotation unit applies.

as a "grain" to which the ¼-cent quotation unit applies. <sup>10</sup> At any given time there may be 50 or more persons in the wheat pit of the Chicago Board of Trade; some, like Mr. A, are doing trading wholly for their own acccounts, but the majority are



CHART 1.—Price Changes in Chicago December and March Wheat, and Transactions of One Scalper During Thirty Minutes\*

\* Arrows indicate prices at which transactions were made (B, bought; S, sold; numerals, thousand bushels).

At the opening of trading, at 9:30, selling orders predominated, and Mr. A was willing to buy 5 March (one "contract" of 5,000 bushels for March delivery) at a price  $\frac{1}{8}$  cent below the low of the previous day's closing price range. At 9:33 there came a selling order for which no buyer could be found at any price above 228%. Mr. A was not the buyer at that price, and presumably did not seek to be, for a minute later he sold 15 March at 228½. He thus offset his previous purchase (at a loss of  $\frac{1}{4}$  cent per bushel) and went short 10 March. A minute later, when a selling order came into the market, Mr. A bought 5 March at  $\frac{1}{8}$  cent below the price at which he had so recently sold; and a minute later yet he bought another 5 March at  $\frac{1}{4}$  cent below the price at which he had last sold. A  $\frac{1}{8}$  cent price difference on 5,000 bushels of wheat amounts to \$6.25, hence Mr. A had now, in 6 minutes of trading, bought and sold 15,000 bushels, for a gross profit of \$6.25, or  $\frac{1}{24}$  cent per bushel.

During the next five minutes, buying orders predominated in the market and were filled successively at prices for the March future  $\frac{1}{8}$  cent and  $\frac{3}{8}$  cent above the price on Mr. A's last transaction. Perhaps Mr. A tried to make the sale on the March buying order that was filled at 228%, but was beaten to it by someone else; or perhaps he had turned his attention momentarily to the more active December future, in which he sold 10,000 bushels at about the same moment that March sold at 228%. And three minutes later, when another buying order for March

there chiefly or wholly to execute orders transmitted to them from traders not present on the floor of the exchange. In so large a group, transactions are facilitated by clustering in separate areas according to the delivery month with which an individual is especially concerned. With several unit-change scalpers present, any one of them may deal principally in the delivery month being traded in the area where he stands.

Mr. A appears in Table 1 under Class I, 2, where his trading (395 thousand bushels bought and sold) comprised 14 per cent of the trading of that class. Like several others in the class, his spread position (30,000 bushels long and short) was small in relation to his volume of transactions. His manner of trading was essentially that of the traders in Class I, 1, a, who held zero overnight positions.

wheat appeared, he did not hold out for a price of  $228\frac{3}{8}$ , but sold 20 March at  $228\frac{1}{2}$ .<sup>20</sup> He was then short 30,000 bushels, and it seems reasonable to suppose that he should have seized the opportunity to buy when selling orders appeared a few minutes later and were filled by others at prices from  $\frac{1}{8}$  cent to  $\frac{3}{8}$  cent below those at which he had recently sold. Mr. A, however, had withdrawn his attention from trading for a few minutes, to talk to an inquiring economist.<sup>21</sup>

The foregoing example, it should be noted, covers an interval in which trading in the wheat pit was exceptionally dull. On a morning of average market activity, Mr. A might have done as much business in five minutes as he did this morning in the 16 minutes that span the transactions shown here.<sup>22</sup>

An interpretation of the foregoing brief record of trading by Mr. A may well begin with his own observation that the most important requirement for success at scalping is ability to recognize "the trend of the market." In the sense in which that term is widely used by traders, the "trend of the market" at any particular time is usually a consequence of buying or selling orders from speculators (news traders) acting on new market information that appears to them to warrant a shift in level of the price. A scalper must try as best he can to avoid taking the opposite side in transactions arising from such orders; and when he finds that he has mistakenly done so, he must correct the mistake at the first good opportunity. Mr. A's second transaction was just such a correction of a mistake made on his first transaction. It necessarily involved accepting a loss. Opportunity for making the correction was presented by appearance in the market of a buying order, and it is noteworthy that, given opportunity at that moment to sell more than 5 March at 228<sup>1</sup>/<sub>2</sub>, Mr. A followed the logic of his altered opinion and went short 10 March in addition to liquidating his previous long position.

Though Mr. A had judged the market "trend" to be downward, he did not assume that it would continue so for long. Instead, he seized the first opportunity to take a profit of  $\frac{1}{8}$  cent on half of his outstanding short position, and soon afterward closed out the remaining half at a profit of  $\frac{1}{4}$  cent.

Obviously Mr. A did not anticipate the reversal in price trend that occurred just after 9:36 (reversals of trend are in general not predictable). But apparently he regarded the buying orders that initiated the new trend as orders against which he would better not sell. So he waited a bit before offering resistance to further price advance through a sale of 10 December at  $224\frac{1}{2}$ . His evident opinion that the recent buying had produced a price bulge was further expressed a little later by his acceptance of a buying order for 20 March wheat at  $228\frac{1}{2}$ ,  $\frac{1}{8}$  cent under the last price for that future.

#### 7. Scalping Versus Trend Trading

The foregoing consideration of Mr. A's trading poses some questions. Was Mr. A really a scalper in the sense of our definition of scalping? If so, why did he

 $<sup>^{20}</sup>$  Our record of transactions excludes any which occurred at the same price as the last previous transaction, hence it is possible that another sale at 228  $\frac{1}{2}$  occurred just before Mr. A made his sale at that price. If so, Mr. A's sale was in fact made at the last price rather than at  $\frac{1}{8}$  cent below it.

<sup>&</sup>lt;sup>21</sup> The example serves, incidentally, to illustrate why visitors are not ordinarily permitted on the floor of the exchange.

<sup>&</sup>lt;sup>22</sup> On an ordinary morning, with prices often changing many times within a single minute, it would have been difficult, and possible only by special arrangement, to get a record from which the timing of Mr. A's transactions could have been correctly shown in relation to the price movements.

seek profits from price trends, as he clearly did on at least one occasion? And why did he regard trend recognition as the chief requisite to success at scalping?

Mr. A regarded himself as a scalper, and among his associates was regarded as one of the leading scalpers on his exchange, the Chicago Board of Trade. On that exchange the term "scalper" is used in the same general sense that we have been using it here, but somewhat more restrictively; it is ordinarily applied specifically to such traders as I have called unit-change scalpers. For these reasons there can be no doubt, I think, that Mr. A should be regarded as a scalper in the sense in which we have been using the term.

Why then did Mr. A regard trend recognition as the most important requirement for success at scalping? One likely reason can be seen at once through considering the means by which a scalper may proceed in undertaking to buy on dips and sell on bulges. He might proceed by simply buying on any price decline of given size, and selling on any price advance of such size. That is the procedure implied by the characterization of a scalper as one who "stands always ready either to buy at ½ cent below the last price, or to sell at ½ cent above it." It is also the procedure that was assumed in Smidt's test of a scalping rule based on close-to-close changes in soybean prices. But such procedure relies wholly on the empirical probability that a price decline of the stated amount will more likely prove to be a dip (being followed by price recovery) than prove to be the beginning of at least a brief downward trend (being followed by further price decline); and similarly with regard to price advances of the stated amount.

In practice, competent scalpers do not rely wholly on empirical probabilities. They develop the ability to discriminate, not very reliably, but in a useful proportion of instances, between those price declines of given magnitude that will be followed by recovery, and those that will be followed by at least some further price decline; and to discriminate similarly with regard to price advances. That ability to discriminate might be called either an ability to recognize dips and bulges or an ability to recognize price trends; the two are opposite sides of the same coin. But there is good reason for preferring the latter expression. When a small price decline is followed by recovery, thus completing the formation of a price dip, it tends to be because of absence of reason for the price to remain at the lower level. When a small price decline is followed by further decline, forming a "trend" it is often because the selling that produced the initial decline was of such a nature as to cause also a continuation of the decline. So it is also with price bulges and upward price trends. It can thus seem much more realistic to a scalper to speak of recognizing price trends than to speak, alternatively, of recognizing dips and bulges.

A second reason for Mr. A's emphasis on the importance of trend recognition may have been its usefulness in aiding his efforts to "cut losses and let profits run." It is clear that in speaking of recognition of a trend he meant recognizing that a movement is in progress that will continue at least a bit farther. It is noteworthy that he did not speak of anticipating trends, despite the degree of anticipation involved in his concept of trend recognition.

From Mr. A's action in connection with the second transaction shown in Chart 1, on which he went short 10 March wheat, it is evident that he believed at that moment that he recognized a trend that would carry the price down at least  $\frac{1}{8}$  cent below the price of 228<sup>1</sup>/<sub>2</sub> at which he sold. The fact that he covered half of his short position at 228<sup>3</sup>/<sub>8</sub> indicates that he had little confidence in the downward trend going farther; and his covering of his remaining short position at 228<sup>1</sup>/<sub>4</sub> seems to reflect an opinion that the trend had by then run its course. If this example of trend recognition is representative, it indicates that Mr. A regarded trend recognition as giving a basis for anticipating only a little further price movement in the direction of the current trend. Even so, it is evidence of the use of trend recognition as a source of trading gains. And we must suppose that what Mr. A did in this case is illustrative of a more or less common practice of scalpers.

What becomes then of the concept that scalping and trend trading are two quite different sorts of trading; must it be abandoned? Not necessarily. The gains that scalpers derive in instances of successful trend recognition may serve only to partially offset the losses that they incur when they fail to recognize trends with sufficient promptness. If so, there remains a clear and sharp basis for distinguishing between scalping and trend trading, at least as regards persons who, like most floor traders, make a profitable business of their trading. Scalping would then be definable as trading that, though it involves often taking profits from price trends, derives no net gains from them, but depends for its net gains on successive buying on dips and selling on bulges. Trend trading would presumably be definable as trading that depends for its net gains chiefly or wholly on trend recognition.

