EVALUATION OF CONVERTIBLE SECURITIES

REVISED VERSION

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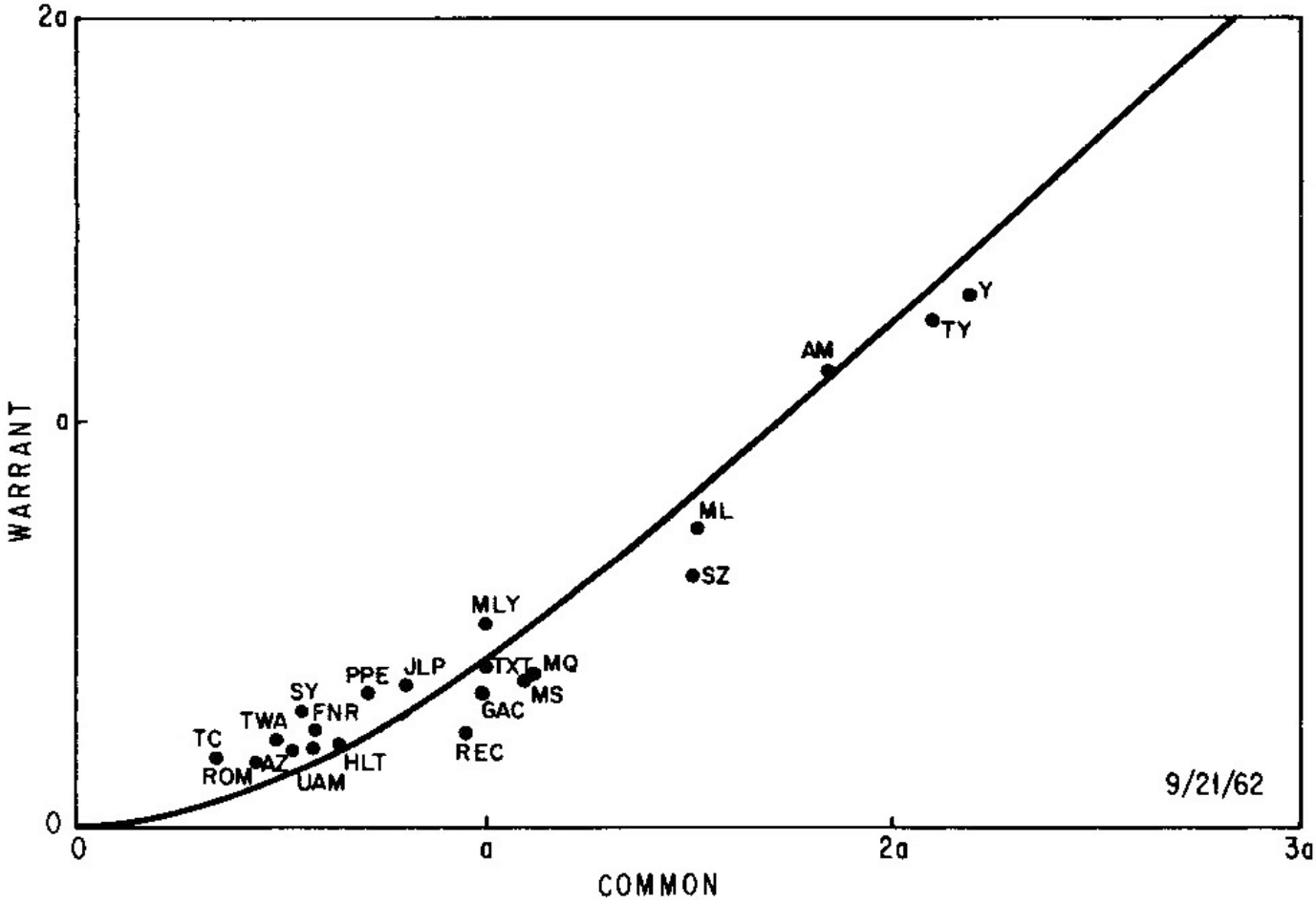
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PREFACE

From the date of publication in 1962, readers of this book have exploited numerous investment opportunities involving warrants and convertible bonds. Specifically, the Teleregister and Molybdenum situations mentioned on pages 13 and 15 yielded substantial profits to my clients and myself (see Beat The Market, Chapter 5, Random House, 1967). In addition, the analysis of the Pacific Petroleums warrant on page 45 proved prophetic: in the few years before it expired it yielded large profits safely. It seems reasonable to expect that opportunities will always exist for investors who understand convertibles.

This revised edition is an expansion of the 1962 edition. It is unnecessary to include new examples because warrant and convertible bond characteristics remain the same. Consequently, the major "changes" in this edition are: a supplement to Appendix A indicating a more refined measure of norm value that I developed in my doctoral dissertation, Appendix E discussing interest leverage, and Appendix F detailing a twenty year history of listed warrants.

It is difficult to gain deep understanding of the stock market without help: success results less from flashes of insight than from careful observation and gathering of data. I am grateful to Thomas Gabriel and Arthur Lefkowitz who supplied me efficiently and rapidly with data and esoteric facts about security trading; to George Nawrod who spent so many hours in the Columbia Business Library he might have been mistaken for Head Librarian; to Ned Kassouf who was my sounding board; and to Arthur F. Burns for his interest in my research and his provoking comments.

S.T.K.

Irvine, California

INTRODUCTION

The difficulty in evaluating common equities is known to all who have attempted it. The most brilliant and logical analysis can be easily thwarted by a swift and unpredictable shift in the economic outlook. Investors, after all, are purchasing future earning power, and human psychology magnifies and distorts all news relating to the outlook of the economy. Furthermore, the most thorough analysis can only consider a few of the factors that cause price changes; all the variables that determine stock prices are not even known.

It is a startling fact that there exists a method of investing which combines safety with high potential gain. This method might be called arbitrage in convertible securities. Conventional arbitrage involves identical securities: stock is purchased in one location and simultaneously sold in another, with a profit resulting from a price difference. The evaluation in this case is simple and direct, for value is measured in dollars, and a discrepancy in value can be recognized instantly by anyone with facilities in both markets. When “arbitraging” convertible securities, location of markets is not important, but a discrepancy in “value” is not always patently clear.

This work will show that a clear relationship exists between convertible securities, and when this relationship is violated, arbitrage operations are possible which are well protected against loss and promise substantial gain. The price toward which securities gravitate is defined as the norm value. This concept enables an investor to instantly measure the value of a convertible security, thereby detecting price discrepancies amenable to arbitrage.

In addition to defining norm value, specific techniques are described in detail showing how maximum advantage can be made of deviations. Surprisingly, these opportunities constantly recur, and informed investors are able to profit with complete immunity.

Note: In an effort to reach a wide audience, it has been necessary to discuss and define many elementary aspects of the stock market. It is hoped that the more knowledgeable reader will not be wearied by these rudimentary passages.

Except in the paragraph so entitled, commissions and expenses were not considered in the illustrative examples in order to simplify the calculations and to emphasize the underlying principles.

WARRANTS

Warrants have been in use for more than half a century, but are still little understood, especially by the conservative investor, who considers them too speculative. But it is precisely the conservative investor who can utilize warrants in his investment approach.

Definition. A common stock warrant is an option to buy common stock. That is, under certain conditions it may be converted into common stock. To describe a warrant, three facts must be known:

(1) The number of shares that the warrant may be converted to.
(2) The amount of money required with the warrant for conversion.
(3) The time period during which the warrant may be converted. (Some warrants are "perpetual" in that the conversion may be made at any time during the life of the corporation.)

To conform with the usual terminology it will sometimes be said that a warrant is exercisable, rather than convertible.

Many warrants have a graduated scale of exercise prices. For example, the Hilton Hotels warrant, with a payment of $42, may be converted into one share of Hilton common stock anytime before October 15, 1963. From October 16, 1963 to October 15, 1967 it would require $46 for conversion; from October 16, 1967 to October 15, 1971, $50 would be required.

Virtually all warrants are issued by the corporation into whose common stock the warrant is convertible. In addition to being sold for cash, warrants may come into existence as attachments to a bond, or they may be given in exchange for another security during a reorganization or merger.

A large number of warrants have arrived on the investment scene in the last few years and the rate of new warrant creations will probably accelerate. More organizations will realize that warrants are an excellent device that permit equity financing at desirable prices. A company that wishes to sell common stock must usually offer the new stock at 10% to 20% below the market price in order for the flotation to be a success. However, if warrants are sold for cash, exercisable at 20% to 50% above the market price of the common, the result will be equivalent to selling common stock at a premium rather than a discount; and if the warrants are never exercised the proceeds from their sale will become a clear profit to the company. The creation of most warrants can be viewed in this light, for even if the warrants are attached to bonds, the resultant lower coupon rate is a cash saving to the issuing company.

"Multiple" and "Partial" Warrants. The three defining terms for a warrant are sometimes complicated. For instance, the Martin-Marietta warrant, in addition to having a graduated exercise price, may be converted at the present time into 2.73 shares of common with a payment of $40. In order to compare warrants, it is necessary to determine what fraction or multiple of a warrant is required to purchase one share of common. Only 1/2.73 = .366, or about 1/3 of a warrant is needed for one share of common stock, and only $40/2.73 = $14.62 is needed with this fraction of

a warrant. This amount, required to obtain one share of common, is called the adjusted exercise price. If the warrant is selling for $27.30, then .366 of the warrant would cost $10, so that one share of common can be obtained by purchasing about 1/3 of a warrant for $10 and surrendering it with $14.62, for a total of $24.62.

In the event a warrant permits the purchase of only a fraction of a share of common at a specified price, this price must be multiplied by the number of warrants needed to purchase one share of common. For instance, at the present time, the Guerdon warrant, with a payment of $7.125, may be converted into 1/2 share of common. Since two warrants are required for one share of common, the adjusted exercise price is 2 x 7.125 = $14.25.

The adjusted exercise price then, is the number of dollars required with a specified fraction or multiple of a warrant for conversion into one share of common. In the case of the Martin-Marietta warrant, the purchase of one warrant may be considered the purchase of 2.73 adjusted warrants. The purchase of one Guerdon warrant may likewise be considered the purchase of 1/2 of an adjusted warrant.

These complicated terms are usually the result of stock splits or stock dividends. Consider a warrant that can be converted into one share of common with a payment of $20. If the common is split 2 for 1, the warrant will usually become the right to convert into two shares of common for $20. Almost all warrant holders are protected in this manner, so that the number of shares that a warrant may be converted into is adjusted after every stock split or stock dividend.

The Determinants of Value For a Warrant. Unlike common stock, the factors determining the worth of a warrant are explicit and relatively few:

(1) The price of the common.
(2) The length of life of the warrant.
(3) The potential dilution of the common stock that may result if all the warrants are exercised.
(4) The dividend rate of the common.

To illustrate the effects of these determinants, consider the ABC Corporation warrant exercisable at $20, that is, one warrant plus $20 may be converted into one share of common. Clearly, the effect of (1) is strong and immediate, for the price of the common sets a minimum value on the warrant. For instance, if ABC common is at $25, the warrant will be worth at least $5. (If the warrant were selling for less, say $4, alert investors would purchase and exercise it, thereby obtaining one share of common for $24. Since this share may be sold simultaneously for $25, the investor would realize an immediate and completely safe gain of $1.)

The price of the common therefore determines the minimum price of the warrant. This minimum price is defined to be the intrinsic value of the warrant. If the common is selling for more than the exercise price, the intrinsic value of the warrant is easily computed by subtracting the exercise price from the selling price of the common. If the common is selling for less than the exercise price, the warrant will have no intrinsic value.

The length of life of the warrant, determinant (2), does not play as significant role as might be suspected. Theoretically, the longer the life of the warrant, the more valuable it is. But investors do no usually pay extra for a warrant with a life of more than five years. However, as the expiration date approaches, the price of the warrant tends toward its intrinsic value. For instance, if the ABC common is at $25 the day before expiration, the warrant will sell for $5, its intrinsic value. It can't sell for less and it won't sell for more since its conversion privilege will disappear the next day. (After a warrant expires it becomes worthless, since the corporation is not obligated to honor the warrant on any terms.)

The reason investors must consider the potential dilution, determinant (3), can be made clear by an example: ABC Corporation has outstanding 1,000,000 shares of common and 100,000 warrants. If all the warrants are exercised, there will then be outstanding 1,100,000 shares of common stock. This will automatically decrease the per share earnings by about 10% and will accordingly decrease the price of the common. The original stockholders, if they did not own and exercise warrants, would find that they own only about 90% of ABC Corporation - the other 10% would be owned by the former warrant holders. This stock dilution would have the same effect on the price of the common as a stock split. Therefore, the greater the number of outstanding warrants, the greater the potential dilution; the greater the dilution the greater the decrease in the price of the common. A large number of outstanding warrants tends to put an upside barrier on the price of the common. This makes the warrant less desirable since it is the possible upward move of the common that attracted the investor to the warrant.

Determinant (4), the dividend rate of the common, is not very often an important factor. However, if the dividend rate on the common is high, investors interested in (say) ABC Corporation might find it preferable to invest in the common rather than the warrant. If ABC common pays no dividend, the investor would not consider that he is relinquishing any return by purchasing the warrant. But if the dividend rate on the common is relatively high, say 7%, the warrant will probably sell for less than if the dividend rate were low, or nil.

Leverage. It has been pointed out that a warrant is worth at least as much as its intrinsic value. But to many people it is worth more -- the people who want more leverage, that is, people who want their investment dollars to do more work. (A primitive example of leverage; purchasing stock on margin. If $1000 worth of stock is purchased with only $500 cash, the other $500 borrowed from a broker, a 10% advance in the stock to $1100 would yield a profit of $100 for the investor, or 20% on his investment. To be sure, a 10% decline in the price of the stock would result in a 20% loss on the investment.)

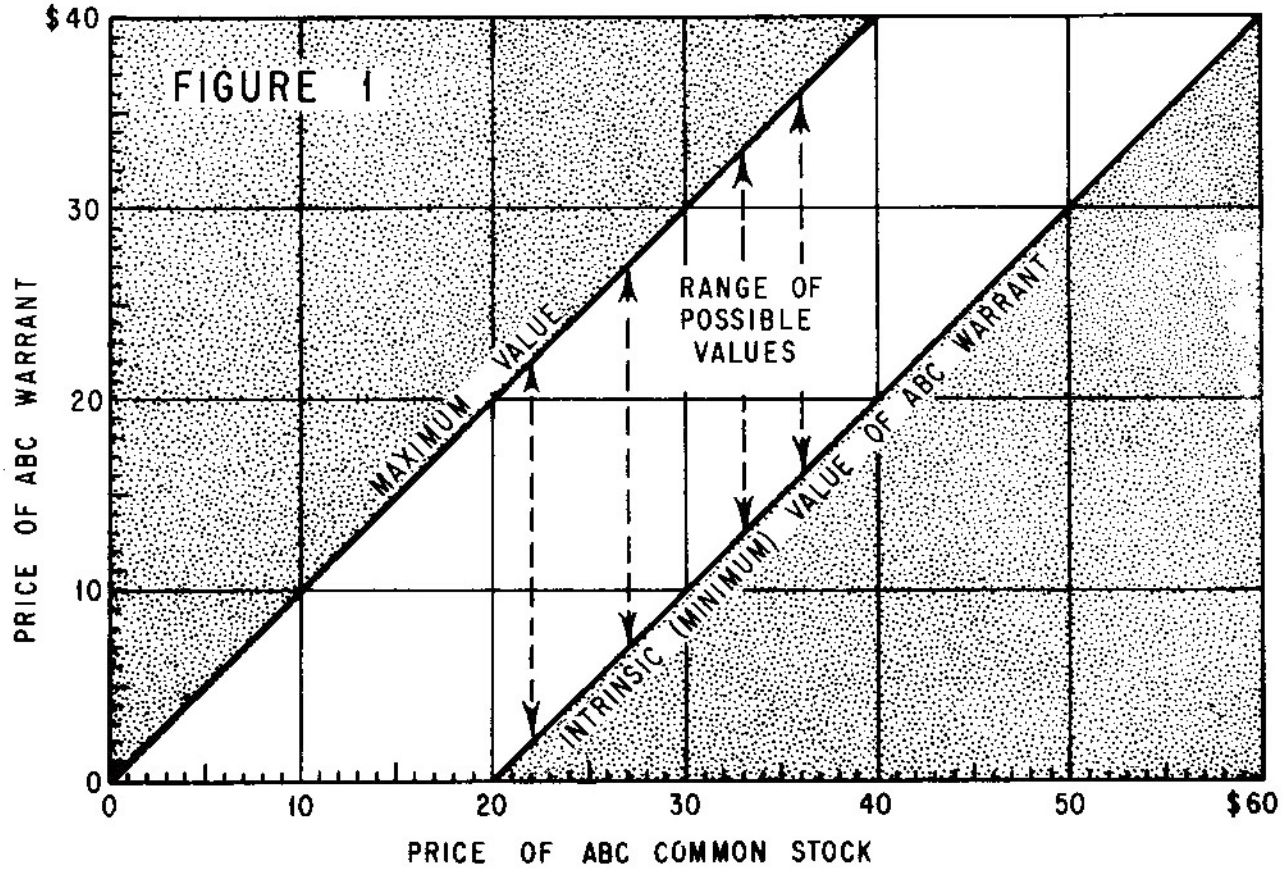
Recall that the ABC warrant is exercisable at $20. If the common is at $25 the warrant has an intrinsic value of $5. If an investor were able to purchase the warrant for $5 his investment would appreciate at least 5 times as fast as an investment in the common stock. If the common rises to $30, a 20% increase, the warrant would have to rise to at least $10 (its intrinsic value), a 100% increase. This leverage would attract many investors and would almost surely raise the price of the warrant above its intrinsic value. But how much above its intrinsic value? In other words, how much leverage will an investor consider sufficient to offset the disadvantages of the warrant compared to the common? (The warrant holder does not receive dividends

and is not entitled to vote for directors. Furthermore, the life of the warrant is fixed by its expiration date, whereas the common is presumably perpetual.)