If we take the foregoing as basic definitions of scalping and trend trading respectively, it may be possible ordinarily to distinguish between the two by fairly simple observation of trading practice, without analysis to determine the source of net gains. Length of the intervals over which net positions are held can serve for initial screening; so far as we know, scalping does not involve use of holding intervals longer than three or four days. All except a small fraction of floor trading is classifiable as possibly scalping according to that criterion.

Secondly, it may be that scalpers are reliably identifiable merely by observing that their transactions fit a scalping pattern more often than the opposite pattern; that is, that their purchases are more often made at a price lower than the previous one rather than otherwise, and their sales more often associated with price advances rather than with price declines. I have not had opportunity to study the record of anyone identified as a trend trader, but I should expect such a trader to only rarely act in the manner that a scalper most commonly does. Rarely if ever, can it be possible for a trend trader to anticipate a trend and make his purchase or sale before the trend begins. And having recognized a trend that has begun, he must ordinarily feel compelled to buy or sell promptly, rather than await opportunity to buy on a dip, in the case of an upward trend, or to sell on a bulge in the case of a downward trend. Therefore I believe that any trend trader, if such there be, who sought profits from intraday price trends, or from trends extending over no more than a few days, would almost never be found to either buy in connection with a price decline, or to sell in connection with a price advance, as scalpers do more often than not.

The case would be different with a trend trader operating on comparatively long trends, having a duration of, say, two weeks or more. Such long trends tend to be gradual, whereas intraday trends, and those that extend over no more than a very few days, tend to be steep. A trend trader recognizing the beginning of a long and gradual trend might well find it advantageous often to wait for a dip on which to buy, if the trend was upward, or to wait for a bulge on which to sell if the trend was downward. It may be, therefore, that a considerable amount of the scalping of the larger dips and bulges is done by traders who combine such scalping with trend trading on long and gradual trends. Their holding intervals would nevertheless tend to be so long as to give no suggestion that they were also doing scalping.

A trend trader concerned with comparatively long trends, and doing also scalping of the largest dips and bulges, would gain no great advantage from operating as a floor trader. Scalping of the largest dips and bulges is commonly attempted also by price-level traders, who likewise have little reason to operate as floor traders. It may be because of the scalping activities of these two classes of traders, operating off the exchange floor, that we have found little evidence of day-to-day scalping by floor traders. Floor traders tend to concentrate on trading of a kind in which they have a comparative advantage over traders who are not able to execute their transactions in person; hence if "outside" traders do much scalping of the largest dips and bulges, floor traders would tend to concentrate on those smaller dips and bulges that an outsider cannot deal with effectively or profitably.

We may now summarize the chief arguments for and against the common supposition that floor traders are in large part trend traders. The chief facts favoring that view have been:

(a) The fact that floor traders commonly, if not invariably, give primary attention to the recognition of price "trends," and often do derive profits from them.

(b) All floor traders lay great emphasis on the need to "cut losses and let profits run." Effort to do so can result in net gains only for a trader who can successfully anticipate the continuation of price trends, not occasionally, but with considerable regularity. The fact that floor traders attribute their success largely to a practice of cutting losses and letting profits run seems evident, therefore, that they are trend traders.

(c) Price fluctuations have been regarded as consisting of up and down swings, tending to alternate in direction, and mainly unwarranted by corresponding changes in either supply or demand. These swings take the form of comparatively brief price trends, and the theories that have been advanced to explain their occurrence have favored the view that an astute trader could profit from such trends.

The chief contrary arguments are:

(1) The "fluctuations" of futures prices are now known to have the character of a nearly perfect random walk, contradicting the earlier supposition that they consist largely of trends in alternate directions. This dominant characteristic of randomness in the price trends indicates that they arise chiefly from unpredictable new information (news) concerning supply and demand prospects. The new information is given prompt effect chiefly through the buying or selling of news traders.

(2) Profitability of news-trading is heavily dependent on market fluidity, allowing news traders to buy or to sell in substantial quantity at the beginning of a

brief news-induced price trend. Scalpers, as major contributors to the fluidity of a futures market, and ordinarily lacking the information on which news traders are acting, tend, therefore, to consistently lose money to news traders; and if most brief price trends are news-induced, scalpers must tend in general to lose money, on balance, in connection with price trends.

(3) The smallest price changes on a futures market tend, nevertheless, to alternate in direction, forming dips and bulges that give opportunity for scalping profits (p. 22 above). A similar, though weaker, tendency to alternation in direction exists also for somewhat larger price movements, with durations extending upward to as much as three or four days for the interval between the beginning of an upward or downward movement and the termination of subsequent reaction or recovery (pp. 16–17 above).

(4) Scalpers, seeking to buy on dips and to sell on bulges, are not wholly dependent on the tendencies for price movements to alternate in direction, as described above. Though they can recognize price trends, and anticipate their continuation, with too little reliability to avoid net losses in connection with the trends, they can do so with enough reliability to substantially reduce the amount of net loss incurred from trends. That is accomplished by able scalpers both through frequent avoidance of losses that would otherwise be incurred, and through less frequent successes in taking profits from price trends. The profits thus taken partially offset the losses that are suffered more commonly.

(5) The adage, "cut your losses and let your profits run," combines in one statement two different procedures that are useful for quite different reasons. By seeking to let profits run, a trader gains as much profit as he can from such trend continuations as he is able to anticipate, and, more importantly, he gains as much as he can from those unanticipated trends that happen to be favorable to him. His efforts to cut losses cannot avoid his taking losses that are greater, in the aggregate, than his gains from letting profits run; he cannot recognize trends and anticipate their continuation quickly and reliably enough for that. But his efforts can, nevertheless, greatly reduce his risk of incurring severe loss per unit of average open position. He is thus enabled to operate on a much larger scale than otherwise, and thereby to increase the overall profitability of his trading.

If the foregoing arguments, numbered (1) to (5) are valid, they remove all grounds for supposing that such floor traders as characteristically hold net positions for brief intervals, even intervals as long as three or four days, derive their net gains from trend trading. They must be scalpers rather than trend traders. In succeeding sections we analyze a two-month trading record that is sufficiently detailed to allow effective testing of the validity of the two conflicting lines of argument summarized above.

#### 8. A Two-Month Trading Record

We turn now to a study of the transactions, during two months, of the leading floor trader on the New York Cotton Exchange; we may call him Mr. C. His previous business experience had included several years as a floor trader on the Chicago Board of Trade. Our first major problem will be to identify the general nature of his trading. Its easily observed characteristics are summarized in Table 5.

| Minimum  |   |
|----------|---|
| Minimani | Maximum   |
| 14       | 193   |
| 23       | 151   |
| 0        | 6   |
| 1.26     | 3.58  |
| -\$28.70 | +\$33.20  |
| -5.74    | +6.64   |
| —\$3,116 | +\$4,364  |
|          | Minimum<br>14<br>23<br>0<br>1.26<br>-\$28.70<br>-5.74<br>-\$3,116 |

TABLE 5.—SUMMARY OF TWO-MONTH RECORD OF A FLOOR TRADER IN New York Cotton, February-March, 1952\*

\* Based on Appendix Table I. Mr. C paid a commission of \$1.80 per contract. He realized his largest loss on March 4 and his largest profit on February 9. The choice of period covered by the record was determined by the fact that, when I talked with Mr. C in late March 1952, he offered to give me immediately the accounting record of his trading for the previous month, and to forward the accounting record for the current month shortly after it was submitted to him.

The unit of trading in cotton futures at New York is one "contract," calling for delivery of 50,000 pounds of cotton (100 bales). On an average day, Mr. C bought (and sold) some 91 contracts, worth around \$1.8 million. His gross profits averaged \$4.64 per contract. Commission charges to nonmembers of the exchange at that time (varying with the price) averaged about \$21 per contract; but Mr. C, doing all his own work except the clearing of transactions and keeping the accounting record, paid only \$1.80 per contract. He thus had an apparent net profit of \$260 per day, before deducting the costs of maintaining his exchange membership, and other business expenses.

Cotton prices during the two months were mostly in the neighborhood of 40 cents per pound. Mr. C's gross profit for the two months averaged slightly over nine-tenths of a "point" per pound, a point being one hundredth of a cent; hence, Mr. C's gross profit margin averaged less than  $\frac{1}{40}$  of 1 per cent of the price. He executed an average of nearly 71 transactions per day, involving an average of not quite 2.6 contracts per transaction. For the most part Mr. C bought and sold within the same day, but he often held a small position overnight.<sup>23</sup>

A striking feature of Mr. C's trading, as shown in Table 5, was the wide variation in every aspect of it. On one day, for example, he bought only 14 contracts (and sold 15); on another day he bought and sold 193 contracts. The financial results ranged from a loss of over 3,000 dollars on one day, to a gain, after commissions, of over 4,000 dollars on another day. Even the average size of transactions varied widely from day to day. On closer examination of the variation in size of contracts, later, we shall find that on the day with largest average transaction size, over half of the business done by Mr. C was in transactions of 9 or more contracts, including one purchase of 38 contracts in a single transaction, whereas on another day his largest transaction was for 3 contracts, and two-thirds of his business was in transactions of only 1 contract each.

<sup>&</sup>lt;sup>28</sup> In any study of trading behavior, it is important to recognize that a speculator does not necessarily confine his activities to a single type of trading. If a professional scalper chooses sometimes to take a position with the intention of holding it for a considerable interval of time, reliable interpretation of his trading record is rendered very difficult unless separate records are kept of the different types of trading that he does. At the time covered by this record, Mr. C occasionally did some "position trading," but such transactions, subject to a higher commission charge, were recorded in a separate account.

To judge whether Mr. C was doing chiefly unit-change scalping or day trading, we need to study at least one day's transactions in detail, with the transactions ordered in time.<sup>24</sup> The available record does not show explicitly the order in which transactions occurred. But the record includes a few days on which the price moved persistently and strongly upward, or downward, throughout the day, and for those days we can arrange the transactions in at least approximately correct temporal order by simply ordering them according to price. Two days, which chanced to occur close together, February 9 and 14, appear particularly suitable for study thus. On February 9 the price of the May future dropped 59 points, from a high of 39.96 cents per pound at the opening of the market, to a low of 39.37 cents at the close. On February 14, the price of the May future rose 31 points, from a low of 39.65 cents per pound at the opening, to a high of 39.96 cents shortly before the close. The closing price was only 2 points below the high for the day.

Days with a large price range tend to be days on which a scalper either profits handsomely, or loses heavily—they tend not to be "average" days with respect to profit. These two days offer examples approaching both extremes of financial result. February 9, though a Saturday, with a short trading session, was a day of unusual trading activity for Mr. C. February 14, on the other hand, was a day with almost exactly the average number of transactions, and their average size (2.72 contracts per transaction) was close to his two-month average. We therefore begin with the record for February 14.

Table 6 summarizes Mr. C's trading on February 14 by successive intervals during the day. The intervals are explicitly intervals of price movement; for example, the purchases and sales assigned to the first interval are those made at prices, for each future, which lay within the lowest sextile of that future's price range for the day.<sup>25</sup> Because prices moved rather steadily upward throughout the day, we shall not be far wrong if we assume that the 3 contracts bought and 18 contracts sold within the first interval of the price ranges, plus 1 short contract held at the opening of trading, produced the accumulation by Mr. C of a net short position of 16 contracts at a time early in the trading session, just before prices moved up into the second sextile of their price ranges.<sup>26</sup> Proceeding

<sup>24</sup> The analyses that follow in this and the next two sections comprise results of only the late stages of my study of Mr. C's trading. The greater part of the analytical work done was guided by the supposition that Mr. C was in large part a trend trader. The evidence forced me by successive stages toward a different interpretation of his trading. The order of presentation corresponds to that which the research might well have taken if the problems to be encountered, and the final results, could have been anticipated at the outset.

<sup>25</sup> It may be noted that four of Mr. C's transactions on February 14 are omitted from Table 6 and six are omitted from Table 7 and its supplementary note. These are all 1-contract transactions for which I failed to retain a record of the prices at which they were executed. The four omitted from both tables comprised two pairs of transactions which apparently might have involved simultaneous purchase and sale in two different delivery months. The other two transactions consisted of a purchase that offset a short position carried over from the previous day, and a sale that remained open as a part of his short position at the end of the day. The latter two transactions, though omitted from Table 7, are included in Table 6, the sale assigned with certainty to Interval VI, the purchase assigned, somewhat dubiously, to Interval I. It is possible that the purchase in question (1 October contract) was not made until Interval IV, in which case Mr. C's net short position at the end of each of the three earlier intervals should be shown as one contract larger than the table indicates.

<sup>26</sup> A detailed record of price movements on a day of strong upward price drift, such as February 14, will ordinarily show that, as the price approaches the margin between one sextile (or other division) of the price range and the next, it first penetrates the margin and drops back. During a brief later interval, while most transactions are at prices above, but close to the dividing margin, some

|                       |                     |                   | Open at end of interval |                    |           |  |
|-----------------------|---------------------|-------------------|-------------------------|--------------------|-----------|--|
| Interval <sup>a</sup> | Bought <sup>b</sup> | Sold <sup>b</sup> | Long <sup>c</sup>       | Short <sup>c</sup> | Net       |  |
| I                     | 3 (3)               | 18 (8)            | 1                       | $17^d$             | $-16^{d}$ |  |
| II                    | 7 (2)               | 12 (6)            | 2                       | 23                 | -21       |  |
| III                   | 20 (5)              | 11 (6)            | 17                      | 29                 | -12       |  |
| ſV                    | 23 (7)              | 24 (5)            | 8                       | 21                 | -13       |  |
| V                     | 19 (3)              | 16 (8)            | 6                       | 16                 | -10       |  |
| VI                    | 22 (7)              | 14 (7)            | 0                       | 2                  | - 2       |  |
| 'otal or<br>average   | 94 (27)             | 95 (40)           | 5.7                     | 17.7               | 12°       |  |
| e                     | . ,                 |                   |                         |                    |           |  |

| TABLE 6.—TRANSACTIONS OF | Mr. C During   | Successive 1 | NTERVALS O | N |
|--------------------------|----------------|--------------|------------|---|
| FEBRUARY 14, AND OPEN    | N CONTRACTS AT | THE END OF   | F Each*    |   |

(Number of contracts)

\* Data as for Appendix Table I; see note in text regarding omitted transactions.

<sup>a</sup> The intervals are successive sextiles of the price range for each delivery, beginning with the lowest prices, which occurred at the start of trading.

<sup>b</sup> Figures in parentheses are numbers of transactions.

<sup>c</sup> Long and short contracts remaining open at the end of an interval were for different delivery months.

<sup>d</sup> Reflects the effect of one short contract (May) held over from the previous day.

<sup>e</sup> Shown without a sign because calculated for a purpose that calls for averaging without regard to sign; see text.

throughout the day on the assumption that the price intervals correspond to time intervals (the latter, however, not necessarily equal in duration), we find that Mr. C had apparently increased his net short position to 21 contracts at the end of the second interval, dropped back to 12 contracts net short at the end of the third interval, and remained net short by about that amount until, in the final interval of trading, he reduced his position to 2 contracts short. (One of these, it may be noted, was in the 1952 July future, the other, in the 1953 March future.)

To a person who does not understand scalping, the fact that Mr. C held a short position throughout all of February 14 tends to invite the supposition that he began the day with expectation of a price decline, and held stubbornly to that expectation throughout, despite the contrary movement of the price. But such an interpretation of the record would lead us away from a true understanding of Mr. C's trading rather than toward it. A scalper may begin a day with some expectation regarding the probable direction of price movement, taking that as an initial guide to action; but once trading has started, he concentrates on "reading the market's action" and trying to fit his trading to it.<sup>27</sup>

may occur at prices below the margin. Inasmuch as a scalper tends to succeed in buying on dips and selling on bulges, the consequence is that a calculation of net positions such as is made in Table 6, implicitly treating the price intervals as time intervals, tends to result in assigning more purchases, and fewer sales, to the first time interval than actually occurred within it. In subsequent intervals prior to the final one, assignment errors at the two margins tend to offset each other. The highest interval of price range tends to contain more sales and fewer purchases than did the corresponding final time interval. It is probable, therefore, that Mr. C held slightly larger net short positions during February 14 than our calculations show.

<sup>&</sup>lt;sup>27</sup> Economists tend to find it difficult to credit such a statement as fully as it should be credited. My own efforts to interpret Mr. C's trading record were long misguided by persistent adherence to the assumption that he was acting often on firm expectations regarding price trends. It was only after many attempts to confirm that preconception, all of which failed, that I shifted to the line of interpretation that is outlined below.

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We must interpret the record accordingly, and for that purpose we need a fuller record, as given in Table 7. The fact that Mr. C began the day by going short has reasonable explanation in the fact that he had opportunity at the opening of the market to sell 4 May contracts, and 7 October, at prices 9 and 7 points, respectively, above the closing prices of the previous day. This would have been normal scalping procedure in the absence of reason to do otherwise. Besides making these sales, Mr. C bought 1 December contract at the opening price. It was natural, also, for a day trader accustomed to deal in such quantities as Mr. C did, to allow his net short position to increase to as much as 21 contracts, through selling more on what he took to be bulges than he bought on apparent dips.

Consider, next, that a scalper is prone to regard any small upward price movement as a bulge, in the absence of reason to the contrary. He rarely, if ever, has advance warning of the beginning of a new trend, and is therefore highly subject to regarding the first moves in any new upward price trend as a price bulge. If, then, the upward price movement of February 14 was not a continuous trend, but was composed of a succession of brief upward trends, with intervening periods of little price movement, Mr. C would have been subjected re-

|                                    |                | _            |                |             |                |               |                 |             |                  |               |                      |                  |              |              |                     |                  |
|------------------------------------|----------------|--------------|----------------|-------------|----------------|---------------|-----------------|-------------|------------------|---------------|----------------------|------------------|--------------|--------------|---------------------|------------------|
|                                    | М              | ay (3        | 1)ª            |             | Jı             | ıly (3        | 9) <sup>a</sup> |             | Octo             | ober (        | (25) <i>ª</i>        |                  | Dece         | mber         | · (22) <sup>a</sup> |                  |
|                                    | Bou            | ght          | So             | ld          | Bou            | ght           | So              | ld          | Bought           |               | Sold                 |                  | Bou          | ght          | So                  | ld               |
| Interval                           | Р              | Q            | P              | Q           | P              | Q             | Р               | Q           | Р                | Q             | Р                    | Q                | Р            | Q            | Р                   | Q                |
| I                                  | -<br>-<br>3    | -<br>1       | 0<br>2<br>3    | 4<br>1<br>1 |                | -             | -<br>4<br>5     |             |                  | -             | 0<br>                | 7                | 0<br>-<br>-  | 1<br>-<br>-  | _<br>_<br>_         |                  |
| II                                 | 9<br>10        | 25           | 7              | 1           | -<br>-<br>-    |               | 8<br>9<br>12    | 2<br>5<br>2 | -                | -             | 7                    | 1                |              |              | -                   |                  |
| III                                | 12<br>13<br>14 | i<br>7<br>10 | 11<br>15       | 2<br>-<br>1 | -<br>-<br>-    | -             | 14<br>16<br>19  | 1<br>1<br>5 |                  | _             | -                    | -                | 9            | 1            | 8                   | 1<br>-<br>-      |
| IV                                 | -              |              | 16<br>         | 9<br>-<br>- | 20<br>23<br>25 | 6<br>4<br>6   | 22<br>24<br>26  | 1<br>7<br>6 | 13<br>15<br>16   | 2<br>2<br>2   | -                    | -                | 13           | -<br>1<br>-  | 12                  | 1 -              |
| v                                  |                |              | -<br>-<br>25   | -<br>-<br>2 | 28<br>29<br>-  |               | 27<br>          | 2           | -<br>-<br>-<br>- |               | 17<br>18<br>19<br>20 | 1<br>3<br>4<br>2 | -<br>-<br>18 | -<br>-<br>2  | -<br>17<br>18       | -<br>-<br>1<br>1 |
| VI                                 | 26<br>28       | 1<br>2<br>-  | 29<br>30<br>31 | 2<br>5<br>1 | -<br>34<br>38  | -<br>5<br>1   | 33<br>37<br>-   | 2<br>2<br>- | 23<br>25         | -<br>7<br>5   | -                    | -                | -<br>-<br>-  | -            | 19<br>              | 1                |
| Total<br>Average<br>Average profit | 13.6           | 29<br>       | 16.6<br>.0     | 29          | 24.5           | 39<br>-<br>-7 | 17.1<br>'.4     | 39          | 16.9             | 18<br>-<br>-6 | 10.1<br>.8           | 18               | -<br>8.3     | 5<br>-<br>+7 | 15.3<br>.0          | 5                |

TABLE 7.—TRANSACTIONS OF MR. C, BY DELIVERY MONTHS AND BY INTERVALS, FEBRUARY 14\*

\* The price (P) on each transaction is expressed in points per pound above the lowest price recorded during the day, at the beginning of trading; quantities (Q) are numbers of contracts.