Just as a warrant (adjusted) cannot sell for less than intrinsic value, it cannot sell for more than the price of the common. In Figure 1, this range of possible values for the ABC warrant is indicated by the unshaded area, so that for any given price of the common, the warrant will sell for more than intrinsic value but for less than the price of the common stock. Notice that a warrant will have no intrinsic value if the common is less than the exercise price, and that there is more danger in owning a warrant if the common is very much below its exercise price. For instance, if ABC common is at $2, the warrant at almost any price becomes a very speculative investment, in the sense that the common must advance over 900% before any intrinsic value will develop in the warrant. In considering the question of leverage therefore, it seems reasonable that an investor will desire more leverage for lower prices of the common.

Premium. The amount that a warrant is selling for above its intrinsic value is called the premium. For instance, if the ABC warrant is selling for $12 when the common is $25, the premium would be calculated as follows:

Selling price of warrant	$12
Less intrinsic value of warrant	5
Premium on warrant	$ 7



The premium expressed in dollars is unsatisfactory, for warrants with different exercise prices cannot be compared. But the premium can be expressed as a percentage of the selling price of the common. In the case of the ABC warrant, if the warrant is at $12 when the common is $25, the percent premium would be 7/25=28%. This figure of 28% may be viewed in two ways: (1) If the warrant were purchased and exercised, the investor would pay 28% more for the common than if the common were purchased outright. (2) The percent premium represents the amount that the common must advance to make the current price of the warrant exactly equal to intrinsic value. This, if ABC common advanced 28% (to $32), the warrant would have an intrinsic value of $12.

Notice that a warrant can sell at 0% premium only if the common is above the exercise price. For instance, if the ABC warrant were at $5 and the common at $25, the warrant would be at 0% premium. But if the common were at $10, even if the warrant were at 10¢ the percent premium would be almost 100%. Therefore the percent premium would be almost 100%. Therefore the percent premium will tend to be different at different price levels of the common.

Norm Value. In studying the price behavior of many warrants, it has been found that under "normal" conditions the warrant-common price relationship approximates that shown in Figure 2. ("Normal" conditions are: (1) Warrant has a life of 4 or more years; (2) The potential dilution is less than 15%; (3) The dividend rate on the common is less than 4%. A technical discussion of this phenomena can be found in Appendix A.)

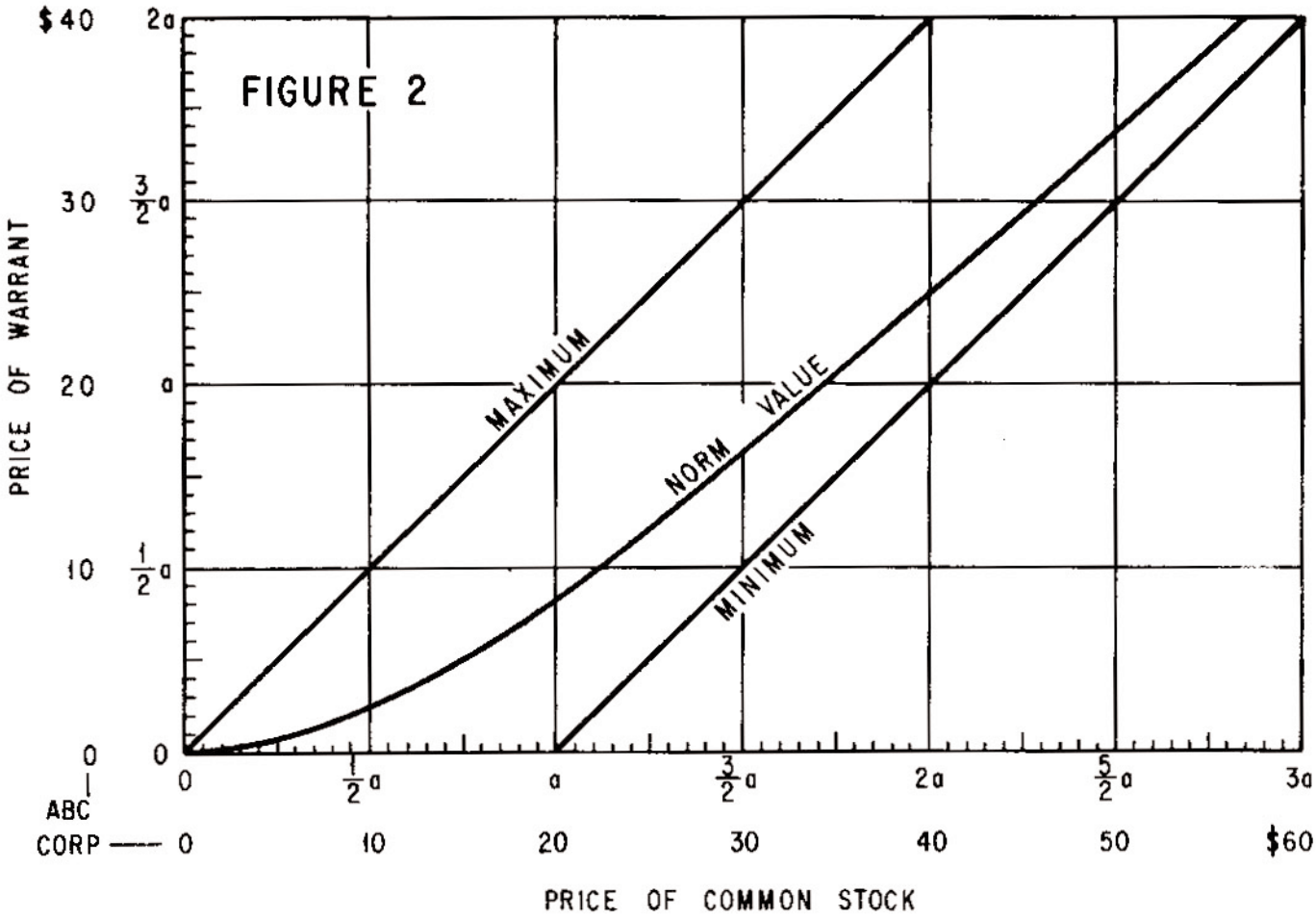
A warrant with any exercise price may be used with Figure 2 by merely substituting the exercise price wherever the symbol "a" appears. The price scale for the ABC warrant and common is shown below and to the left of the symbols.

In adhering to this relationship, investors, consciously or not, seem to be demanding a leverage factor of more than 2 when the common falls to less than half of the exercise price and slightly less than 2 as the common rises, with the leverage about 1.5 when the common is twice the exercise price. (If the warrants can be purchased on margin, the leverage of course if further increased.)

The curve in Figure 2 defines the norm value of any warrant at any price of the common. It is important to realize, however, that if any of the "normal" conditions change, then so will the norm value curve. For instance, if the life of the warrant is very short, say a few days, then the norm value curve will move down until it is almost identical with the intrinsic value, or minimum value line.

In summary then, warrants have a minimum value (intrinsic); a maximum value (the price of the common); and a norm value as defined in Figure 2. If the selling price of the warrant deviates from the norm value while conditions remain "normal", then investors can safely enter ideal commitments, which will now be described.

Profiting From Overpriced Warrants. If a warrant is selling above norm value, it is defined to be overpriced. Overpriced warrants with a short life and selling at a high premium are ideal candidates for short sales. (Short selling is discussed in Appendix B.) As an example, assume that the ABC warrant will expire in one year and that the common is $10 and the warrant $5. The norm value of the warrant, as found on Figure 2, is about $2.40, so that the warrant is more than 100% above

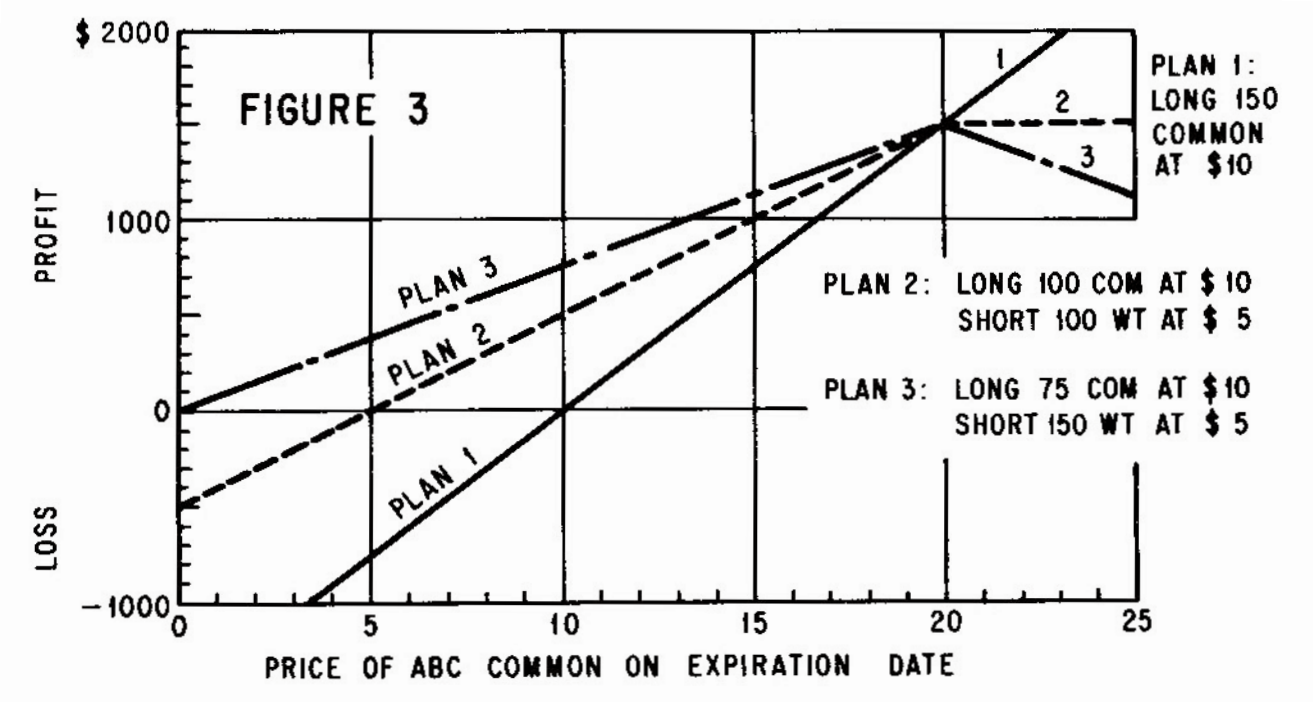


norm value. The percent premium is 15/10 = 150%. The venturesome speculator might consider the warrant an excellent short sale, for the common must advance beyond $25 within the year (an advance of more than 150%) before he would lose on the short position. But there is room for the most cautious investor.

Consider Investor A, who is optimistic about ABC Corporation and would like to invest in its shares. Assume that he wishes to invest $1500. He might purchase 150 shares of the common and hope that his expectations materialize. Or he might purchase 100 shares of the common and short 100 warrants. Call these Plans 1 and 2 respectively. At its expiration date, the warrant will sell for its intrinsic value, since any leverage or speculative power will be non-existent. Therefore, Plans 1 and 2 can be compared as to profit or loss on the expiration date. If the common remains at $10, Plan 1 would yield neither a profit nor a loss, while Plan 2 would yield a $500 profit due to the short sale. If Investor A is correct, and ABC common advances, say to $20, Plan 1 would yield a profit of $1500, but so would Plan 2. Suppose due to unforeseen developments, ABC common falls 50% in value to $5 a share. Plan 1 would suffer a $750, or 50% loss, but Plan 2 would show no net loss! (There would be a $500 loss on the purchase of the common but a concomitant $500 gain on the short sale of the warrants.) In the event of a rise to $20 or a decline to $5, Plan 2 matches or outperforms Plan 1. Certainly, Investor A, if he realizes how fallible all predictions are, would choose Plan 2, since he could show a profit even if the common declined.

Investor B, not having a strong conviction about the prospects of ABC Corporation, might enter Plan 3: long 75 shares of common and short 150 warrants, for a total investment of $1500. If the common remains at $10, Plan 3 would yield a profit of $750. If the common declines to $5, a profit will still result -- $375 or 25% on the investment. In fact, even if the common falls to 0, this investment would show no loss. If the common advanced to 20, a net profit of $1500 would be realized.

The relationship between profit (or loss) and the price of the common on expiration date is shown for these three Plans in Figure 3.



The more bearish investor might divide the $1500 in a manner to short 3 times as many warrants as common shares held long (60 shares of common long, 180 warrants short). When increasing the ratio of warrants short to common stock long, the investor will wish to know how far the common can advance before a loss might result. Figure 4 determines the breakeven point if the common advances, in terms of the percent premium and the ratio of warrants short to common long. This Figure may be used with any warrant with any exercise price; however, adjusted warrants must be used in determining the ratio.

To summarize the ideal situation for taking advantage of overpriced warrants: the warrant should have a short life, preferably less than two years and should sell above norm value with a percent premium of more than 50%. To assure the reader that the foregoing discussion is not purely academic and that possibilities for this type of commitment occur, it may be observed that in the Fall of 1962, Teleregister warrants were selling at more than 100% above norm value and at more than 250%

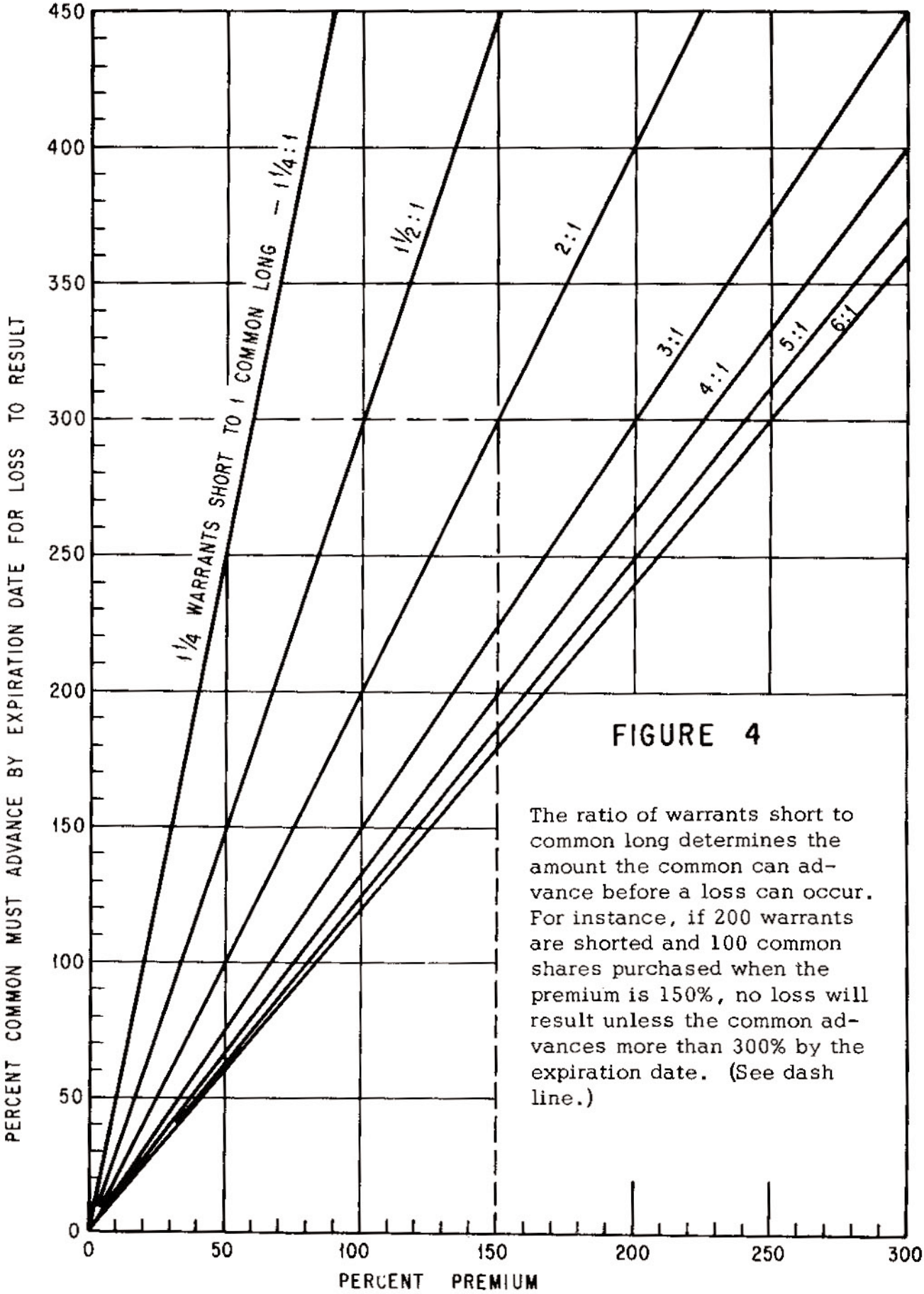


FIGURE 4

The ratio of warrants short to common long determines the amount the common can advance before a loss can occur. For instance, if 200 warrants are shorted and 100 common shares purchased when the premium is 150%, no loss will result unless the common advances more than 300% by the expiration date. (See dash line.)

premium, and had about 2-1/2 years of life remaining; Molybdenum warrants were more than 50% above norm with a premium of more than 60% and were to expire in one year.

Profiting From Underpriced Warrants. An underpriced warrant is defined to be a warrant selling for less than its norm value. Consider ABC Corporation again, with its warrant exercisable at $10. Assume that the expiration date is now 5 years distant and that the common is at $10. The norm value of the warrant is about $2.40. If in a confused and bearish climate, the warrant is about $1.50, an alert investor can make an ideal investment. Assume an investor enters the following investment:

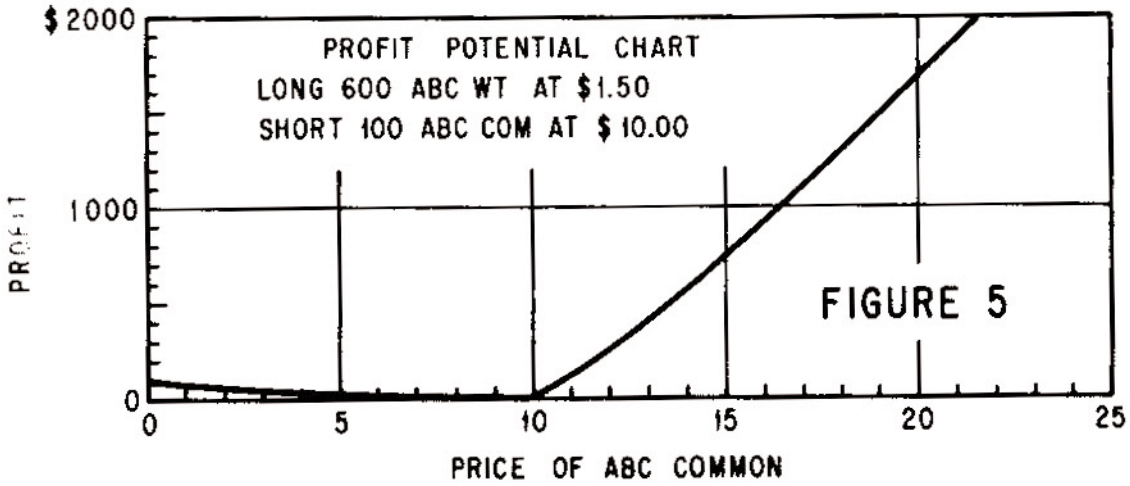
Long 600 warrants at $1.50	$900.00
Short 100 shares of common at $10.00	_____
Total Investment	$900.00

Notice that this investment can be entered for only the purchase price of the warrants -- no additional cash is required for shorting the common (see Appendix C).

If the common should advance to $20, or 100%, the norm value of the warrant would be about $8.25, but assume the warrant remains underpriced and only advances to $6. The loss of $1000 on the short sale of the common would be more than offset by the gain of $2700 in the warrants. This $1700 net profit, on a investment of $900, is an increase of 189%.

On the other hand, if the common should drop to $4, the warrant would very probably not sell for less than 50¢, so that the loss of $600 on the warrants would be offset by the gain of $600 on the short sale of the common. this remarkable investment therefore, would increase almost twice as fast as any increase in the common but would not decrease at all if the common fails.

Figure 5 is a Profit Potential Chart showing the profit this investment would be expected to yield depending upon the price reached by the common. It is a conservative chart, in that it is assumed the warrant will remain underpriced. Greater profit is quite conceivable.



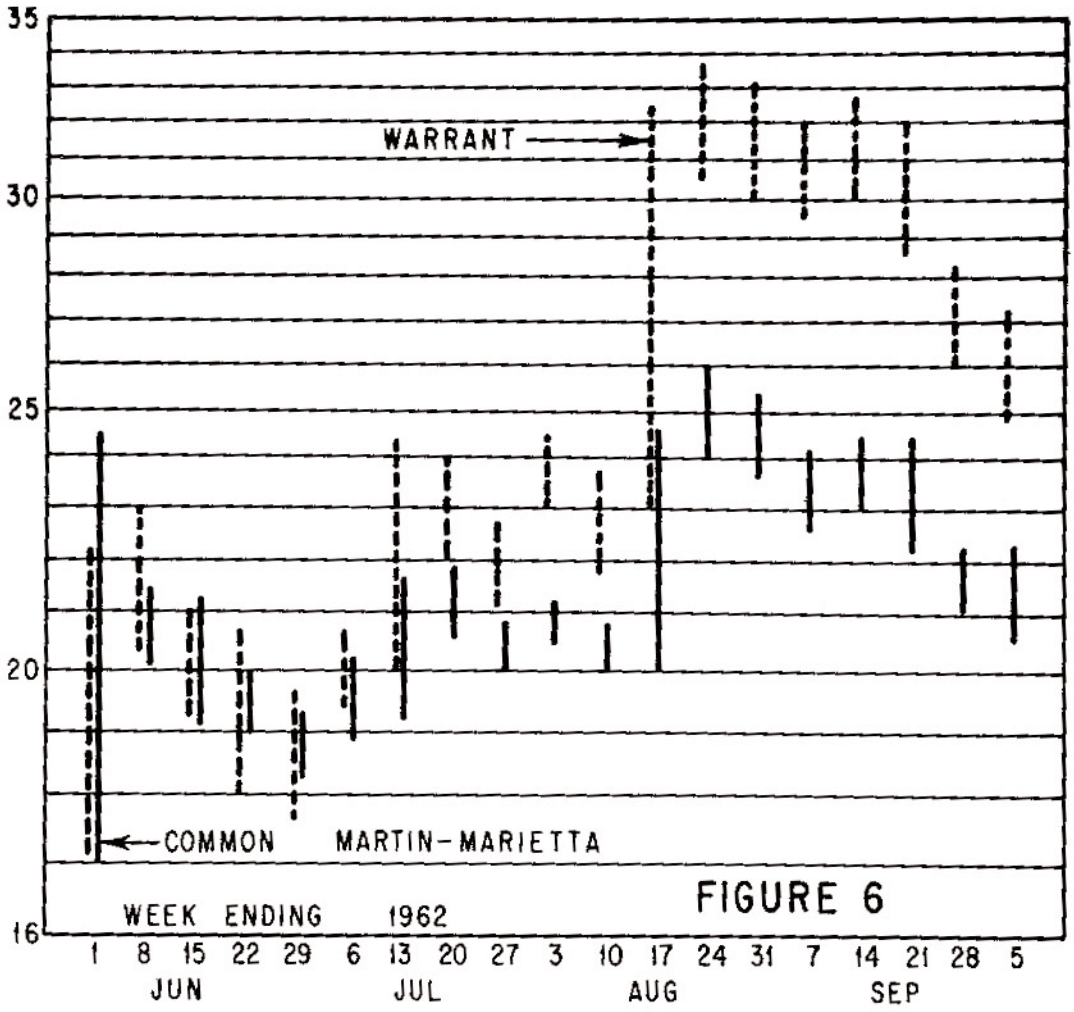


FIGURE 6

The Martin-Marietta Example. Figure 6 shows the price ranges of Martin-Marietta common and warrant for June, July, August and September 1962. In June when both the warrant and the common were about $20, the timing was excellent for taking a long position in the warrant and a short position in the common. The warrant at this time was 27% below its norm value of $27.52 and commanded the small premium of 9.7%.

100 warrants could have been purchased at $20 each on the then available margin of 70%, for a total of $1400 and 100 shares of common could have been shorted at $20 each without additional investment (see Appendix C). Each warrant represents the right to purchase 2.73 shares of common for $40, so for analytic purposes it would be considered a purchase of 273 adjusted warrants.

An investor in this position would have anticipated no loss in the event the common fell because the warrants were underpriced and would probably have fallen no faster than the common. However, in August, when the common did advance to $26, the warrant went to $33.75, so that the loss of $600 on the short sale would have been more than offset by the gain of $1375 on the warrants. The net profit of $775 represented a return of more than 50% on the invested money.

Conversion of Warrants. It is interesting to observe that most warrants are not exercised until shortly before expiration. The reason is simple: if a warrant is selling at a premium, that is above intrinsic value, an investor would lose if he exercised the warrant. It would be more profitable to sell the warrant and purchase common with the proceeds.

But usually a warrant will sell at zero premium only if the expiration date is near or if the common is much above the exercise price. It is at these times then, that most warrants are exercised. This can result in a surprising situation: if a company issues perpetual warrants exercisable at a price many times the current price of the common, the warrants may never be exercised. The proceeds from the sale of the warrants would then represent a clear profit to the company.

BONDS

If there were no uncertainty concerning the future, security appraisal would be very simple. All securities would be priced to yield the same amount, and this yield would be called the interest rate. Conceptually then, putting a price on a security is not complicated. By assigning yields to future dates, a little arithmetic will decide a proper value. The difficulty of course, lies in the method of assigning the yields and the degree of probability involved. Theoretically, if it is assumed that two securities, A and B, will yield the same amount in the future, and that security A is less likely to default on this expectation, then Security A should fetch a higher price than B.

The reason that the stock of the United States Steel has fallen more than 60% in the last few years is not because the country is in a severe depression or that the assets and physical plant of the Corporation have been dissipated. It is because investors have changed their minds about the earning power (yield) of United States Steel for the future. Since earnings are susceptible to wide fluctuations, and since the prices of common stock adumbrate the expectations of investors, equity prices are subject to volatile movements.

In contrast to common stock, bond prices are relatively stable. A bond is a debt, payable at a certain time and yielding a specified amount of money annually. Usually, the certainty of this yield is more predictable than the yield on common stock. The determinants or price in the case of a bond are few:

(1) The coupon, or interest rate. This is the fixed amount of money paid, usually semi-annually, to the bond holder.
(2) Safety with respect to ability of company to maintain interest payments and ability to redeem the bond at face value.
(3) Yield on bonds of comparable safety.

The price of bonds is usually quoted as a percentage of face value. For instance a $1000 face value bond that is quoted at 97-3/4, is selling at $977.50, or 97-3/4% of face value.

It must be emphasized that a bond, as a form of investment, is not necessarily safer than a common stock merely because it represents a debt. A bond, even one that is heavily secured, of a weak company may be a riskier investment than the common stock of a strong and well established company. If bankruptcy occurs, theoretically the bond holder has prior claim to the company's assets, over the stockholder. But too often the courts have put the claims of the bond holder aside and allowed the company to continue its business in the hope that it will eventually succeed, the "rights" of the bond holder are bypassed and interest payments on the bond may be discontinued indefinitely. Under these circumstances the price of the bond may deteriorate drastically; if the firm does not succeed, the bond holder may recover none or only a small fraction of his investment.

If a corporation is in a strong position and has a good outlook, it may be wiser to choose its "weakest" (least secured) bond, usually a debenture. The weak issue will yield a higher rate of interest, and in the final test is probably as safe as the

strong bond. For a detailed discussion of this viewpoint see Security Analysis by Graham and Dodd, Third Edition, page 287.

A primary measure of safety is the number of times the interest on the debt was earned in prior years. For instance, if a firm has consistently earned more than ten times the interest charges on its debt, the bond is considered relatively safe. Safety is fairly well summarized by the ratings of the leading statistical services. Standard and Poor's, for instance, uses the following ratings:

AAA - Highest grade corporate obligations.
AA- High grade.
A - Upper medium grade.
BBB - Medium grade. Lowest which qualify for commercial bank investment.
BB - Lower medium grade. In poor periods, deficit operations possible.
B - Speculative. Interest not assured under difficult economic conditions.
CCC -CC- Outright speculations.
C- Income bonds on which no interest is being paid.
DDD-DD-D - Bonds in default; relative rating indicates salvage value.

Convertible Bonds. A convertible bond is usually a debenture, backed only by the name and reputation of the issuing organization. As noted previously, this does not imply that convertible bonds are necessarily risky. The Scott Paper Company convertible debentures presently carry a Standard and Poor's rating of AA.