In addition to transactions for 1952 delivery, shown above, Mr. C made two sales of one contract each for March 1953 delivery, at slightly above the opening price, and sold one March (1953) shortly before the close; in the July 1953 delivery, he sold one contract during the second interval, and bought one contract during the third interval. See footnote 25, p. 30, regarding other omissions from the table. <sup>*a*</sup> Price range, in points per pound. peatedly to the risk of selling against the first price advances in a new upward trend, mistaking the initial advance for a bulge. Apparently he made a series of such mistakes on February 14, perhaps because the "market action" was especially hard to interpret on that day; or perhaps only "because his luck was bad" that day.

Finally, we may note that Mr. C's trading on February 14 offers a conspicuous example of the use of spread positions in scalping. At the end of Interval III Mr. C had a spread position of 17 contracts, according to Table 6. From the more detailed Table 7 we see that this consisted chiefly of long May contracts held against short contracts in July. Mr. C was not a "spreader" in the ordinary sense, as may be seen most clearly from the fact that only once in two months did he hold a spread position overnight (see Appendix Table I). Nor did he accumulate his mid-session spread position of February 14 in the manner of a pure spreader, by making purchases and sales simultaneously.<sup>28</sup> The position accumulated because, during the first three intervals of the day, he was progressively building up a short position in the July future, and was finding what seemed his best opportunities for purchases in other futures, chiefly the May. Such use of transactions in one future as a temporary substitute for like transactions in a different future is a common practice of scalpers, as we noted earlier.

To return now to the question whether Mr. C was primarily a unit-change scalper or a day trader, it is obvious from evidence in the tables that he was primarily a day trader. Though much of his buying and selling was done through transactions of only 1 or 2 contracts each, absorbing "market" orders that could themselves have produced only the smallest of dips and bulges, he was apparently regarding these tiny dips and bulges as superposed on larger ones, with which he was principally concerned. We may derive a rough estimate of his average holding interval. Dividing his average net position, 12 contracts,<sup>29</sup> into the quantity bought and sold during the day, indicates his average holding interval on February 14 to have been about one-eighth of the trading session.

The next day of trading that we consider in some detail, February 9, was a day of unusually active trading by Mr. C. He made 106 transactions, 50 per cent more than his average number in a day.

The average size of his net position, as calculated in Table 8, was 11.3 contracts, indicating an average holding interval of a little over one-thirteenth of the trading session. The difference between this figure and that calculated for February 14 appears reasonably attributable to the greater trading activity on February 9; but each calculation rests on a rather weak estimate of average size of net position, and the difference in calculated lengths of holding interval may not be statistically significant.

In interpreting Mr. C's trading on February 9, we must again avoid supposing that he reasoned like a price-level trader. The fact that he began the day by selling on a declining market, is open to either of two reasonable interpretations: the overnight news may have led him to expect a weak market at the opening;

<sup>&</sup>lt;sup>28</sup> The record seemed to me, nevertheless, to indicate that he did make two pairs of transactions simultaneously which are not included in either Table 6 or Table 7; see footnote 25, p. 30.
<sup>29</sup> For this purpose, the average should be taken without regard to sign, hence Table 6 shows

<sup>&</sup>lt;sup>29</sup> For this purpose, the average should be taken without regard to sign, hence Table 6 shows it without a sign, though in this instance the numerical result coincides with that of an algebraic average.

|                       |                     |                   | Oper | n at end of inte | erval |
|-----------------------|---------------------|-------------------|------|------------------|-------|
| Interval <sup>a</sup> | Bought <sup>b</sup> | Sold <sup>b</sup> | Long | Short            | Net   |
| Ι                     | 10 (4)              | 32 (12)           | 0    | 22               | -22   |
| II                    | 41 (18)             | 22 ( 3)           | 0    | 3                | - 3   |
| III                   | 14 (4)              | 17 (`6)́          | 2    | 8                | - 6   |
| IV                    | 17 (5)              | 23 (11)           | 7    | 19               | -12   |
| v                     | 25 (8)              | 36 (14)           | 0    | 23               | -23   |
| VI                    | 38 (13)             | 17 ( 5)           | 0    | 2                | — 2   |
| Total or              |                     | . ,               |      |                  |       |
| average               | 145 (52)            | 147 (54)          | -1.5 | 12.8             | 11.3  |

| TABLE 8.—TRANSACTIONS OF MR. C DURING SUCCESSIVE INTERVALS ON |
|---|
| February 9, and Open Contracts at the End of Each*            |
| (Number of contracts)   |

\* Data as for Table 6.

<sup>a</sup> The intervals are successive sextiles of the price range for each delivery, beginning with the highest prices, which occurred at the beginning of trading.

<sup>b</sup> Figures in parentheses are numbers of transactions.

or his decision to begin by selling may have rested simply on a judgment that the predominance of selling orders in the market at the opening was such as to produce a downward price trend for at least the first few minutes of trading. However that may be, he began the day by immediately selling 2 May contracts and 2 July contracts at 13 points and 15 points, respectively, below the previous closing prices. And he sold 5 March contracts quickly afterward at 1 point below its opening (March had opened only 6 points below its previous close).

These sales at, and quickly after, the opening of the market, clearly did not express confidence in a persistent downward trend, for soon thereafter Mr. C bought 2 May at only 2 points under the price at which he had previously sold May.30

If, as Table 8 suggests,<sup>31</sup> Mr. C held always at least a small short position during the trading session of February 9, while the price moved persistently downward, never getting "on the wrong side" of the market, it was probably at least partly through good fortune. But it may have been also because the price movement for the day was made up of only a few successive "true" trends, nearly all of them downward. If that was the case, there were few instances in which Mr. C was led to regard the current price trend as upward and, therefore, few instances in which he became subject to mistakenly regarding a new downturn as a dip rather than as a new downward trend.

The circumstances of February 9 allow us to attempt a rough estimate of the portion of Mr. C's gains for the day that can be attributed to buying on dips and selling on bulges. Averaging the price ranges of the several delivery months in which he traded, with weighting according to the amount of his trading in

<sup>&</sup>lt;sup>30</sup> Except for the need to consider in detail the transactions mentioned above, it has appeared to me that Mr. C's trading on February 9 could be comprehended better from the summarization used in Table 9 than from a listing in full detail of the 106 transactions made on that day. <sup>81</sup> Applying the reasoning of footnote 26 on p. 30, to the case of downward price movement leads to the inference that Mr. C may have actually held somewhat smaller net short positions than

Table 8 shows, and may indeed have been slightly net long at the time most nearly corresponding to the lower margin of Interval II.

|          |      | March      | (52) <i>a</i> |            |      | May        | (59) <i>ª</i> | -          |      | July       | (62) <i>a</i> |            | 00             | tober                 | (28) <i>a</i> |                       |
|----------|------|------------|---------------|------------|------|------------|---------------|------------|------|------------|---------------|------------|----------------|-----------------------|---------------|-----------------------|
|          | Во   | ught       | Se            | old        | Bo   | ught       | S             | old        | Bo   | ught       | S             | old        | Bou            | ght                   | Sol           | d                     |
| Interval | Р    | Q          | P             | Q          | Р    | Q          | P             | Q          | Р    | Q          | P             | Q          | Р              | Q                     | P             | Q                     |
| I        | 44.7 | 3<br>(2)   | 51.0          | 5<br>(2)   | 57.0 | 2<br>(1)   | 53.4          | 14<br>(4)  | 53.0 | 5<br>(1)   | 58.1          | 13<br>(6)  | -              | _                     | _             | _                     |
| II       | 39.0 | 2<br>(2)   | -             | -          | 43.6 | 24<br>(8)  | 45.0          | 15<br>(8)  | 44.6 | 13<br>(7)  | 50.0          | 5<br>(2)   | 19             | 2<br>(1)              | 20            | 2<br>(1)              |
| 111      | 31.0 | 1<br>(1)   | 32.0          | 1<br>(1)   | 36.5 | 11<br>(2)  | 35.9          | 16<br>(5)  | 39.0 | 2<br>(1)   | -             | -          | -              | -                     | -             |                       |
| IV       | 26.0 | 4<br>(1)   | 22.3          | 3<br>(3)   | 24.1 | 9<br>(2)   | 26.6          | 20<br>(8)  | 29.5 | 4<br>(2)   | -             | -          | -              | -                     |               | -                     |
| v        | 10.5 | 2<br>(2)   | 15.2          | 5<br>(3)   | 13.6 | 19<br>(5)  | 16.4          | 15<br>(3)  | 13.0 | 4<br>(1)   | 15.8          | 14<br>(7)  | -              | -                     | 4 <b>b</b>    | 2 <sup>b</sup><br>(1) |
| VI       | 1.8  | 4<br>(2)   | 5.0           | 2<br>(1)   | 4.9  | 15<br>(5)  | -             |            | 2.8  | 17<br>(5)  | 7.2           | 13<br>(2)  | 2 <sup>b</sup> | 2 <sup>b</sup><br>(1) | -             | -                     |
| Total    | -    | 16<br>(10) | -             | 16<br>(10) | -    | 80<br>(23) | -             | 80<br>(23) | -    | 45<br>(17) | -             | 45<br>(17) | -              | 40<br>(2)             | -             | 40<br>(2)             |
| Average  | 23.4 | -          | 25.5          | -          | 28.6 | -          | 34.7          | -          | 25.3 |            | 29.3          |            | 10.50          | -                     | 12.00         | -                     |

TABLE 9.—SUMMARY OF TRANSACTIONS OF MR. C, BY DELIVERY MONTHS AND BY INTERVALS, FEBRUARY 9\*

\* Data as for Table 7 except that here the quantities (Q) usually resulted from more than one transaction, the number of transactions being given in parentheses below the quantity. In such instances, the prices (P) are weighted averages. Sales of 2 May contracts that remained open at the end of the day are here omitted.