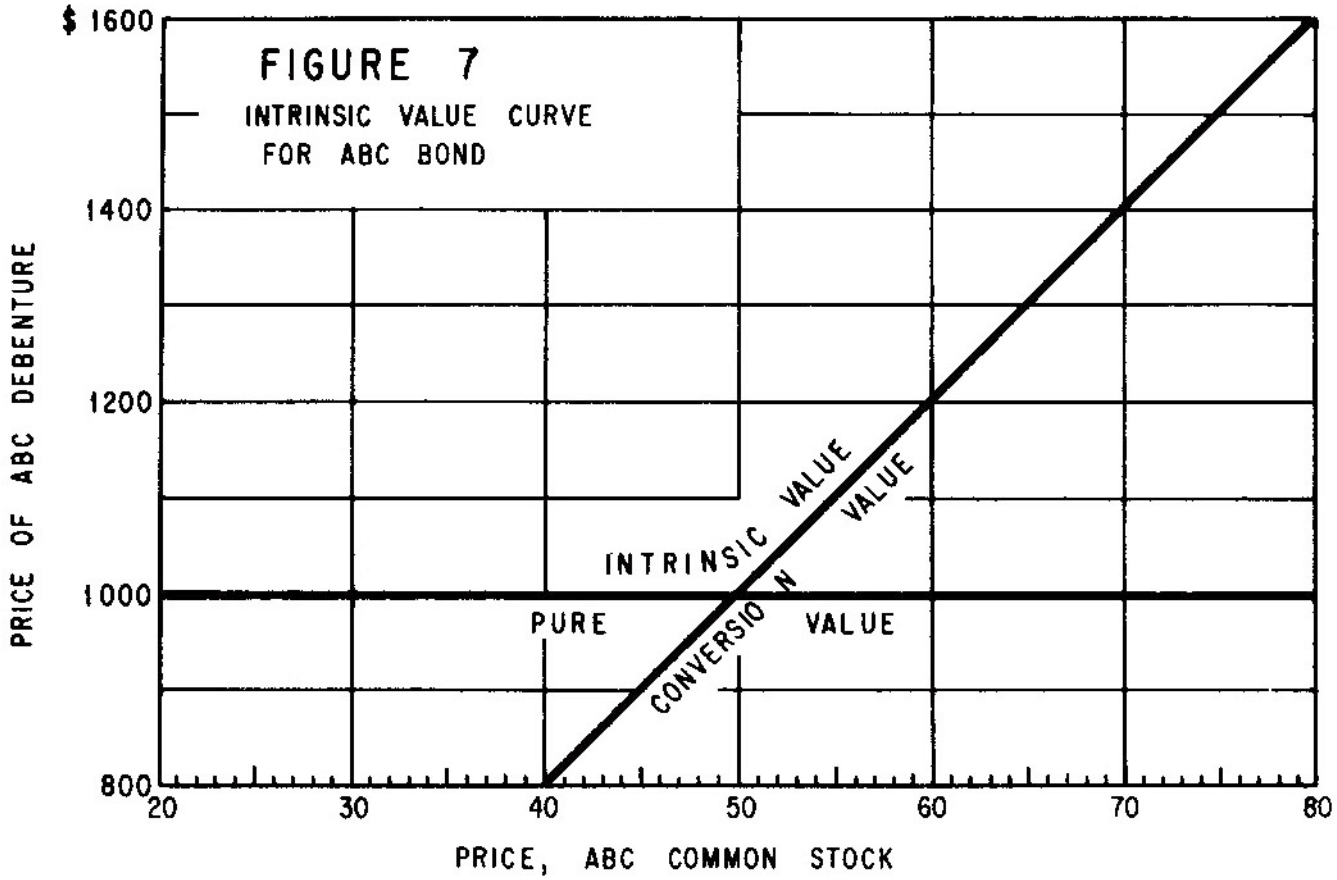
The conversion feature of a bond is usually expressed in two ways: the number of shares that the bond may be exchanged for or the number of dollars of par value that may be exchanged for one share of stock. For instance, if a bond is convertible into 40 shares of stock, the conversion feature may be expressed by stating that the bond is convertible at $25. This latter method is helpful in that it indicates the price level for the common at which the bond's face value is equal to the value of the shares obtainable on conversion. In this example, if the common stock is at $25, the 40 shares that may be obtained on conversion will be worth $1000, the face value of the bond.

The determinants of price for a convertible bond are relatively few:

(1) The price of the common stock.
(2) The coupon, or interest rate.
(3) The time limit of the conversion privilege and the number of years before redemption.
(4) The safety of the bond.
(5) The dividend yield on the common.

As with a warrant, a convertible bond has an intrinsic value, but this value is not always dependent upon the price of the common. Consider the ABC Corporation 4-1/2% of 1982 AA rated debenture convertible at $50 (into 20 shares of common). (This is the usual method of describing a bond and it means that the interest payments are $45 a year, or 4-1/2% of face value, and that the redemption date is sometime in 1982. Note that if the price of this bond differs from the face value of $1000, the interest yield will differ from 4-1/2%. Nevertheless, it is customary to refer to these

debentures as 4-1/2% bonds.) If this ABC bond had no conversion feature it would probably sell for close to face value, for presently bonds of the same rating that are not convertible are yielding about 4-1/2%. Therefore the intrinsic value of the bond is at least $1000. This is defined as the pure (bond) value of the ABC convertible, that is the probably value of the bond if it had no conversion privilege. (Recall that in the case of a warrant the intrinsic value was often zero). But the ABC debenture may have an intrinsic value of more than $1000. Since it is convertible into 20 shares of common, its conversion value will be equal to 20 times the price of the common. If the common is at $60, for instance, the conversion value will be $1200, so that in this case the bond will have an intrinsic value of $1200. Just as a warrant will not sell below intrinsic value for any length of time, neither will a convertible sell for less than conversion value -- otherwise alert investors will purchase and convert it making a quick profit, and such action will tend to raise the price of the bond to at least its conversion value. Intrinsic value then is the greater of pure value and conversion value. Figure 7 shows the intrinsic value for the ABC convertible.



Intrinsic value determines the minimum price at which a bond will sell. Very probably the bond will sell for more.

The difference between conversion value and selling price is called the premium, and this is expressed as a percentage of the conversion value. If the ABC bond were

selling for $1320 with the common at $60, the premium would be calculated thusly:

Selling price of bond	$1320.00
Conversion value of bond	1200.00
Difference = dollar premium	$ 120.00

$120/$1200 = 10% premium.

Again, the percent premium may be considered in two ways: (1) if the common advanced 10% to $66, then the conversion value would be equal to the present selling price; (2) if the bond were purchased for $1320 and converted, the investor would be paying 10% more for the stock than if he had purchased the common outright.

Buy why should the bond be worth more than intrinsic value? That is, why should anyone pay a premium for a convertible bond? In the case of warrants it was observed that the investor paid a premium for a warrant because he was seeking leverage. This is partly true for convertible bonds, but only because of the financing that may be obtained. Banks and other lending institutions (but not brokers) may lend up to 85% of the purchase price of bonds. This is equivalent to a low margin which results in greater leverage, as explained in Appendix C.

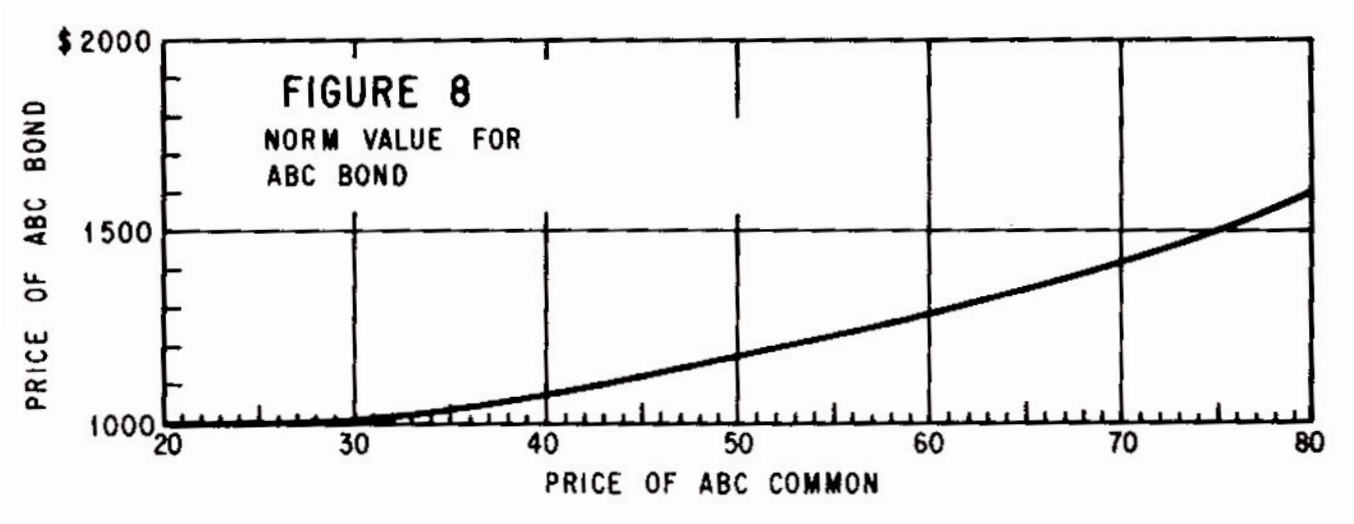
But there are more important reasons for the premium -- the bond is limited on the downside by its pure value and it may be less dangerous to hold in case the common falls. An example will illustrate this.

Assume Investor A is interested in ABC Corporation and feels that the common will advance. He is presumably an informed investor and realizes that he may commit his funds in either the common or the convertible bond. If the common were at $55 and the bond at $1100, its conversion value, Investor A would almost certainly purchase the bond rather than the common, because the bond will appreciate at least as fast as the common but is restricted on the downside by its pure value. (It is conceivable, notwithstanding this safety feature, that Investor A might prefer the common over the bond if the common were yielding a much higher dividend return than the 4.1% he could realize on the bond. For the remainder of this example assume that ABC common yields 4% in dividends when the common is $55.) For this safety in a downside move in the common, Investor A might be willing to pay a premium, but what can he consider a “fair” premium?

Notice first, that the bond will command different percent premiums at different prices of the common. If ABC common falls to $12.50, the bond will probably sell near par ($1000) even though its conversion value will only be $250, assuming of course that the safety of the bond has remained constant. This would be a 300% premium. On the other hand, if ABC common should advance to $100, the bond would have a conversion value of $2000 and from the observation of many bonds, would probably not command any premium. This suggests that the additional leverage obtainable from bank financing does not account as much for the premium accorded a bond as the inherent safety of the bond when it is not too far above its pure value.

Suppose Investor A is willing to pay a 10% premium, or a price of $1210 for the bond. Then the common will advance faster than the bond. For example, if the common advances to $80, a 45% increase, the bond will probably only advance to its conversion value of $1600, or an advance of 32%. But Investor A may not con-

sider this 13% forfeiture exorbitant, since on the downside the bond would not fall as fast or as far as the common. Figure 8 shows the probable range of selling prices for the ABC convertible. This is called the norm value curve for this bond. The concept of norm value cannot be easily generalized because of the differences in safety,



and yield on both the common stocks and bonds involved. However, a norm value curve can be estimated for individual bonds, and bonds selling below norm value will provide excellent vehicles for safe investments that will now be described. (A further discussion of individual norm curves for bonds may be found in Appendix A.)

The Hedging Operation. If an investor can purchase a convertible bond close to its pure value and at a small premium (that is, close to its conversion value), he would surely profit from a rise in the common and would not suffer too much if the common fell because an increase in the common will be reflected in the price of the bond, but a decrease in the common will not cause a decrease in the bond since the bond is limited on the downside by its pure value.

But it is possible to benefit from either a rise or fall in the common. If in addition to purchasing the convertible bond, some common stock is shorted, a profit may be made regardless of the action of the common. Suppose the ABC convertible can be purchased for $1160 when the common is $55. The bond would be at a 5.5% premium. An investor might enter the following position:

Long 10 ABC convertibles at 116 on 50% margin	$5800.00
Short 100 shares ABC common at 55	_____
Total Investment	$5800.00

Notice that no cash was required to short the common stock, since Regulation T cited in Appendix C is applicable. (The bonds can be purchased with even less cash if they are financed through a bank, but then the bank would require that the bonds be delivered for collateral, thereby precluding the possibility of shorting the common

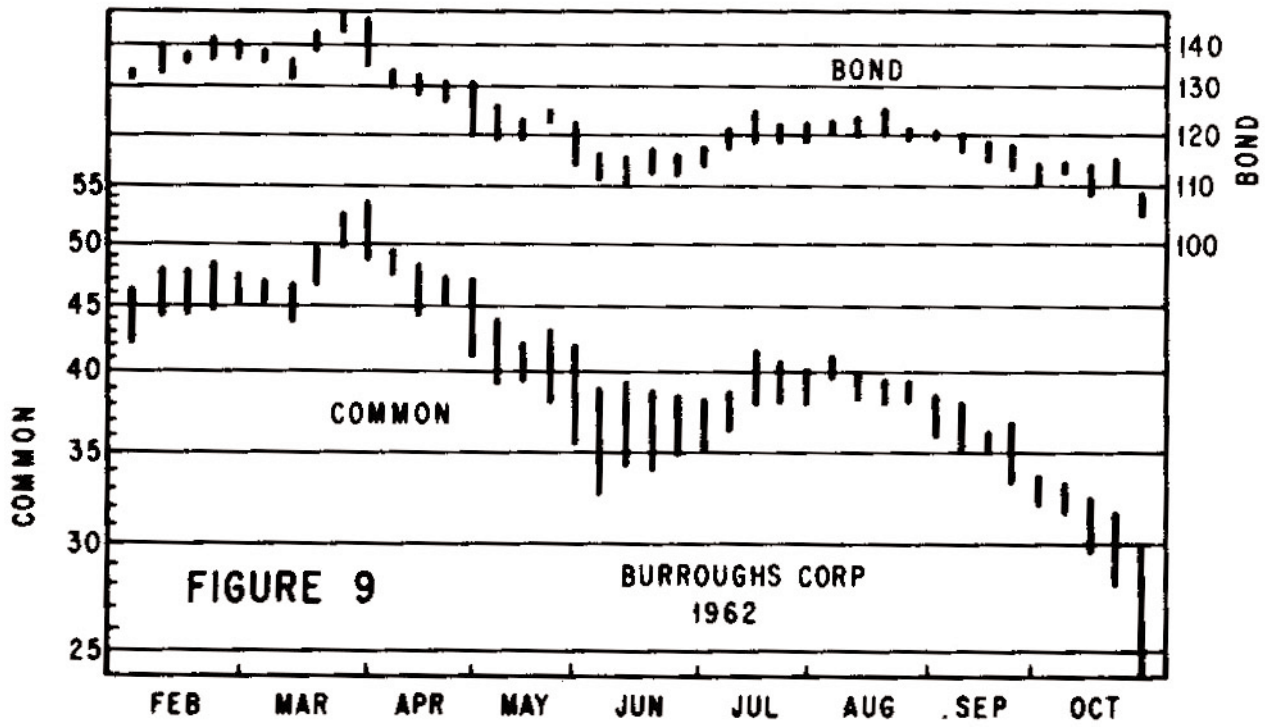
without additional funds. This procedure is discussed in Appendix C.)

The bonds represent 200 latent shares of common stock, so in effect this investor is long 200 shares and short 100 shares for a net position of 100 shares long. Since the bond was acquired at a small premium it will reflect virtually all of any advance in the common. For instance, if the common moves up to $80, a rise of 45%, the bond will move to at least its conversion value of $1600, or a rise of 38%. On this advance, a loss of $2500 would result on the short position and a profit of at least $4400 on the bonds for a minimum net profit of $1900.

But what if ABC common falls to $30? Most probably, the bond would stay slightly above par, so that the investment would show a profit of $2500 on the short sale and a loss of $1500 on the bonds for a net profit of $1000. The investor would be in the highly desirable heads-I-win-tails-you-lose position.

If an investor was convinced that the common was going to fall, the above position could have been modified by shorting 200 shares against the bonds. This would require no more cash, and almost full benefit would be taken of a fall in the common, while being completely protected in the event the common rises.

The Burroughs Example. Figure 9 shows the weekly trading ranges for Burroughs Corporation common stock and the 4-1/2% of 1981 convertible debenture for the first ten months of 1962. The bond is convertible into 25.67 shares of common and throughout this period was rated BBB by Standard and Poor's. There were periods in May and



June when the bond was at 112 while the common was at $39, representing an 11% premium. If an investor at that time had no strong convictions about the future course of the common, he might have entered the following transaction:

Long 8 bonds at 112 on 70% margin	$6272.00
Short 100 shares of common at $39	_____
Total Investment	$6272.00

To illustrate how an investor would have fared subsequently, notice that in August the bond reached a high of more than 124 while the common was about 39-1/2. But the investor would have been very lucky to close out his commitment at these prices, so assume that the bonds were sold for 122 and the common short sale was covered at 39-1/2. (There was ample opportunity for doing this -- between August 6 and August 17.) This would have yielded a net profit of $750, or a return of 12% on invested money. This occurred in less than two months, and if it could be repeated six times in the year, the original investment would be doubled.

If the investor did not liquidate this position in August, and waited until October, he could have sold the bonds for 112 and covered the short sale at $30, thereby realizing a net profit of $900, or more than 14%. The investor who committed his funds in this transaction in June had the peace of mind resulting from an anticipation of profit regardless of the future course of the common stock.

Thus a bond selling at a small premium and not too far above its pure value is an excellent vehicle for a hedge operation. The bond will increase almost as fast as the common but will show resistance on any downside move. By varying the amount of common sold short, more bearish or bullish investors can give expression to their convictions but still remain perfectly safe should the market act perversely.

Current Yield and Yield to Maturity. If a 5% bond is purchased for $833.25, the annual interest payment of $50 would represent a yield of 6% on invested money. This is called the current yield. However, if the bond is held to maturity and then redeemed at face value of $1000, a capital gain of $166.75 would result. The bond holder would have received 6% on his investment each year, and an extra $166.75 at maturity.

The concept of yield to maturity compensates for the capital gain or loss that would occur if a bond is held until maturity. Thus a bond purchased for less than face value would have a larger yield to maturity than current yield and a bond purchased for more than face value would have a smaller yield to maturity than current yield.

Compound interest tables are used to determine the yield to maturity by discounting the eventual capital gain or loss and the formula is somewhat cumbersome. But most brokers have a yield book showing the yield to maturity depending upon the purchase price, size of coupon, and date of redemption. For example, the Standard Oil Company (New Jersey) 2-3/8s of ‘71 closed on May 31, 1962 at $875, so that the current yield was 2.71% and the yield to maturity was 4.05%.

The long term investor is more concerned with yield to maturity than current yield. But traders and short term investors are more interested in current yield. If a bond is

purchased on margin, the current yield is important because if it is less than the interest charged for the loan, the difference between them would be an added expense to the investment.

The crucial aspect of yield to maturity is that long term bonds are more affected by a change in the interest rate than short term bonds. As an example, assume that AAA rated bonds will be priced to yield 4% to maturity, and that the ABC Corporation has two such bonds outstanding:

(1) ABC 5s of 1965
(2) ABC 5s of 1992

Then bond (1) will sell very close to face value, perhaps 102, while bond (2) will sell for about 116, since at these prices they will yield about 4% to maturity. Therefore, long term bonds will tend to fluctuate more than short term bonds in response to changes in the interest rate.

Warrants Utilizing Par Value of Bond or Preferred For Conversion. Many warrants may be exchanged for common by using the face value of a bond rather than cash. For instance, the Hilton Hotels warrant presently requires $42 with each warrant for conversion, but the $42 need not be cash -- the face value of the Hilton 6s of 1984 may be used. So if the 6s of ‘84 can be purchased for $900, a discount of 10% from par, the effective exercise price of the warrant would be reduced 10% to $37.80. The 6s of ‘84 in effect are convertible bonds and may be analyzed as such, but they have the added advantage that the conversion feature, represented by the attached warrants, is detachable and may be sold separately. This explicitly reveals the pure value of the bond. In other cases the pure value of a convertible bond must be estimated since the conversion feature is not detachable.

Atlas Corporation allows its preferred stock to be used at par value when exercising the warrant. This makes the preferred stock convertible, with a detachable feature.

Convertible Preferred Stock. The characteristics of preferred stock combine many of the features of common stock and bonds. The preferred stock is not a debt, but its dividend is considered safer than the common dividend, since the common dividend cannot be declared before the preferred. Also many dividends are cumulative.

Convertible preferred stocks may be analyzed in the same manner as convertible bonds. There are certain differences however:

(1) Preferred stock cannot be purchased on thin margin from banks since they are considered equities and come under the same regulations governing common stock.
(2) Corporations enjoy certain tax advantages by investing in preferred stock of other organizations. In many cases the dividends received are 85% exempt from corporate tax.
(3) The conversion feature may not be limited by a maturity date and may be applicable for the life of the preferred issue.

Bond and Preferred Stock Redemptions. Most bonds and preferred stocks can be redeemed at the option of the issuing corporation before maturity at a price that is usually above par. This is called the call price. For a convertible bond this might be a hazard. If the bond is selling above call price and at a high premium, the bond holder would lose the premium if the corporation called the bond for redemption. For instance, if the ABC Corporation convertible were callable at any time by the Company at $1050, and if the bond were selling for $1500 with the common at $70, the bond holder would suffer if the company redeemed the bond. If the bond holder does not covert the bond, he will receive $1050 on redemption thereby losing $450. If he does convert, the will receive 20 shares of common worth $1400 thereby losing $100. At best, then, he will lose $100. This is not a common occurrence, but investors should be aware of this danger.

Commissions: Bonds vs. Common Stock. Trading in bonds is a pleasant experience for many investors because of the relatively small commission charges. The usual commission on a $1000 bond is $2.50. When convertible bonds are selling far above par, as is presently the case with the Avco 5s of ‘79, the bond will not command a premium. The bond’s behavior becomes indistinguishable from the common, and will fall and rise at the same rate. Traders interested in Avco should only trade in the bond since commission rates are much less. For instance, if the common is at $23, the bond will sell for $2000. Each bond is convertible into 86.96 shares of common stock. If 100 shares of common are purchased the commission will be about $30, or 30¢ per share of stock. If one bond is purchased, equivalent to about 87 shares, the cost will be $2.50, or less than 3¢ per share! The commission cost would be reduced by more than 90%.

Warrants. The norm value curve shown in Figure 2 represents the hyperbolic equation $y = \sqrt{a^2+x^2} - a$, where a = exercise price, y = price of warrant and x = price of common. The evidence of many warrant-common price relationships over a period of time suggests this function. Working in this way, from experience to assumptions, has a fault: the relationship cannot claim to be a priori nor can it be logically justified as in the sense of a theorem in the non-referential closed system of mathematics. However all physical and social sciences do and must work back from empirical data. To do otherwise, that is trying to "think through" the problem without referring to the real world can lead to sad results.

The norm value function has the virtue that it enables an investor to recognize "underpriced" and "overpriced" warrants for use in hedge operations described earlier. This function leads to a reasonable assumption: investors consider a leverage factor of about 2 a fair compensation for ownership of a warrant, in view of the inherent dangers. The leverage factor, assuming the price of the warrant will adhere to the norm, can be calculated by considering $xf'(x) / f(x) =$

$$x^2 \Big/ \left(\sqrt{a^2 + x^2}\right)\left(\sqrt{a^2 + x^2} - a\right),$$

so that at x = a, the warrant would appreciate at 1.7 times the rate of the common and at a/2 it would appreciate twice as fast.

Table 1 is a compilation of most of the listed warrants on the American Stock Exchange on September 21, 1962. The price relationships of these warrants are plotted in Figure 10. The log-log grid enables a visualization of $xf'(x)/f(x)$ as the slope of the tangent to the norm curve, and allows an interesting geometrical analysis in some cases. Consider Teleregister (TC) in Figure 10. In order for the warrant to appreciate at least as fast as the common, it must maintain a price relationship indicated by the dash line, a 45º line with a slope of 1. This line intersects the norm value curve at a point representing an advance of about 250% for the common. So if it is assumed that the warrant will achieve norm value when the common advances, the common would have to advance more than 250% before the warrant would prove to be a superior investment over the common. The 45º line intersects the intrinsic value curve at a point representing an advance in the common of more than 500%. Since the warrant will achieve intrinsic value on its expiration date in May 1965, the danger of owning the warrant is graphically emphasized. Unless the common advances to more than $34, the warrant will prove an inferior investment.

On the other hand, the REC warrant, even if it only achieved intrinsic value, would appreciate much faster than the common. Any forward movement in the common, as visualized on the log-log grid, would have to remain above the intrinsic value curve, and any such path would have a steep slope. If it assumed that the REC warrant will achieve norm value when the common rises, the slope of such a path could be 4 or more, indicating a very high leverage.

Figure 10 reveals that the Armour, Tri-Continental and Alleghany warrants were

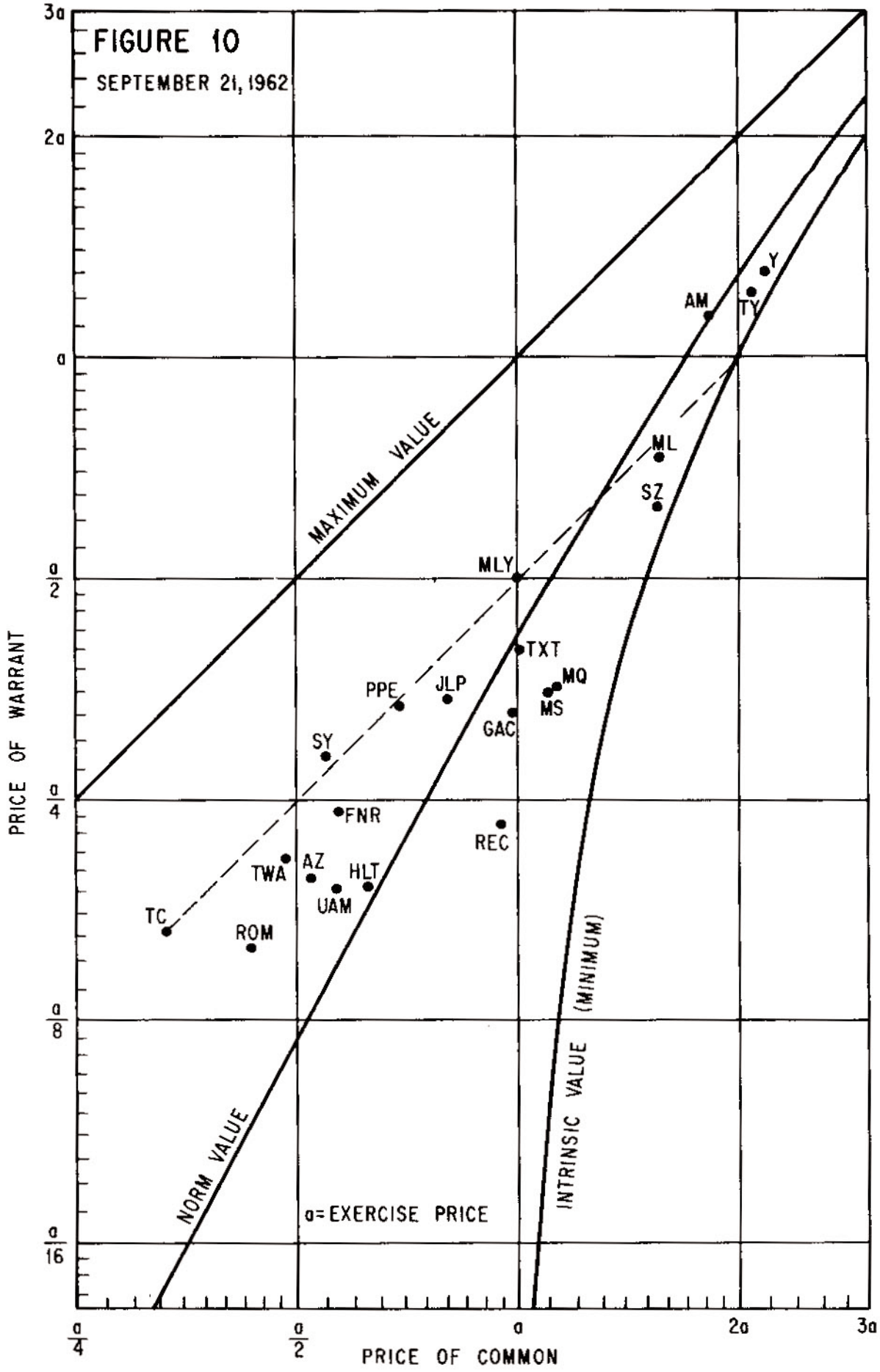


FIGURE 10
SEPTEMBER 21, 1962
3a
2a
a
a/2
a/4
a/8
a/16
PRICE OF WARRANT
MAXIMUM VALUE
NORM VALUE
INTRINSIC VALUE (MINIMUM)
a= EXERCISE PRICE
AM
TY
Y
ML
SZ
MLY
TXT
MQ
MS
PPE
JLP
GAC
SY
FNR
REC
TWA
AZ
HLT
UAM
TC
ROM
a/4
a/2
a
2a
3a
PRICE OF COMMON

Issue and Symbol	Number of shares for $; Time Limit	Com. price	War. price	Norm value	% prem.	%pot. dilut.	%div. com.
Alleghany Corp (Y)	1 for 3.75; perpetual	8.00	4.88	5.00	8	26	0
Armour & Co (AM)	1 for 20.00; to 12/64	36.00	22.50	21.10	18	12	3.9
Atlas Corp (AZ)	1 for 6.25; perpetual; 5% pfd at par	2.50	.94	.63	128	33	0
First Nat Realty (FNR)	1.05 for 6.00 to 12/66; 6.75 to 12/71	3.25	1.25	.90	119	30	3.1
Gen Acceptance (GAC)	1 for 20 to 11/69; 6-1/4s of ‘74 at par	19.50	6.50	8.00	36	47	5.1
Hilton Hotels (HLT)	1 for 42 to 10/63; 46 to 10/67; 50 to 10/71; 6s ‘84 par	24.00	6.50	6.25	102	11	6.3
Jeff Lake Petro (JLP)	1 for 7 to 6/65; 1.00 increase each June to 6/71	5.63	2.38	1.96	67	20	0
Mack Trucks (MQ)	1.4 for 45 to 9/63; 47-1/2 to 9/65; 50 to 9/66	35.13	15.63	21.60	26	21	5.1
Martin-Marietta (ML)	2.73 for 40 to 11/63; 45 to 11/68	22.63	28.50	33.80	11	2	4.4
McCrory Corp (MS)	1 for 20 to 3/76	22.25	7.13	10.10	22	42	4.0
Molybdenum (MLY)	1.05 for 30 to 10/63	28.50	14.25	12.90	50	10	0
Pacific Petrol (PPE)	1 for 19 to 3/68	12.88	6.38	3.90	97	6	0
Realty Equities (REC)	1 for 7.50 to 8/63; 50¢ increase every 1-1/2 years; 2/72	7.13	1.75	2.82	30	44	2.8
Rio Algom (ROM)	.135 at 22.23 per share to 12/66	9.69	.44	.28	166	4	0
Sperry Rand (SY)	1.08 for 25 to 9/63; 28 to 9/67	12.75	7.12	5.20	148	7	0
Symington Wayne (SZ)	1 for 10 to 5/63; 15 to 5/68	15.13	6.25	8.12	8	26	5.3
Teleregister (TC)	1 for 15 to 5/63; 17 to 5/65	5.13	2.50	.85	241	4	0
Textron (TXT)	1 for 25 to 5/64; 30 to 5/69;35 to 5/74; 40 to 5/79	25.00	10.00	10.40	40	23	5.0
Trans World Air (TWA)	1 for 20 to 6/65; 22 to 12/73	10.00	4.25	2.40	143	29	0
Tri-Continental (TY)	1.27 for 22.60; perpetual	36.88	27.63	29.30	8	11	4.0
Universal Amer (UAM)	1 for 13.75 to 3/67	7.88	2.63	2.15	108	22	0

The closing prices on September 21, 1962 of all the warrants listed on the American Stock Exchange except Guerdon Industries and Universal American 1955 warrants. The Guerdon warrants expire January 15, 1963 and were selling for 13¢, very close to their intrinsic value of zero. The conversion terms of the Universal American 1955 warrants are too complex to be included in this evaluation.