<sup>a</sup> Price range, in points per pound.

<sup>b</sup> December future, which had a price range of 22 points.

<sup>o</sup> Transactions in October and December futures combined.

each, gives an average price range of 58.2 points. If his average holding interval was slightly over one-thirteenth of the trading session, as we have calculated, his profit from the dominant price movement of the day is unlikely to have been much over 4.54 points per pound and may have been somewhat less than that. That calculation is based on an implied assumption that purchases and sales were made, on the average, at "intermediate" prices; that neither the purchases nor the sales were made predominantly on dips or predominantly on bulges. But in fact Mr. C's trading gain for the day was 6.38 points per pound. Hence it appears that his efforts to buy on dips and to sell on bulges probably added about 1.8 points per pound to his trading gain for the day.<sup>32</sup> His average rate of gain from two months of trading, it will be recalled, was 0.93 point per pound.

#### 9. The Significance of Size and of Numbers of Transactions

We noted earlier that the number of Mr. C's transactions varied, during two months, from 23 transactions on one day (February 6), to 151 on another day (February 11). And we noted that the average size of his transactions ranged from 1.26 contracts per transaction (February 6, again)<sup>33</sup> to 3.58 contracts per transaction (February 29).

<sup>&</sup>lt;sup>82</sup> A more elaborate calculation, made to check the reliability of this very simple one, produced an identical result.

<sup>&</sup>lt;sup>38</sup> The thought naturally occurs that Mr. C may have worked during only part of the trading session on February 6. That, however, seems not to have been the case, for the prices on his transactions are well distributed through the entire price range for the day.

The variation in average size of transactions reflects the fact that the number of "large" transactions moved in a different pattern than did the number of "small" ones; and it appears from the data of Table 10 that the dividing line between "small" and "large" may best be drawn between 2-contract transactions and 3-contract transactions.<sup>34</sup> Three contracts represented an amount of cotton worth about 60,000 dollars at prices then prevailing.

The wide variation from day to day in the amount of business done by Mr. C

| Size <sup>a</sup> | Feb. 6   | Feb. 7   | Feb. 5     | Feb. 11                | Feb. 14          | Feb. 9   | Feb. 21 | Feb. 29  |  |
|-------------------|----------|----------|------------|------------------------|------------------|----------|---------|----------|--|
|                   |          | A        | A. Numb    | ers of Tra             | insactions       | ;        |         |          |  |
| 1                 | 19       | 31       | 58         | 63                     | 34               | 34       | 28      | 33       |  |
| $\hat{2}$         | 2        | 14       | 28         | 34                     | 16               | 34       | 20      | 12       |  |
| 3                 | 2        | 6        | 4          | 16                     | Ĩ                | 10       | 6       | 3        |  |
| 4                 | _        | ž        | 6          | 16                     | 3                | 12       | 7       | 5        |  |
| 5                 | _        | _        | 4          | 10                     | 6                | 6        | 6       | 5        |  |
| 6                 |          |          | _          | 8                      | 3                | 2        | 4       | _        |  |
| 7                 | _        | _        | _          | 4                      | 4                | 2        | 3       | -        |  |
| Ŕ                 | _        |          | _          | _                      | 1                | 2        | 3       |          |  |
| ğ                 | -        | _        | _          | _                      | $\tilde{2}$      | _        | 2       | 1        |  |
| 10                | _        | _        | _          |                        | 1                | 4        | 2       | 1        |  |
| îĭ                |          | _        | _          | _                      | _                |          | 1       | ī        |  |
| 12                | _        | _        |            | _                      |                  | _        | _       | _        |  |
| 13                |          | _        | _          | _                      | _                |          | 1       | _        |  |
| 14                | _        | _        | -          | _                      |                  | _        | 1       | -        |  |
| 15                | _        | _        | _          | _                      | _                | _        | _       | 1        |  |
| 16                | _        | _        | _          | _                      |                  |          | _       | _        |  |
| 17                | _        | -        | _          | _                      | _                | _        | _       |          |  |
| 18                |          |          |            | -                      |                  | _        | -       | 1        |  |
| 19                | -        | _        | -          | -                      | -                | -        | _       |          |  |
| 20                | -        | -        | _          |                        | -                | -        | -       | -        |  |
| 21                | -        | -        | -          | -                      | -                | -        | -       | 1        |  |
| 38                |          | -        |            | _                      | -                | -        | _       | 1        |  |
| Tota              | 1 23     | 53       | 100        | 151                    | 71               | 106      | 84      | 65       |  |
| 200               |          |          |            |                        |                  |          |         |          |  |
|                   |          | В.       | Average    | Size <sup>a</sup> of ' | <b>Fransacti</b> | on       |         |          |  |
| ••                | 1.26     | 1.60     | 1.70       | 2.44                   | 2.72             | 2.75     | 3.44    | 3.58     |  |
|                   |          | C. Pero  | centage of | f Total Q              | uantity In       | volved   |         |          |  |
| 1                 | 15       | 26       | 24         | 17                     | 10               | 10       | 10      | 14       |  |
| 1                 | 67<br>14 | 50<br>22 | 34<br>22   | 10                     | 10               | 12       | 10      | 10       |  |
| 2                 | 14       | 55       | 55<br>22   | 10                     | 17               | 23<br>65 | 14      | 10<br>76 |  |
| 3 or m            | ore 21   | 51       | 55         | 00                     | 00               | CO       | /0      | 100      |  |
| Tota              | al 100   | 100      | 100        | 100                    | 100              | 100      | 100     | 100      |  |

TABLE 10.—Frequency Distributions, According to Size, of Transactions of Mr. C on Eight Selected Days\*

\* Data as for Appendix Table I.

<sup>a</sup> Number of contracts.

<sup>84</sup> The selection of days for Table 10 was made to include those with the smallest and the largest numbers of transactions, the smallest and the largest average size, and a few days of intermediate characteristics, including those days studied closely in the previous section.

a

--from only 14 contracts bought, and 15 sold, on one day, to 193 contracts bought, and 193 sold, on another day---obviously reflects a similar variation in the amount of opportunity for profitable trading that he thought he recognized. He was devoting full time during trading sessions to his business of trading in cotton, and presumably would have tried to take advantage, each day, of all the attractive profit opportunities that he could recognize and seize. But it may be that on a few days, physical and financial limitations put an upper limit on the amount of business that he could do.

According to one view of the nature of floor trading, Mr. C's profit opportunities would have varied from day to day chiefly according to the amount of price movement that occurred, and the amount of "outside" speculation that entered the market. Those were clearly not major influences determining the amount of business done by Mr. C.<sup>35</sup> The only tenable explanation that I have been able to find for the observed variation in the amount of business that he did relies, first, on the supposition that he was seeking primarily to buy on dips and to sell on bulges of intermediate size—not the smallest, which occur often on any day of even moderately active trading, nor the large ones that require much overnight holding of positions. Secondly, it seems necessary to suppose that these dips and bulges on which he depended chiefly for his profits, were produced mainly by hedging orders.

Let us undertake a few tests of the validity of these suppositions, and begin by considering the record for the day on which Mr. C made his largest number of transactions, February 11.

From Table 10 we see that on February 11 Mr. C's "large" transactions (3 or more contracts) were exceptionally numerous, numbering 54, though none was conspicuously large. Concerning trading for the day, the *Wall Street Journal* noted that there was "heavy pressure of liquidation and hedge-selling"; and in explanation of the hedging, it added; "Merchants who had been carrying spot cotton on an open unprotected basis continued to hedge their holdings aggressively in futures." We may recall that prices had declined sharply on the previous trading day, February 9, a circumstance that could have promoted decisions to hedge stocks that had thus far been carried unhedged.

Consider next the exceptionally large transaction made by Mr. C on February 29, involving 38 contracts. On closer examination, this proves to have been a purchase by Mr. C. The *Wall Street Journal* spoke of hedging as a price influence on that day, and the *New York Times* was more specific, speaking of "hedge selling from the South." A hedging sale of 38 contracts would have been a notably large one, representing cotton worth 760,000 dollars (the price on the transaction was precisely 40 cents). I can think of no plausible explanation for Mr. C's having suddenly made so exceptionally large a transaction except that he did so in order to absorb a particularly large hedging order at what seemed to him an attractive price.<sup>36</sup>

<sup>86</sup> It is difficult to judge from the record whether this transaction did prove profitable or not. For the day as a whole, Mr. C had a loss of 1.68 points per pound.

<sup>&</sup>lt;sup>85</sup> I must, regretfully, omit the supporting evidence. To give only a minor part of it would be misleading, and to give it all would require far too much space. I may suggest, however, that a reader disposed toward a different interpretation might begin by trying to account for the very small amount of business that Mr. C did on February 6, bearing in mind the evidence given in footnote 33, p. 35, above.



Chart 2.—Daily Averages of Transaction Size for a Day Trader in Cotton, February-March 1952\*

\* Data from Appendix Table I. The fact that the adjusted values lie always below the observed values, except at one point, reflects only an arbitrary choice of constant term for the adjustment formula, made to avoid confusing intersections of the two curves on the chart. Dates on the horizontal scale are Mondays.

If we are correct in supposing that Mr. C's larger transactions involved, in major part, the absorption of hedging orders, it follows that the variations in his average transaction size should serve as a rough index of variation in the volume of hedging transactions on the New York Cotton Exchange. As an aid toward testing that inference, Chart 2 shows the average contract size, daily, both as observed, and as modified by an adjustment which somewhat improves its reliability as an index of the volume of hedging transactions.<sup>87</sup>

We have already noted instances, on February 11 and February 29, in which our inferences from transaction size proved consistent with comments in the market reports. Some contrary instances can be found also; for example, on February 5 Mr. C had a comparatively low average transaction size and only 14 "large" transactions (none exceeding 5 contracts), but the *Wall Street Journal* said that, "Hedge-selling credited to dealers . . . increased" on that day. Market comments in the daily press prove of limited usefulness in judging the volume of hedging transactions on the market. Their authors try to give the leading reasons for price movements that occurred, and if the price rose despite hedging pressure, the hedging may go unmentioned. When the price declined, it seems to have been almost routine for them to say that it declined "because of liquidation and hedging," or to use some other expression that tells little more than that about the amount of hedging. Perhaps there exists some better evidence on daily variation in volume of hedging transactions during February-March 1952 than I have found, which might be compared with the evidence in Chart 2.

A notable feature of Chart 2 is that, as here interpreted, it indicates a considerably greater volume of hedging transactions during February than during

<sup>&</sup>lt;sup>87</sup> The basis for the adjustment is derived in the next section. Amount of business done through large transactions (subject to similar adjustment) would be a better index of amount of hedging than is average transaction size; but, as noted earlier, that is information now available only for days in February.

| Average size of transactions <sup>a</sup> | Number of days<br>in class | Average number<br>of transactions |
|---|----------------------------|-----------------------------------|
| 1.26—1.85                                 | 7                          | 52                                |
| 1.892.24                                  | 7                          | 67                                |
| 2.25-2.47                                 | 8                          | 69                                |
| 2.48-2.72                                 | 7                          | 74                                |
| 2.75-3.12                                 | 7                          | 84                                |
| 3.13-3.58                                 | 7                          | 79                                |
| All                                       | 43                         | 70.8                              |

TABLE 11.—Relation of Daily Number of Transactions to Average Size\*

\* From Appendix Table I.

<sup>a</sup> Number of contracts per transaction.

March. That might explain why Mr. C's net trading income for the two months was drawn entirely from his trading during February. In March, his trading gains exceeded losses by less than 200 dollars, before paying commission charges of 3,155 dollars.

Though the number of Mr. C's large transactions changed from day to day in quite a different pattern than did the number of his small transactions, there was a tendency for an increase in number of large transactions to carry with it an increase also in number of 1- and 2-contract transactions. This tendency can be observed in Table 10, and has the surprising consequence seen in Table 11: as the average size of Mr. C's transactions increased so also did the total number of transactions that he made. It would have seemed reasonable to have found an opposite tendency: that when he was able to deal in large quantities per transaction, he tended to relax his efforts to make money from 1- and 2-contract transactions.<sup>88</sup> The occurrence of a moderately large dip necessarily involves the emergence of market "weakness" extending over an interval of many minutesperhaps half an hour. When a day trader believes that such an interval of market weakness will be followed by strength, thus forming a price dip, he seeks to take advantage of any favorable buying opportunity, whether presented by a single large selling order, or by a series of small selling orders. Even though the dip has been produced by large-scale hedge selling, it may happen that the day trader absorbs directly only a small part of the hedging order, yet aids absorbtion of the remainder through absorbing a number of small speculative selling orders that were contributing to occurrence of the price dip. So also, the selling done by a day trader during an interval of temporary market strength induced by hedge buying may take the form, in part, of small sales rather than one or two large ones.

Another reason for the occurrence of many small transactions by a scalper on days when he finds opportunity for large scalping transactions, is that the large transactions may all be purchases, made in connection with hedge selling, requiring that he make numerous small sales to offset them; or the large transactions may all be sales, requiring that he make numerous small purchases to

<sup>&</sup>lt;sup>38</sup> Table 11 suggests that there may have been a slight tendency toward such relaxation within the uppermost ranges of transaction size; but the irregularities that inevitably arise when observations are few make this inference uncertain.

offset them. It is common for the hedging orders that reach a market on any one day to be chiefly selling orders or chiefly buying orders. If hedge buying and hedge selling tended to occur in equal amounts day by day, there would be little need for speculation on a futures market.

#### 10. Relations Between Transaction Size and Profits

We may now undertake to get some indication of the amount of advantage, in terms of profit per unit of the commodity, that is obtainable by a scalper through trading on the larger dips and bulges rather than trading on those of only the smallest size. A professional unit-change scalper, dealing mainly with the smallest dips and bulges, can earn a satisfactory income only if he makes a great number of transactions per day, involving a large total quantity of the commodity. Dealing chiefly with the smallest dips and bulges, his profit per unit of the commodity is inevitably very small. A day trader, on the other hand, dealing with larger dips and bulges, finds their number comparatively few within a day; but he may expect to earn more, per unit of the commodity, than does a unit-change scalper.

Though Mr. C was essentially a day trader, concerned chiefly with moderately large dips and bulges, he dealt also with the smallest dips and bulges, associated with 1- and 2-contract "market" orders. On days when there were few, if any, dips and bulges larger than the smallest, Mr. C's profits necessarily depended mainly on what he could earn from those smallest dips and bulges. And on days with a goodly number of larger dips and bulges, Mr. C's trading income would reflect the results of trading principally on those larger dips and bulges.

We may therefore expect Mr. C's rate of gain, per pound of cotton dealt in, to have varied appreciably according to the average size of his transactions: his average gain per pound to have been especially small for days when his average transaction size was small; and his average gain per pound to have been appreciably larger for days on which he had many large transactions. The upper section of Table 12 tests this supposition.

The table shows at once that our reasoning has gone wrong at some point. In place of the expected increase in profit per pound, as transaction size increased, we find a sharp decrease.

I must admit that it took me some time to recognize why the facts, in this instance, proved so awkward for the theory. But the explanation, once found, proved to be quite simple. Large transactions are made by a scalper under two quite different sets of circumstances, and we have considered only one of them. The other circumstances are those in which a scalper decides to "cut his loss." Having concluded that he has "got on the wrong side of the market" and should reduce or reverse his position, he acts quickly, through one or two fairly large transactions. Consequently, days on which a scalper incurs many losses tend to be days of fairly large average transaction size, owing to the large loss-cutting transactions. That effect is clearly evident in the lower section of Table 12.

An excellent example of the relation of losses to transaction size came under our eyes earlier, but passed unnoticed. On February 14, when Mr. C was persistently losing money by getting on the short side of an advancing market, he made repeated loss-cutting purchases, with the consequence that his purchases had an

| <br>A. Apparent Dependence of Profit on Transaction Size |                                |  |                   |  |  |  |  |  |  |  |
|--|--------------------------------|--|-------------------|--|--|--|--|--|--|--|
| <br>Number of<br>contracts per<br>transaction            | Average<br>transaction<br>size | Gross profit<br>in points<br>per pound | Number<br>of days |  |  |  |  |  |  |  |
| <br>1.26-1.89  | 1.68                           | +3.04                                  | 8                 |  |  |  |  |  |  |  |
| 1.99-2.32  | 2.19                           | +2.40                                  | 9                 |  |  |  |  |  |  |  |
| 2.34-2.63  | 2.47                           | + .70                                  | 9                 |  |  |  |  |  |  |  |
| 2.66-3.10  | 2.84                           | + .30                                  | 9                 |  |  |  |  |  |  |  |
| 3.123.58   | 3.33                           | 49                                     | 8                 |  |  |  |  |  |  |  |
| All  | 2.58ª                          | + .93⁵                                 | 43                |  |  |  |  |  |  |  |

TABLE 12.—RELATIONS BETWEEN PROFITS AND TRANSACTION SIZE

#### B. Dependence of Transaction Size on Profit or Loss

| Profit per<br>pound | Average<br>profit | Average<br>transaction<br>size | Number<br>of days |  |
|---------------------|-------------------|--------------------------------|-------------------|--|
| +6.64 to $+5.00$    | +5.82             | 2.06                           | 6                 |  |
| +4.99 to $+3.00$    | +4.25             | 2.34                           | 7                 |  |
| +2.99 to $+1.00$    | +2.25             | 2.58                           | 10                |  |
| + .99 to $-1.00$    | + .15             | 2.37                           | 8                 |  |
| -1.01 to $-3.00$    | -1.67             | 2.74                           | 6                 |  |
| 3.01 to5.74         | -4.56             | 2.94                           | 6                 |  |
| All                 | + .93ª            | 2.58 <sup>b</sup>              | 43                |  |

<sup>a</sup> Weighted by number of transactions, though the class averages are not so weighted.

<sup>b</sup> Weighted by number of contracts, though the class averages are not so weighted.

average size of 3.5 contracts, whereas his selling transactions averaged less than 2.4 contracts each (Table 6, above). On February 9, on the other hand, when few if any occasions arose for Mr. C to "cut a loss," purchases and sales were of almost exactly equal average size, 2.69 and 2.72 respectively (Table 8).

The fact that daily average transaction size depended considerably on the good or ill fortune experienced by Mr. C, day by day, calls for corresponding adjustment of the transaction-size averages, when intended for use as an index to the daily volume of cotton hedging at New York. It was for that reason that the adjusted values in Chart 2 were shown the more prominently.<sup>39</sup>

#### 11. Inter-Market Differences in Scalping

We observed earlier, in Table 2 that statistics intended to reflect the amounts of scalping indicated that over 23 per cent of the trading in Chicago wheat was scalping, whereas the corresponding figure for Chicago corn was slightly less than 11 per cent. At Kansas City, the amounts of trading classed as scalping were 11 per cent for wheat and corn alike. The relevant data are repeated below, together with supplementary calculations.