Note: The % potential dilution column indicates the amount by which the present stockholders equity would be reduced if all convertible securities are exercised. If an estimate of future earnings is made, this estimate should be reduced by this percentage to give effect to the possible new shares.

(In addition to the warrants listed above, there are presently over 100 warrants traded in the over-the-counter market).

TABLE 1

all selling very close to their norm value on this date, even though the Armour warrants were to expire in about 2 years while the other two were perpetual. If this tendency to disregard the difference between expiration dates persists, corporations in the future may not issue warrants of longer duration than 5 to 10 years. To further illustrate how little attention is given to expiration dates, it may be observed that at this same time the Molybdenum warrants were selling at 20% above norm value and had a life of only 13 months. If the common did not more than double in the time remaining, the warrant would perform worse than the common. If an investor felt that the common would advance more than 100% in this time, he might have been wiser to purchase the common, not the warrant, since he would not be in danger of losing his entire commitment in one year if he was mistaken and the common did not advance.

Note that the McCrory, General Acceptance, and Realty Equities warrants were all below their norm values and in each case the potential dilution was considerable. It seems reasonable to suspect that investors were aware of this potential dilution and were only willing to pay a relatively small premium.

Bonds. Figure 8 is the norm value curve for the 4-1/2s of 1980 ABC Corporation convertible debentures. The rationale in constructing this curve depended upon the assumption that the bond would sell for pure value when the common was at half the conversion price. This assumption is somewhat conservative when compared to the actual behavior of convertibles in the market, but it will be shown that bonds which sell for more than norm value are inferior investments, and hence norm value here may be considered “fair” value.

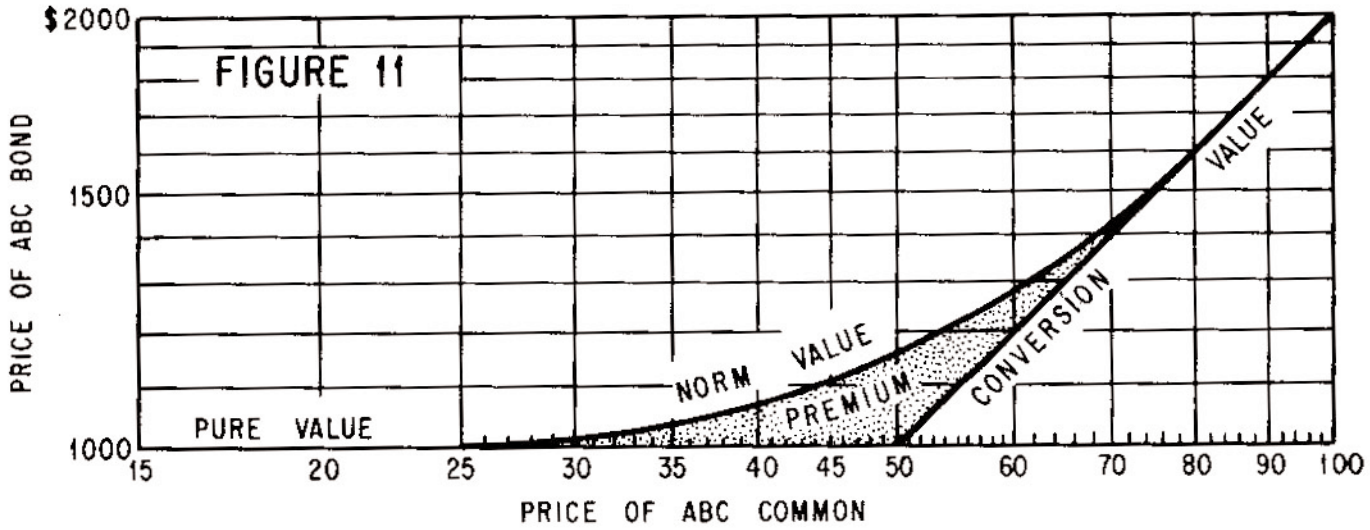


Figure 11 shows the ABC convertible norm value curve on a log-log grid so that percentage changes in the price of the common can be compared with percentage changes in the price of the bond. The norm value curve is the circular arc tangent to the pure value line and the conversion value line. This is the simplest continuously differentiable function that satisfies the assumption that no premium will be accorded

the bond when the common is at one-half the conversion price of $25. In general, the point of tangency on the pure value line is determined by the quality or rating of the bond. For instance, if the ABC bond had a rating of BB, the norm value curve would be drawn tangent to the pure value line at 3/4 of the conversion price, or $37.50. Thus, the lower the quality of the bond, the closer the norm value curve will be to the intrinsic value of the bond.

The slope of the tangent to this curve then determines the amount of leverage that is being forfeited in order to gain the safety of the bond. (This is the exact reverse of the norm value curve for warrants where the extra leverage is measured to compensate for the danger of owning the warrant.)

Because the measure of safety as revealed by a bond's rating is not too exact, especially in ratings of BB and less, it is difficult to generalize the norm value curve. It is best to use past history with the geometrical construction described above to define the norm value for individual bonds. The importance of norm value is that it will protect investors from paying too much for a convertible by showing its potential rate of advance. Similarly, it will quickly determine bargain values for bonds that are excellent for hedge operations.

* * * * * * * * * * * * * * *

The preceding part of this Appendix was written in 1962. Since that time a more accurate measure of norm value was obtained by considering all listed American Stock Exchange warrants during the period 1945-1964. The complete details appear in my doctoral dissertation, A Theory and An Economic Model For Common Stock Purchase Warrants. Analytical Publishers Co., 1967. The following charts show how an average warrant behaved during this period. Note that warrants with four years to expiration sold for very little less than perpetual warrants.

These curves can be used for an indication of historical behavior. But because it would be impossible to present curves for every possible combination of time to expiration, potential dilution, and dividend yield, a more exact tool is the formula derived in my dissertation.

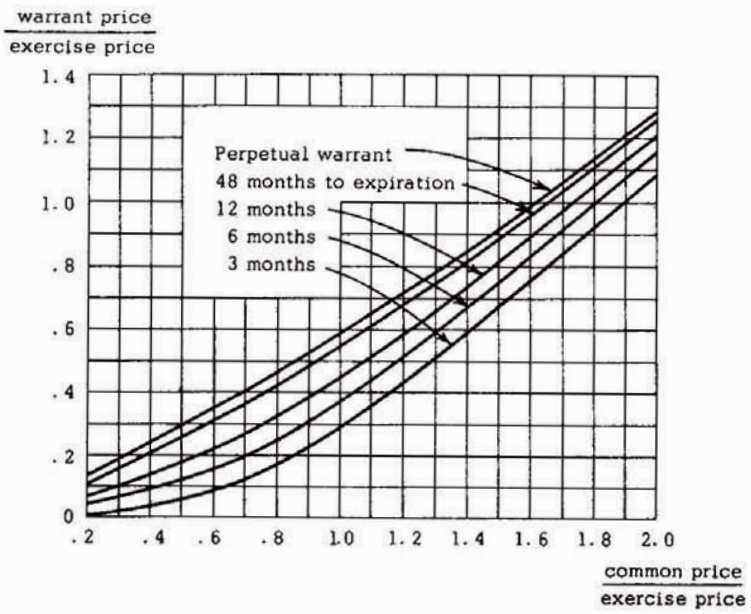


Chart 1. Average stock-warrant relationship when potential dilution is negligible (D=0); no dividends are paid on common (R=0); and present price of common is equal to price 11 months ago ($X/X_j = 1$).

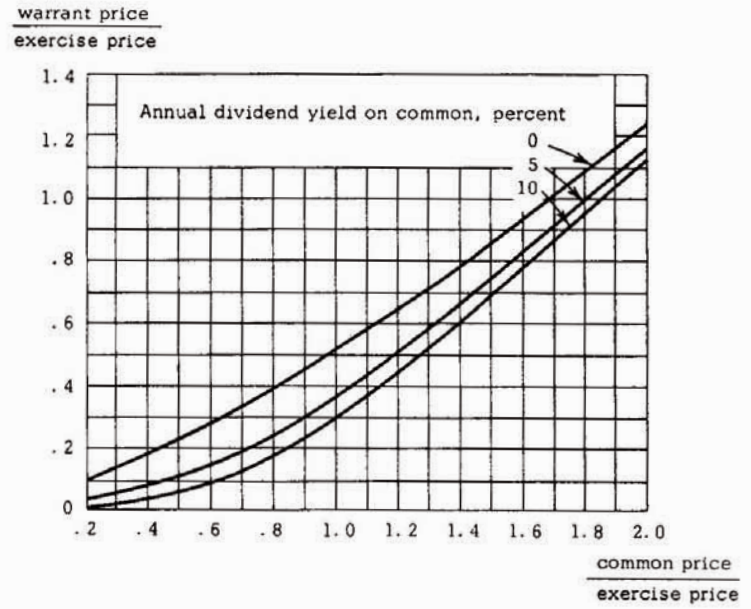


Chart 2. Average stock-warrant relationship when there are 4 warrants outstanding for every 10 common shares (D= .4); 48 months to expiration (T=48); and present price of common is equal to price 11 months ago ($X/X_j = 1$).

These charts are from “Warrant Price Behavior -- 1945 to 1964” by S.T. Kassouf, an article which appeared in the Financial Analysis Journal, Jan-Feb 1968, pages 123-126.

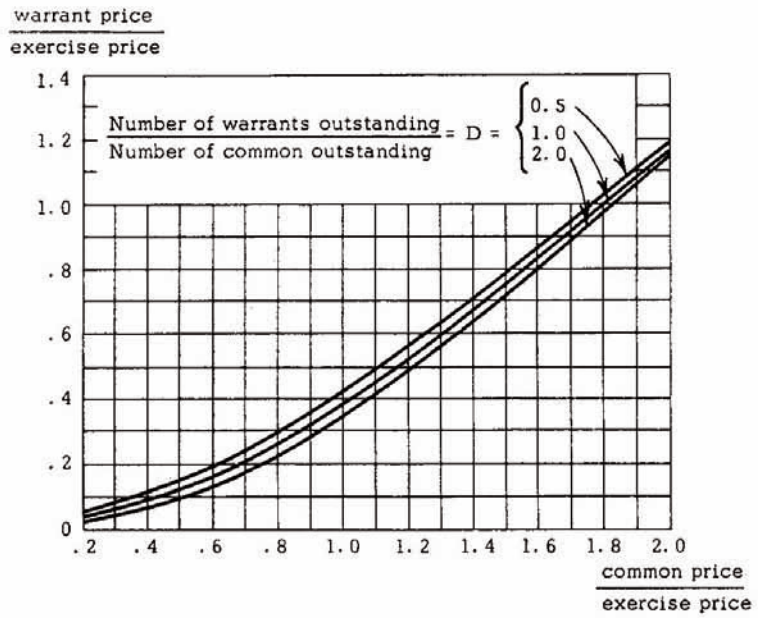


Chart 3. Average stock-warrant relationship when 48 months to expiration (T=48); common yields 3% in dividends annually (R=.03); and present price of common is equal to price 11 months ago (X/X_j =1).

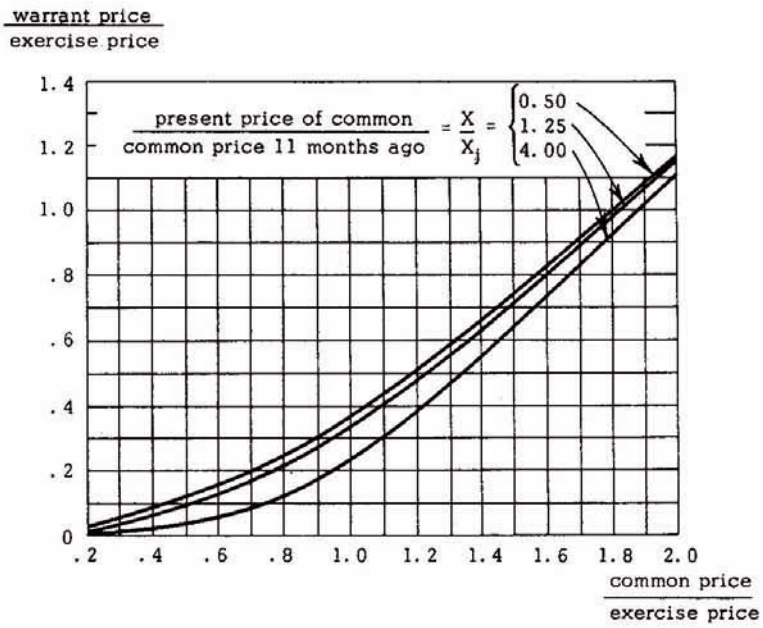


Chart 4. Average stock-warrant relationship when 48 months to expiration (T=48); common yields 3% in dividends annually (R=.03); there are 4 warrants outstanding for every 10 common shares.

These charts are from “Warrant Price Behavior -- 1945 to 1964” by S.T. Kassouf, an article which appeared in the Financial Analysts Journal, Jan-Feb 1968, pages 123-126.

APPENDIX B - SHORT SELLING

If a person believes the price of a stock is going to rise, he may profit if he is correct by buying the stock and selling it when it rises. What about the person who believes the price is going down? Can he profit if he is correct? Yes. By selling the stock short.

The investor instructs his broker to sell 100 shares of ABC common short. The broker will borrow the stock from either another broker, or from one of his customers, and sell them. (Many customers leave their stock in “street name”, that is, their broker’s name, for the convenience and safety. Margin accounts in particular, are required to do so. This supply of stock is available for loan.)

The proceeds from the sale of the stock are used as collateral for the borrowed shares, and safer collateral does not exist because 100% of the value of the stock is given the lender as a guarantee that the stock will be returned. If the stock rises, the lender may ask for additional cash reflecting the increase in price; if the stock falls the borrower may request the return of part of the original collateral.

The short seller is required to put up margin with his broker, at the same rate in effect for purchase of stock. So if the ABC common is at $50 a share when it is sold short, and the margin rate in effect is 50%, the short seller must deposit with his broker $2500 if he shorts 100 shares. Note that the short seller has not borrowed any money from his broker. The $5000 received from the sale of the common was given to the lender of the stock as collateral, so the $2500 deposited by the short seller is actually a surplus.

If the price of ABC falls, the short seller may purchase 100 shares and have them returned to the lender, realizing a profit on the difference between sale price and purchase price. (The usual procedure has been reversed: the stock was sold first and purchased later.) If the price of the stock rises and the short seller decides to close out his commitment, he would lose the difference in price.

The short seller has actually created 100 shares of ABC common. The person who lent the shares still considers himself the owner of 100 shares -- but so does the person who bought them in the course of the short sale. The short seller therefore must pay any dividends that ABC Corporation declares to the lender of the stock.

Short selling has an unhappy history and is still considered a tool for manipulators and other shady characters. In truth, regulations have long since protected the market from “bear raids”, and have actually placed the short seller at a slight disadvantage: a stock may be sold short only in a rising market. This rule was instituted to prevent speculators from selling short in a falling market, thereby depressing prices further to a point where purchases could be made profitable.