<sup>&</sup>lt;sup>30</sup> The regression coefficient indicated in Table 12, is -0.085. In order to avoid intersections of the two series in Chart 2, yet keep them as close together as possible, the adjustment formula was taken as S' = S + 0.085 (G-6.64), where S and S' are the observed and the adjusted transaction sizes respectively, and G is the gain (negative if a loss), in points per pound, on the day's trading.

| Market           |                    | Avera               | Ratio<br>trading:    |                |                   |
|------------------|--------------------|---------------------|----------------------|----------------|-------------------|
| and<br>commodity | Number of scalpers | Thousand<br>bushels | Per cent<br>of total | Per<br>scalper | open<br>contracts |
| Chicago          |                    |                     |                      |                |                   |
| Wheat            | 63                 | 7,342               | 23.2                 | 116            | 20.3              |
| Corn             | 45                 | 2,282               | 10.9                 | 51             | 12.2              |
| Total            | 85ª                | 9,624               |                      | 114            |                   |
| Kansas City      |                    |                     |                      |                |                   |
| Wheat            | 3                  | 162                 | 11.1                 | 54             | 4.9               |
| Corn             | 3                  | 79                  | 11.0                 | 26             | 4.9               |
| Total            | $3^a$              | 241                 |                      | 80             |                   |

<sup>a</sup> Eliminating duplications estimated; see text and accompanying footnote.

Difference among the trading ratios in the final column above reflect differences in composition of the scalping trade recorded.<sup>40</sup> The trading ratio for Chicago wheat is as high as it is principally because of the large proportion of specialized unit-change scalping in that market, which comprised a considerable fraction of the scalping trade in wheat, while adding nothing to the volume of the scalpers' open contracts. The much smaller corn futures market may have had no traders who specialized in unit-change scalping. The trading ratios at Kansas City were low because the three scalpers operating in that small market could attain a profitable volume of business only by including a substantial amount of day-to-day scalping with their other scalping trade. They doubtless made much use of Kansas City–Chicago spreads to restrict the risk involved.<sup>41</sup>

A professional scalper must do a fairly large volume of business per day in order to gain an adequate income. In consequence, professional scalpers are few in a small market, but tend to do nearly as much business per person as do their counterparts in larger markets. The 85 Chicago scalpers covered by the foregoing tabulation doubtless included several who did trading in other commodities besides wheat and corn. If that other business could have been added to their trading in wheat and corn, as shown in the tabulation, it might have raised the total to as much as 120,000 bushels per trader per day. If so, the amount of trading per person per day was two-thirds as much for the Kansas City scalpers as for those at Chicago.<sup>42</sup>

<sup>40</sup> Inasmuch as it is common for scalpers to do some position trading at times, we may confidently assume that all of the trading ratios above are considerably lower than they would have been if the only open contracts included had been those associated with the scalping activities of the traders covered by the tabulation. The record of Mr. C, studied above, which excluded any position trading that he did, shows a trading ratio of nearly 54.

<sup>41</sup> Spreading between markets of widely differing size, if it is concerned primarily with small and short-lived price variations, tends to be done chiefly or wholly by floor traders in the smaller of the two markets. They can seize favorable opportunities to buy or sell in the smaller market with confidence that an offsetting transaction can be made in the large market at very nearly the last quoted price there.

That the Kansas City scalpers did a considerable amount of day-to-day scalping, either with or without the aid of intermarket spreading, is evident from their low ratio of trading to open contracts.

<sup>42</sup> Most, if not all, of the brokers and floor traders who deal in corn on the Kansas City Board of Trade, deal also in wheat, and trading in the two commodities is conducted simultaneously within what is essentially a single group of traders. At Chicago, the groups dealing in the two commodities are separated almost as effectively as though they were operating in separate rooms—a condition made necessary by the large number of persons and large amount of business done in each group. Certain scalpers are to be found always in the wheat pit, and others (much fewer), always in the corn pit; while still others work sometimes in wheat and sometimes in corn, depending on the relaIn the presence of specialized unit-change scalping, the unit-change scalpers often accept bids and offers that would not be accepted by another sort of scalper, and thus keep successive price changes smaller than they would otherwise be. Moreover, unit-change scalpers, seeking to keep their holding intervals very brief, are often led to deal with other scalpers who are accustomed to holding over longer time intervals. Thus, the presence of specialized unit-change scalping tends in two ways to increase the ratio of scalping to total trade in a market. The fact that the exceptional volume of business in Chicago wheat could support much specialized unit-change scalping is probably the chief reason for the conspicuously high ratio of scalping to total trade in Chicago wheat.

The amount of scalping relative to total trade in a futures market, besides depending on the scalpers and their ways of doing business, may be substantially influenced by the character of the hedging being done. Some dealers and processors do their hedging in a routine manner, placing heavy reliance on the services of scalpers, whereas others exercise market judgment in timing the placing and lifting of hedges; if hedgers of the latter class act with sufficient knowledge and skill, their hedging gives rise to relatively little scalping. The amount of scalping can be influenced also by the character of the speculation (more properly, other speculation) in the market. For example, the use of stop-loss orders by speculators tends to lead to profit opportunities for scalpers. Speculators who seek to buy on dips and sell on bulges in connection with their price-level trading, may either restrict or enhance the profit opportunities of scalpers, depending on the knowledge and skill of the speculator. Such speculators are seeking to combine scalping with their price-level trading. If they do so skillfully enough, they diminish the profit opportunities of professional scalpers. Done less skillfully, the effect is to establish "resistance and support levels" that aid professional scalping.

It must be borne in mind that the statistics of scalping that we have been considering in this section cover only that done by persons for whom scalping comprised at least a major part of their business activity. If all scalping were included for each market, the resultant ratios might stand in appreciably different relations than do the ratios in the table. We may nevertheless feel confident that there was much more scalping in Chicago wheat, relative to total trade, than there was in Chicago corn or in either of the grains at Kansas City. My own guess would be that the great amount of scalping in Chicago wheat was not merely a consequence of the presence of much specialized unit-change scalping in that market, but owed something also to special characteristics of the hedging and of the speculation in Chicago wheat.

#### 12. Conclusions

The theory that has been tested in the foregoing pages carries implications beyond the obvious one, that most floor trading on commodity exchanges is

tive abundance of scalping opportunities currently arising in the two commodities. (Soybean trading, now so prominent, did not exist at the time to which these comments apply.) The shifting of scalpers between pits tends to maintain continuous equality between the two pits in the frequency of scalping opportunities per average scalper, except as regards the specialist in unit-change scalping. In estimating the total number of Chicago scalpers represented in the above tabulation at 85, I may have made insufficient allowance for that exception, with the effect of slightly underestimating the number of scalpers, and therefore slightly overstating the average amount of wheat and corn trading per scalper at Chicago.

economically useful. One of those further implications, already noted, is that the dips and bulges whose amplitudes scalpers restrict, are not all very small and brief, as has commonly been supposed. They include also many larger intraday dips and bulges, and numerous others, presumably of still greater amplitude, that have durations ranging from one to as much as three or four days. Scalping is of greatest benefit to hedgers through restricting the amplitude of these larger dips and bulges.

Another implication, irrelevant to the tests made here, has thus far gone unmentioned, but requires notice in a summary of conclusions. That is the implication that, because the price dips and bulges occasioned by "market" orders, and by bunches of such orders, are often fairly large, hedgers must incur a substantial cost, in the form of price concessions, through their frequent use of market orders to insure prompt execution when they place their hedges, and again when they lift them. Recognition of this execution cost of hedging, which is a hitherto unrecognized source of the incomes of speculators in futures, may be the key to a greatly improved understanding of commodity speculation on futures markets. If the execution cost of hedging is a large source of speculative incomes, able speculators may in fact draw their incomes chiefly from hedgers, rather than chiefly from those inept traders who lose money at speculation.<sup>43</sup> Moreover, as a source of income that arises directly in connection with the placing and the lifting of hedges, execution cost has the characteristic necessary for explaining the hitherto unexplained fact that the volume of speculation on a futures market tends to increase or decrease in prompt response to changes in the amount of hedging.

The first stage of our testing of the scalping theory of floor trading (Sections 1-5) produced evidence for a considerably qualified conclusion, namely, that most floor trading is scalping, unless much of it is intraday trend trading. Most floor trading—indeed, all but a small fraction of it—is done by traders whose overnight holdings, net long or net short, are so small in relation to their volume of transactions as to be consistent with the supposition that they are scalpers. But that fact does not exclude the possibility that floor traders may be in large part trend traders, deriving their profits from very brief price trends rather than from scalping.

By proceeding to a brief study of the trading of a known scalper, Mr. A, we got a clue to solution of the problem of distinguishing between scalping and trend trading. Mr. A's second transaction of the day was an effort to derive profit from a very brief price trend; and it was successful. Moreover, Mr. A asserted that the most important requirement *for success at scalping* was ability to recognize price trends. We proceeded with the second stage of our inquiry by supposing tentatively (Section 7) that intraday price trends, and trends running for as much as three or four days (involving holding intervals no longer than those of scalpers), tend to be a source of net loss to a floor trader. There is substantial reason for believing this to be true. Three major conclusions emerged, namely:

 $<sup>4^3</sup>$  A calculation of the results of speculative holding of wheat in the United States over a period of 41 years indicated that, leaving out of account any speculative gains derived from the execution cost of hedging, "speculators in futures, as a group, have lost money" (13, p. 433). I believe the calculation to have been a reliable one, so far as it went; but I now believe the quoted conclusion to have been grossly in error because of the neglect of the execution cost of the hedging.