To illustrate this rule, suppose that the last sale of ABC common was at $50. No short sale may now take place at less than $50. (A short sale may take place at $50, if the most prior different price was less than $50; otherwise a short sale can only be made at $50.125 or higher.) So an order to short 100 shares at the market may not be

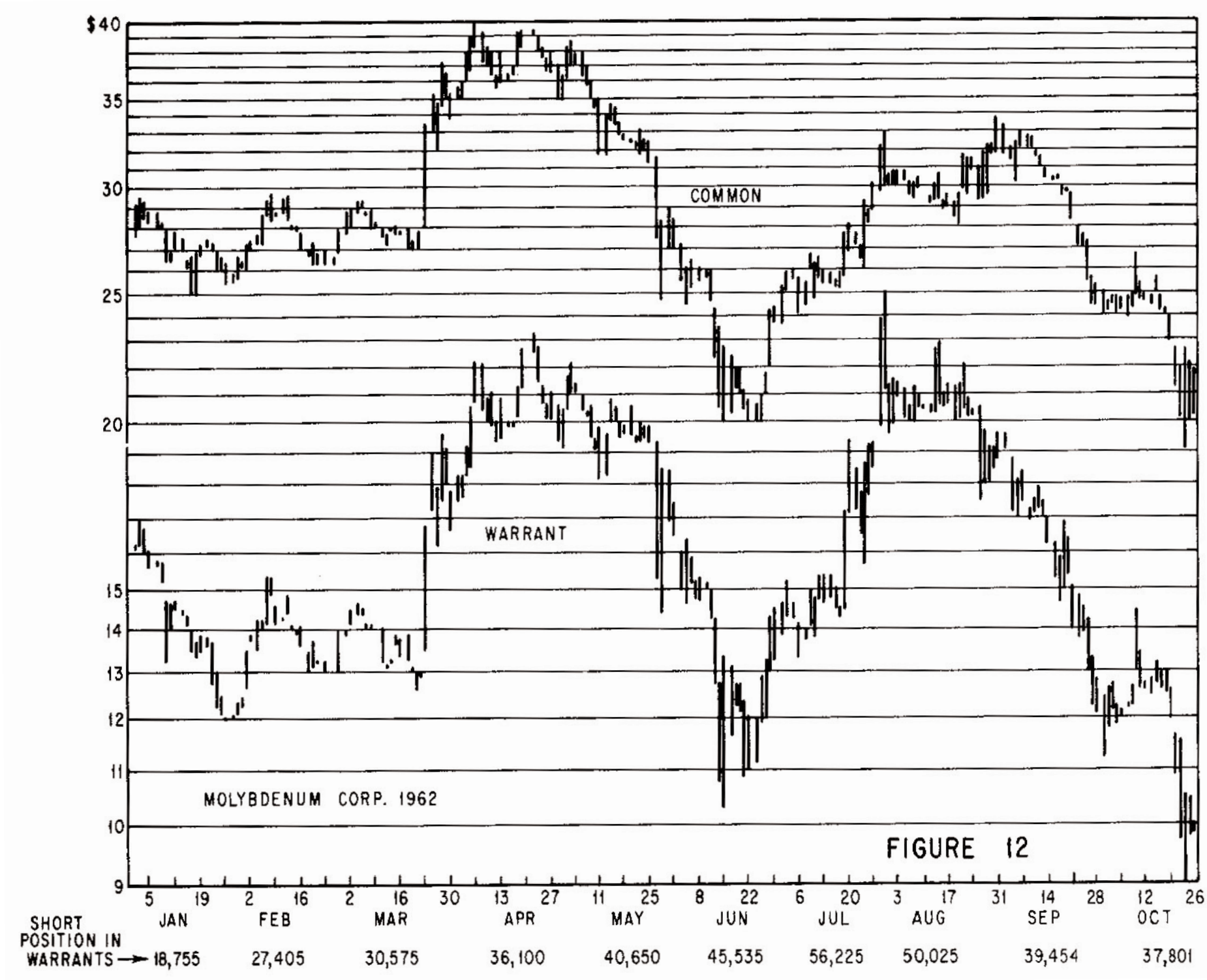
executed for some time, possibly days, and then at a price far removed from $50. For instance, if ABC common falls uninterruptedly to $46 and then rises to $46.125, the short seller will be informed that he shorted 100 shares of ABC common at $46.125. This is a vexing situation and is very possible in the case of thin or inactive issues. It is important, therefore, if a hedge is contemplated, that the short sale be completed first before the long position is taken. Otherwise, the investor may find that he shorted too low and bought too high. Of course limit orders may be placed, rather than market orders, but then the investor runs the risk of missing the short sale entirely. For instance, if a limit order is placed to short 100 ABC shares at $50, the stock may fall to $49.75, then rise to $49.875 (where a short sale is permitted) but then continue to fall without reaching $50 again. So the investor would have missed the short sale by the notorious eighth. The decision whether to short by market or limit orders depends upon the activity and volatility of the stock. A stock that is very inactive and volatile is best handled with limit orders.

Amateurs are usually warned not to consider short selling because it is dangerous and should be left to the "professional". Unfortunately, amateurs are seldom cautioned against purchasing common stock, which is just as dangerous and should also be left to the "professional". The solution of course is not to ban an amateur. An informed and serious investor need not relinquish short sales in his quest for profit.

One of the unfortunate aspects of short selling is the possibility of a "squeeze". This might occur if someone or some group managed to purchase a large portion of the floating supply of stock, while there was a substantial short interest. By then demanding the return of stock that was lent, they could force the short sellers to purchase the stock at relatively high prices.

In recent years there has been little squeezing or "pinching" of short sellers, but when it has happened it has resulted in huge losses. Eddie Gilbert, the erstwhile financier, decided in 1958 to take over the flooring company of E.L. Bruce. Bruce stock was trading on the American Stock Exchange, and in response to Gilbert's aggressive purchasing, ran up from $17 to $77 a share. Many traders were cynical about the prospects of the flooring company and shorted the stock when the price began to rise for no apparent fundamental reason. Gilbert's accumulation left so few shares in the hands of the public that trading was suspended on the Exchange. In the over-the-counter market, traders short the stock were forced to pay as high as $195 a share.

More recently, an incipient corner developed in Molybdenum Corporation warrants, trading on the American Stock Exchange. Figure 12 shows the volatile daily activity in both Molybdenum common and the warrants for the first ten months of 1962. The International Mining Corporation, according to the Official Summary of Security Transactions and Holdings published by the Securities and Exchange Commission, bought and sold Molybdenum common and warrants in the following manner:


$40
35
30
25
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10
9
COMMON
WARRANT
MOLYBDENUM CORP. 1962
5 19 2 16 2 16 30 13 27 11 25 8 22 6 20 3 17 31 14 28 12 26
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
SHORT POSITION IN WARRANTS → 18,755 27,405 30,575 36,100 40,650 45,535 56,225 50,025 39,454 37,801

FIGURE 12

Date	common		warrants	
	bought	sold	bought	sold
June	5,600			
July	16,500		8,100	
Aug 16	400			
Aug 17	500			
Aug 20	600			
Aug 21	1,000			sometime in
Aug 22	5,150			August (not
Aug 23	2,207			reported daily
Aug 24	1,261			by the SEC)
Aug 27	420			22,600
Aug 28	5,886			
Aug 29	4,835			
Aug 30	526			
Aug 31	3,468			
Sep 4	1,681			1,600
Sep 5	2,312			2,200
Sep 6	3,573			3,400
Sep 7	1,892			1,800
Sep 10	3,678			3,500
Sep 11	1,263			1,200

TABLE 2 . Activities of International Mining
in Molybdenum common and warrant.

International Mining held 36,300 warrants in early August. This was more than 20% of the total number of outstanding warrants. Another 14,285 warrants were held by the Kennecott Copper Corporation, so that the floating supply of warrants was decidedly reduced. In a report in the New York Times of July 28, 1962, Mr. Harder, President of International Mining, was quoted as saying that he was purchasing the warrants to eventually get the common stock and that International mining had no intention of getting anyone “into trouble”. This was in reference to the fact that many short sellers of the warrants were being forced to cover (return the borrowed warrants).

Apparently by August, Mr. Harder realized how expensive the warrants were and decided that purchasing the common outright rather than via the warrant was the proper thing to do. Notice how the common advanced in late August and early September when INternational Mining stepped up its purchases. At the same time the warrants started to break sharply, presumably because International Mining began to dispose of all its holdings.

In July the warrants ranged from $13.50 to $19.50, so that if Mr. Harder accumulated the 8,100 warrants at an average price of $16.50, they would have cost about $130,000. At this time the common ranged between $24 and $30 for an average price of about $27. The average norm price for the warrant was about $11.00, so that the warrant was selling for about 50% above norm and had only 14 months of life left. If the common did not advance to at least $45 before expiration of the warrant, the price of $16.50 could hardly be justified. It is difficult to imagine what kind of

an evaluation process International Mining used in assessing the worth of the warrant before committing $130,000. But fortunately International Mining sold most of the warrants when the shorts were scrambling over each other in their eagerness to buy, and consequently International Mining realized a handsome profit.

The American Stock Exchange, under fire in recent times for the informal nature of its operations and supervision of rules, asked its members to report the weekly short positions of their clients in Molybdenum warrants, starting August 27. The extreme volatility of the warrants had probably alerted the Governors to the possibility of an unfortunate occurrence. Almost simultaneously with this notice that the Exchange was watching the situation closely, the warrants fell almost uninterruptedly to $11 from their high of $25.

The foregoing is not intended to frighten investors but only to warn them that alertness and agility are necessary for successful investing -- the same requirements for success in any field.

APPENDIX C - MARGIN

Like short selling, the use of margin is considered by many people a speculative and dangerous technique. Promiscuous use of margin has often been cited as a major cause of the 1929 catastrophe. True, a thinly margined purchase is threatened by a small fluctuation in the price of the security involved. But the nature of the investment is more important than the amount of credit used. It is unquestionably safer to purchase Government bonds by borrowing 95% of the purchase price than it is to purchase “penny” mining stocks for cash.

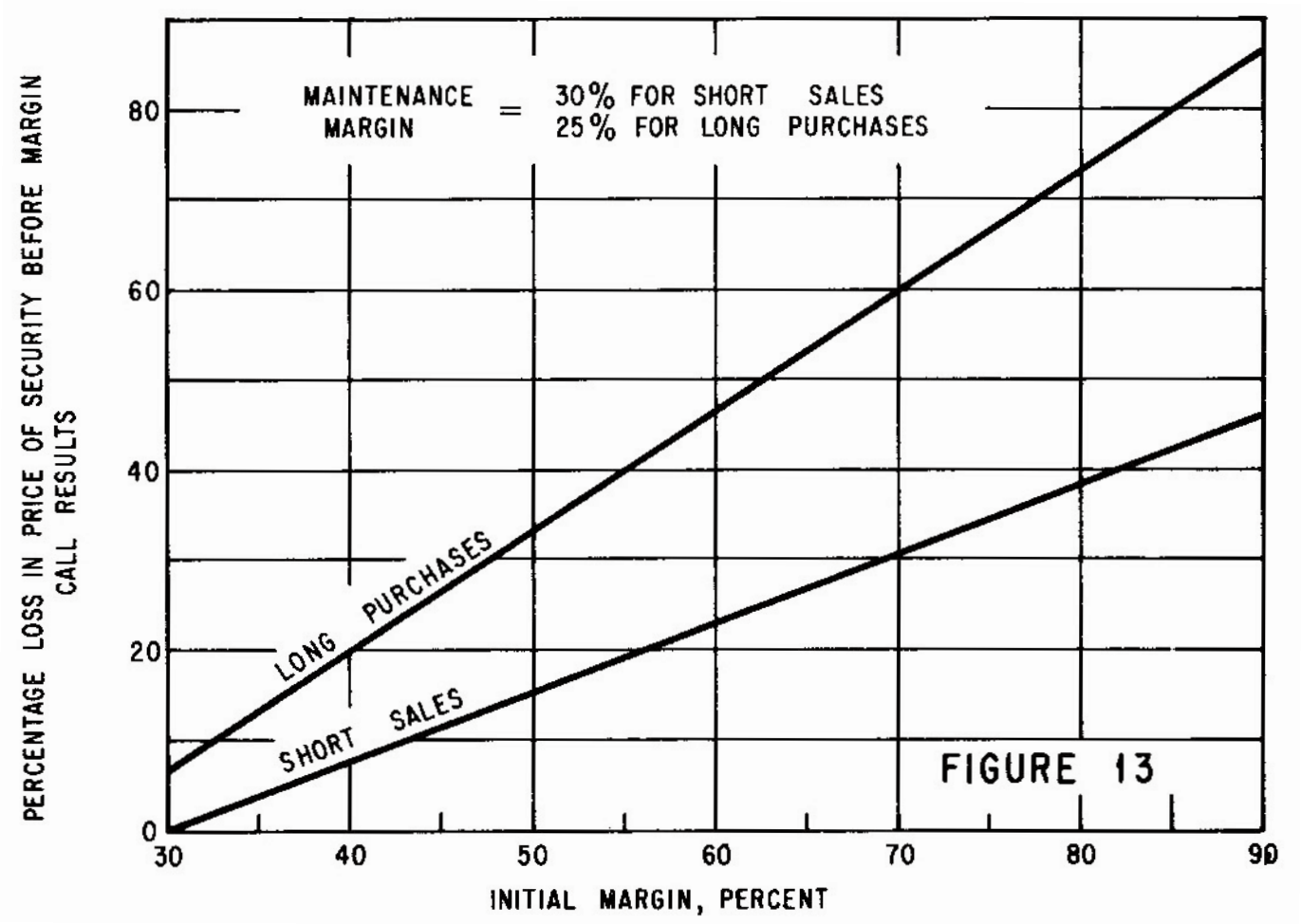
This principle of safety applies to the hedge investments considered earlier. When a profit is anticipated if a security advances or declines, it is neither dangerous nor foolish to borrow the maximum amount allowable. If the analysis is correct and safety is assured, it is logical and profitable to use as low a margin as possible.

In the general case, when margin is used to purchase stock, not only is the profit magnified, but so is the loss. For instance, if $1000 worth of stock is purchased on 50% margin, it is true that a 10% increase in the price of the stock will result in a 20% profit on the investment of $500. But a 10% decrease in the price of the stock will result in a 20% decrease in the investment.

In the case of 50% margin an investment will increase or decrease twice as fast as the price of the security purchased. To calculate this leverage factor (increased rate of rise or fall in investment) take the reciprocal of the margin rate expressed as a fraction. When the margin rate is 50%, or 1/2, the reciprocal is obtained by inverting the fraction, resulting in a leverage factor of 2. If the margin rate is 25%, or 1/4, the leverage factor is 4; if the margin rate is 70%, or 7/10, the leverage factor is 10/7 = 1.43. (A margin rate of x% means that the investor must put up a minimum of x% of the purchase.)

In addition to initial margin, investors are required to maintain an equity of 25% in long accounts and 30% in short accounts. This is called the maintenance margin. If an investor purchases $1000 worth of stock by depositing $500 with his broker, he would be required to deposit more money if the value of the stock falls below $667, for then the investor would have lost $333 of his original investment, leaving him with an equity of $167 in his account. This is 25% of the value of the securities in the account, so at this point he would receive a margin call from his broker. (He would probably be called on sooner to ante more money, since most brokers require more than the minimum 25% maintenance margin.) On a short sale, if the initial margin is 50%, an advance of about 15% in the price of the security would result in a margin call. Figure 13 shows the relationship between initial margin and the amount a long purchase can decline or a short sale can advance before additional margin is required.

The initial margin on long purchases is usually applicable to securities selling for more than $10 because most brokers will not lend any money toward the purchase of low-priced stocks. The New York Stock Exchange regulations concerning margin on short sales require an investor to maintain an equity of $5 a share or the prevalent maintenance rate, whichever is higher for stocks selling fore more than $5. To short a $5 stock, for example, it would be necessary to deposit the full $5 per share with a broker, regardless of the initial margin rate. For stocks selling for less than



$5, the investor is required to deposit the full selling price of the stock or $2.50 per share, whichever is higher. To short a stock selling for less than $2.50 therefore, an investor is required to maintain an equity of more than 100%.