(a) because a "trend" is the converse of a dip or bulge, trend recognition is a means of recognizing dips and bulges; (b) a scalper must derive as much profit as he can from trends that he successfully recognizes, in order to partially offset the losses that he incurs from trends whose beginnings he mistakenly regards as initial moves in a dip or a bulge; and (c) the adage "cut your losses and let your profits run," which is highly respected by floor traders, deserves such respect even if its application cannot be made a source of net gains. By letting profits run, to the best of his ability, a scalper derives such profits as he can from the emergence of unpredictable trends that happen to be in his favor, partially offsetting inevitable losses from the emergence of trends that run against him. By setting a limit on the amount of loss that he allows himself to incur, per unit of the commodity, a scalper accepts unnecessary loss to a greater extent than he avoids further loss (a consequence of the supposition that brief price trends are a source of net loss); but the practice, while slightly reducing his overall rate of profit per unit of the commodity, allows him to trade safely on a scale several times as large as would be prudent if he did not thus limit his losses per unit.

We thus found that: (1) effort to deal as successfully as possible with brief price trends is necessarily an integral part of professional scalping; and therefore, (2) evidence that a floor trader makes such efforts does not, by itself, warrant classing him as a trend trader.

In the third stage of our inquiry, we analyzed a two-month record of the trading of the leading floor trader in New York cotton, Mr. C, at a time when that was still a large futures market. His trading was of such a kind that his financial results, day by day, depended principally on price trends; on his best days, favorable price trends gave him profits 10 to 15 times as great as his average rate of profit. Yet his average rate of profit, per pound of cotton, was so small as to require attributing it wholly to his successes at buying on price dips and selling on price bulges, the net gains thus derived being offset in considerable part by net losses incurred in connection with intraday price trends. Several characteristics of Mr. C's trading indicated that he was trying continously to buy on price dips and to sell on price bulges, except on occasions when he sought to "cut his loss."

This two-month record of floor trading by Mr. C, besides confirming the deductions of the second stage of our inquiry, gave persuasive evidence of the validity of the supposition, treated earlier as tentative, that intraday price trends tend to be a source of net loss to a floor trader. Mr. C was a professional trader of conspicuous ability, with a long and varied trading experience. The fact that he could not avoid incurring a net loss in connection with intraday price trends makes it appear doubtful that any trader can consistently derive net gains from such trends.

Our analysis of Mr. C's trading record sought evidence also on a subsidiary theory, namely, that floor trading, besides being mainly scalping, derives profits chiefly from the scalping of dips and bulges occasioned by hedging orders. The results were inconclusive. The facts in that respect cannot be clearly established, I suspect, without a record, covering many months, of the relation between floor traders' profits and the volume of hedging transactions on an exchange.

We sought also explanation of the fact that the available records show much

more floor trading in Chicago wheat, relative to total trading, than in Chicago corn, or in either wheat or corn at Kansas City. Our conclusion was that, while several factors may have contributed to the differences, the relatively high proportion of floor trading in Chicago wheat was probably attributable largely to the fact that the great volume of trading on that market favored specialization by individual traders in particular types of scalping, with differing holding intervals. In the presence of such specialization, many transactions occur between floor traders engaged in different types of scalping.

The overall result as regards our main objective is that we have found no valid evidence against the theory that most floor trading on commodity exchanges is scalping, and have turned up substantial new evidence in its favor. In the process, we have found that scalping, as a professional occupation, is a much more complicated business than tends to appear from its simple definition as "buying on dips and selling on bulges."

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| Appendix | Table | I.—Daily | TRADING  | Record | OF A | . "Day | Trader' | ' IN | COTTON, |
|----------|-------|----------|----------|--------|------|--------|---------|------|---------|
|          |       | F        | EBRUARY- | -March | 1952 | *      |         |      |         |

|          | Number  | Numbe<br>contra | er of<br>cts <sup>a</sup> | Final po | osition <sup>b</sup> | Gain or | Contract<br>transac | s per<br>tion |
|----------|---------|-----------------|---------------------------|----------|----------------------|---------|---------------------|---------------|
| Date     | actions | Bought          | Sold                      | Long     | Short                | losse   | Observed Adjusted   |               |
| February |         |                 |                           |          |                      |         |                     |               |
| 1        | 73      | 66 <sup>e</sup> | 66                        | 1        |                      | +4.79   | 1.85                | 1.69          |
| 2        | 76      | 99              | 101                       |          | 1                    | +1.01   | 2.63                | 2.15          |
| 4        | 107     | 113             | 112                       |          |                      | +5.79   | 2.10                | 2.03          |
| 5        | 100     | 85              | 85                        |          |                      | + .89   | 1.70                | 1.21          |
| 6        | 23      | 14              | 15                        |          | 1                    | +6.64   | 1.26                | 1.26          |
| 7        | 53      | 43              | 42                        |          |                      | +4.79   | 1.60                | 1.44          |
| 8        | 28      | 23              | 23                        |          |                      | +5.05   | 1.64                | 1.50          |
| 9        | 106     | 145             | 147                       |          | 2                    | +6.38   | 2.75                | 2.73          |
| 11       | 151     | 188             | 185                       | 1        |                      | +4.83   | 2.47                | 2.32          |
| 13       | 99      | 147             | 149                       |          | 1                    | +4.59   | 2.99                | 2.82          |
| 14       | 71      | 96              | 97                        |          | 2 (2)                | 3.96    | 2.72                | 1.82          |
| 15       | 54      | 61              | 60                        |          | 1                    | +5.32   | 2.24                | 2.13          |
| 16       | 63      | 76              | 80                        |          | 5 (2)                | + .95   | 2.48                | 2.00          |
| 18       | 78      | 84              | 83                        |          | 4 (2)                | -1.74   | 2.14                | 1.43          |
| 19       | 68      | 114             | 114                       |          | 4 (2)                | 26      | 3.35                | 2.76          |
| 20       | 75      | 113             | 112                       |          | 3 (2)                | -3.72   | 3.00                | 2.12          |
| 21       | 84      | 143             | 146                       |          | 6 (3)                | -3.40   | 3.44                | 2.59          |
| 25       | 55      | 62              | 55                        | 1        |                      | +2.95   | 2.13                | 1.82          |
| 26       | 84      | 133             | 137                       |          | 3 (2)                | +2.75   | 3.21                | 2.88          |
| 27       | 123     | 172             | 168                       | 1        |                      | 92      | 2.76                | 2.12          |
| 28       | 65      | 77              | 75                        | 3 (2)    |                      | +5.73   | 2.34                | 2.26          |
| 29       | 65      | 116             | 117                       | 2        |                      | -1.68   | 3.58                | 2.87          |

\* Data from an accounting record routinely prepared for the trader by the firm that cleared his transactions.

<sup>a</sup> A "contract" is for 50,000 pounds of cotton, worth roughly 20,000 dollars at the prices ruling at the time.

 $^{b}$  Figures in parentheses show the number of different futures (when more than one) in which an overnight position was held.

<sup> $^{\circ}$ </sup> Gain (+) or loss (-), in points (hundredths of a cent) per pound. <sup> $^{d}$ </sup> The average size of transactions indicates roughly the proportion of transactions that arise from large hedging orders; the adjusted figures are the more reliable in that respect. See pp. 38-41. <sup>6</sup> The trader was short 1 May contract and 1 July at the beginning of trading, and was long 1 March contract at the end, accounting for the excess of purchases over sales.

#### (Continued)

|                    | Number<br>of trans- | Number of contracts <sup>a</sup> |      | Final position <sup>b</sup> |       | Gain or           | Contracts per<br>transaction |           |
|--------------------|---------------------|----------------------------------|------|-----------------------------|-------|-------------------|------------------------------|-----------|
| Date               | actions             | Bought                           | Sold | Long                        | Short | loss <sup>o</sup> | Observed                     | Adjusteda |
| March <sup>1</sup> |                     |                                  |      |                             |       |                   |                              |           |
| 3                  | 69                  | 106                              | 110  |                             | 2     | -1.69             | 3.13                         | 2.42      |
| 4                  | 73                  | 120                              | 118  |                             |       | -4.83             | 3.26                         | 2.28      |
| 5                  | 43                  | 52                               | 52   |                             |       | -1.10             | 2.42                         | 1.76      |
| 6                  | 58                  | 69                               | 71   |                             | 2     | +4.43             | 2.41                         | 2.22      |
| 7                  | 32                  | 37                               | 35   | 1                           | 1     | +2.42             | 2.25                         | 1.89      |
| 10                 | 56                  | 53                               | 53   |                             |       | + .48             | 1.89                         | 1.37      |
| 11                 | 49                  | 75                               | 77   |                             | 2     | +3.08             | 3.10                         | 2.80      |
| 12                 | 32                  | 29                               | 27   |                             |       | <b>—</b> .21      | 1.75                         | 1.17      |
| 13                 | 43                  | 49                               | 46   | 3 (3)                       |       | +2.35             | 2.21                         | 1.85      |
| 14                 | 82                  | 96                               | 96   | 3                           |       | -5.71             | 2.34                         | 1.29      |
| 17                 | 73                  | 99                               | 99   | 3                           |       | + .27             | 2.71                         | 2.17      |
| 18                 | 76                  | 100                              | 102  | 1                           |       | +2.75             | 2.66                         | 2.33      |
| 19                 | 97                  | 127                              | 125  | 3 (2)                       |       | -1.46             | 2.60                         | 1.91      |
| 20                 | 74                  | 71                               | 76   | ~ /                         | 2     | +3.27             | 1.99                         | 1.70      |
| 21                 | 59                  | 70                               | 67   | 1                           |       | +1.22             | 2.32                         | 1.86      |
| 24                 | 58                  | 81                               | 85   |                             | 3 (2) | -5.74             | 2.86                         | 1.81      |
| 25                 | 63                  | 73                               | 72   |                             | 3 (2) | +.01              | 2.30                         | 1.74      |
| 26                 | 65                  | 85                               | 83   |                             |       | -2.38             | 2.58                         | 1.81      |
| 27                 | 76                  | 118                              | 119  |                             | 1     | +2.86             | 3.12                         | 2.80      |
| 28                 | 57                  | 50                               | 48   | 1                           |       | +1.86             | 1.72                         | 1.31      |
| 31                 | 108                 | 193                              | 193  | 1                           |       | +2.31             | 3.57                         | 3.20      |

Appendix Table I—(Cont.)

<sup>f</sup> Beginning with March 1 the exchange remained closed on Saturdays.