For many hedging operations, the investment may be made with less cash than usual. Section 220.3(d)(3), amended August 1961, of the Federal Reserve System Regulation T, pertaining to margin requirements, reads in part:

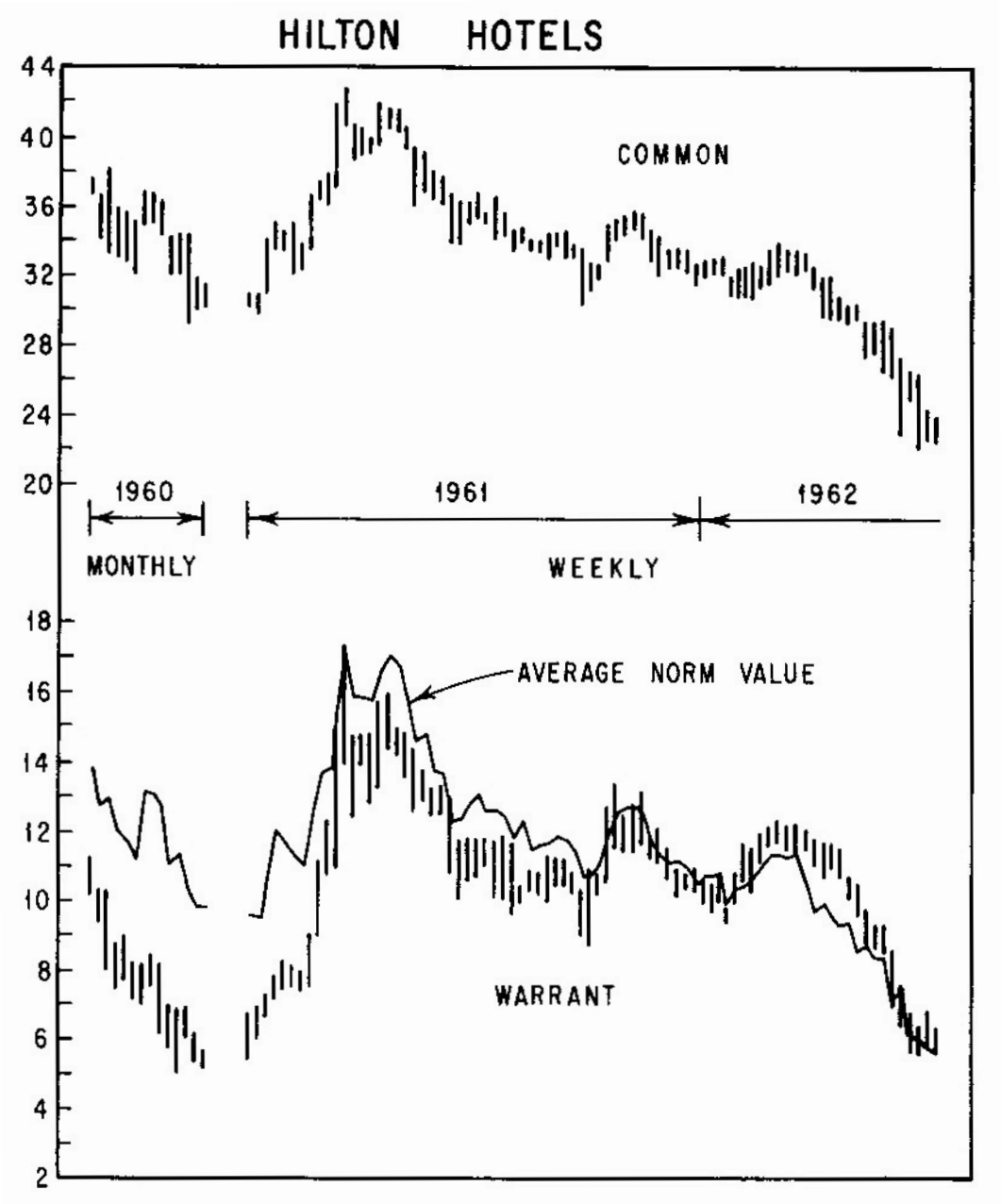
"... such amount as the Board shall prescribe from time to time ... as the margin required for short sales, except that such amount so prescribed ... need not be included when there are held in the account securities exchangeable or convertible within 90 calendar days, without restriction other than the payment of money, into such securities sold short; ... "

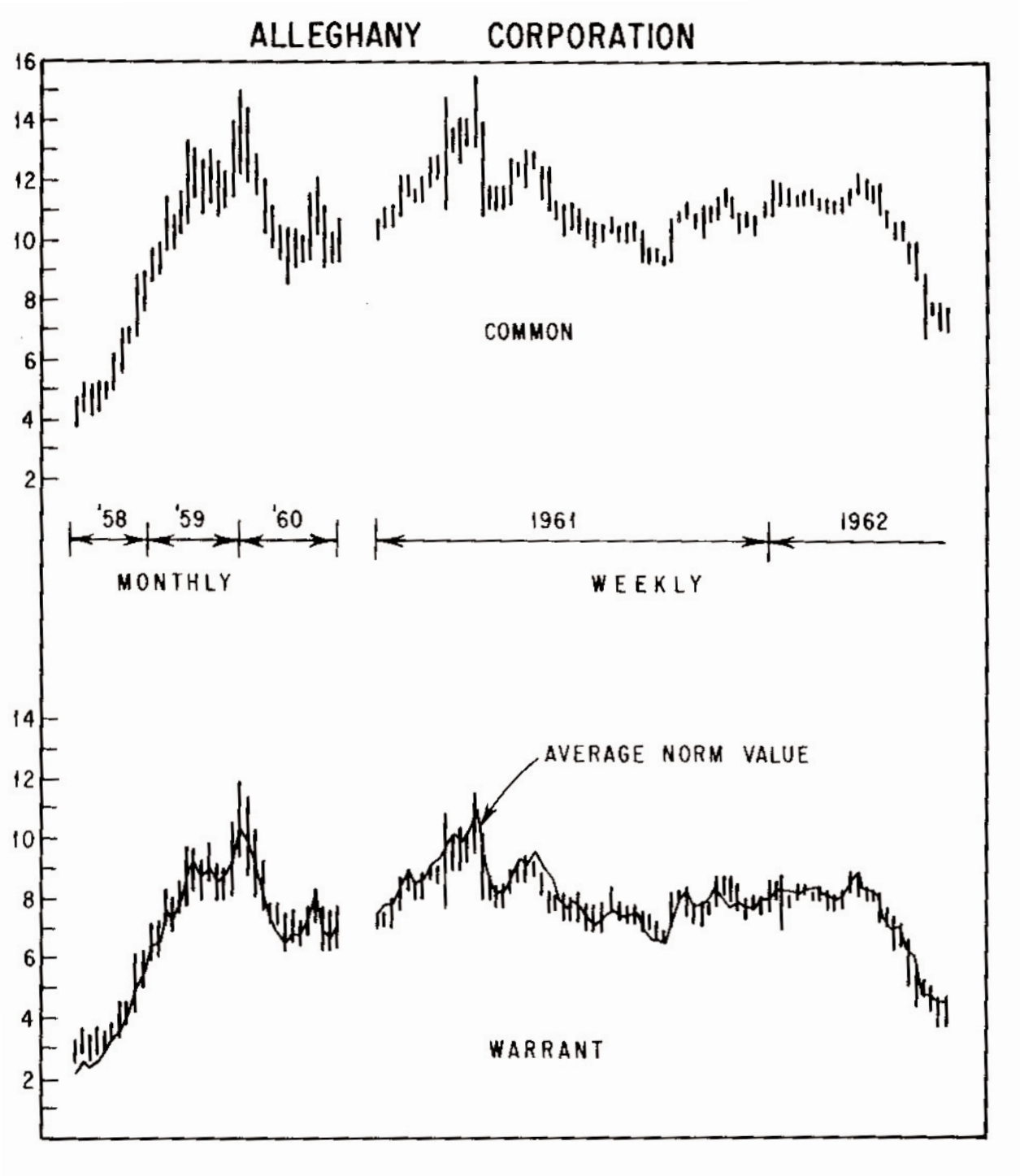
Consider the case when warrants were purchased and common stock was shorted as described on page 14. The 600 warrants were purchased for $900. Since these warrants are convertible into common within the meaning of the above quoted regulation, up to 600 common shares may be shorted without posting additional money. This example called for shorting only 100 shares of common. The total investment would be only $900.

In the case described on page 21, where convertible bonds were purchased and common stock shorted, the same Regulation applies because the bonds are convertible into the common that was shorted. The ten bonds are convertible into 200 shares of common, so actually 200 shares of the common could be shorted without additional funds. This particular example, however, only called for shorting 100 shares. The total amount of money required would be $5800.

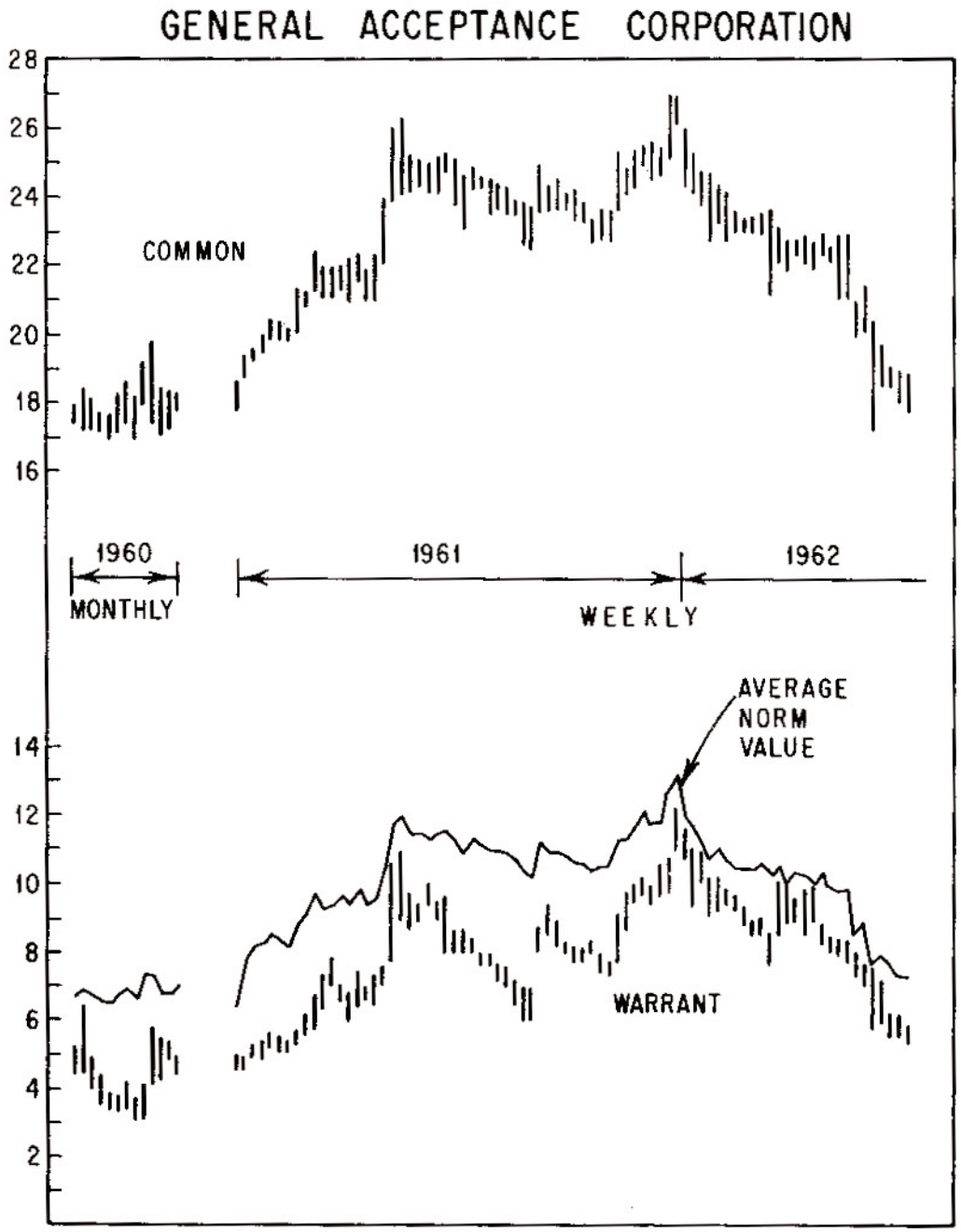
APPENDIX D - RECORDED WARRANT - PRICE RELATIONSHIPS

Figure 10 shows various warrant-price relationships in “snapshot” form. That is, at a particular instant in time. The following graphs may be considered “motion pictures”, in that they show a relationship through time. The weekly (or monthly) price ranges for the common and warrant are shown. The norm value was computed for the average of the weekly or monthly price range. This value has been plotted as the “average norm value” on the following graphs. (They have been connected by a thin continuous line for visual clarity.) Other examples may have been shown but these are representative. The criteria for choosing these particular warrants were the availability of data (listed on an exchange) and the relatively simple conversion terms.

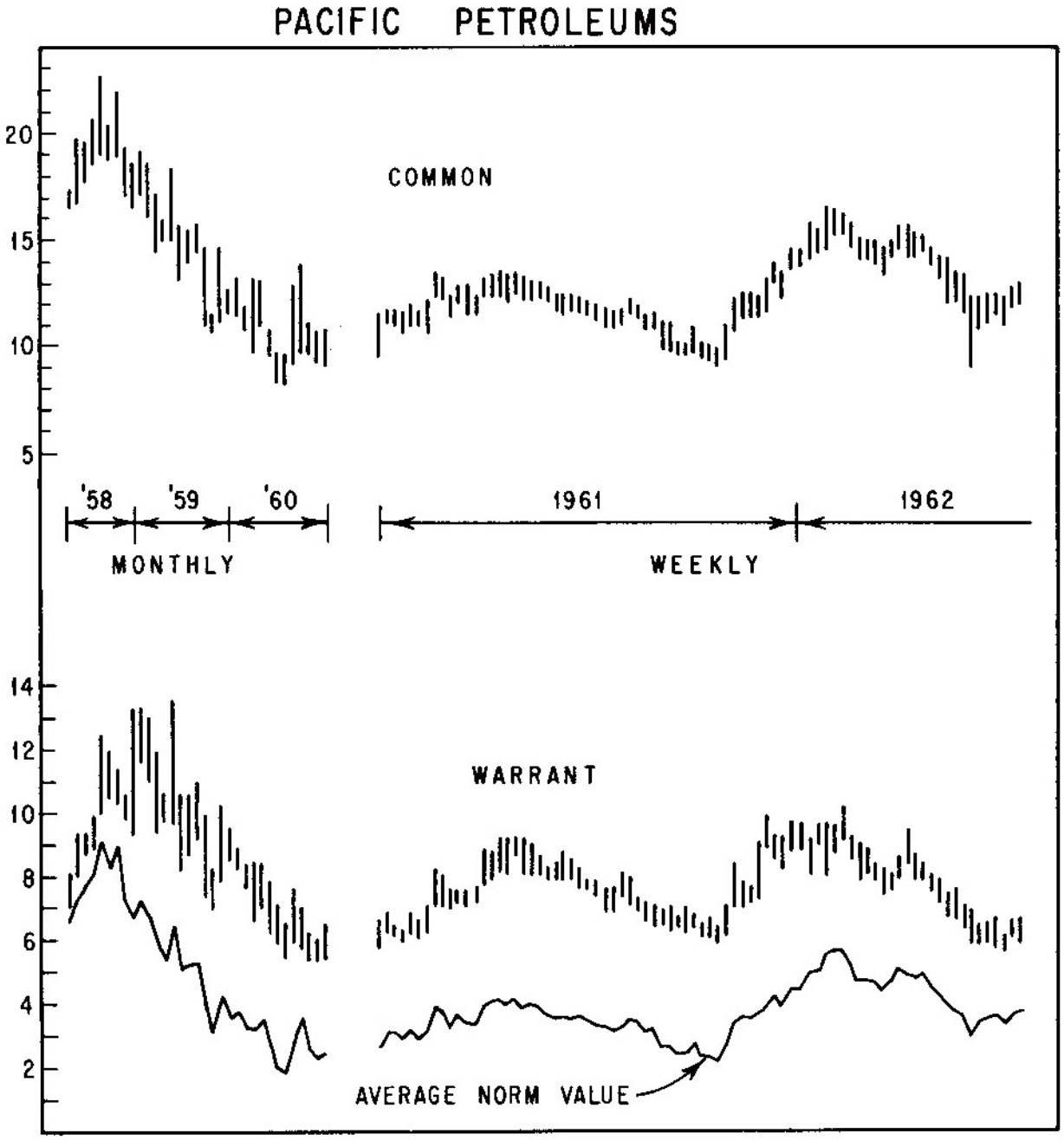




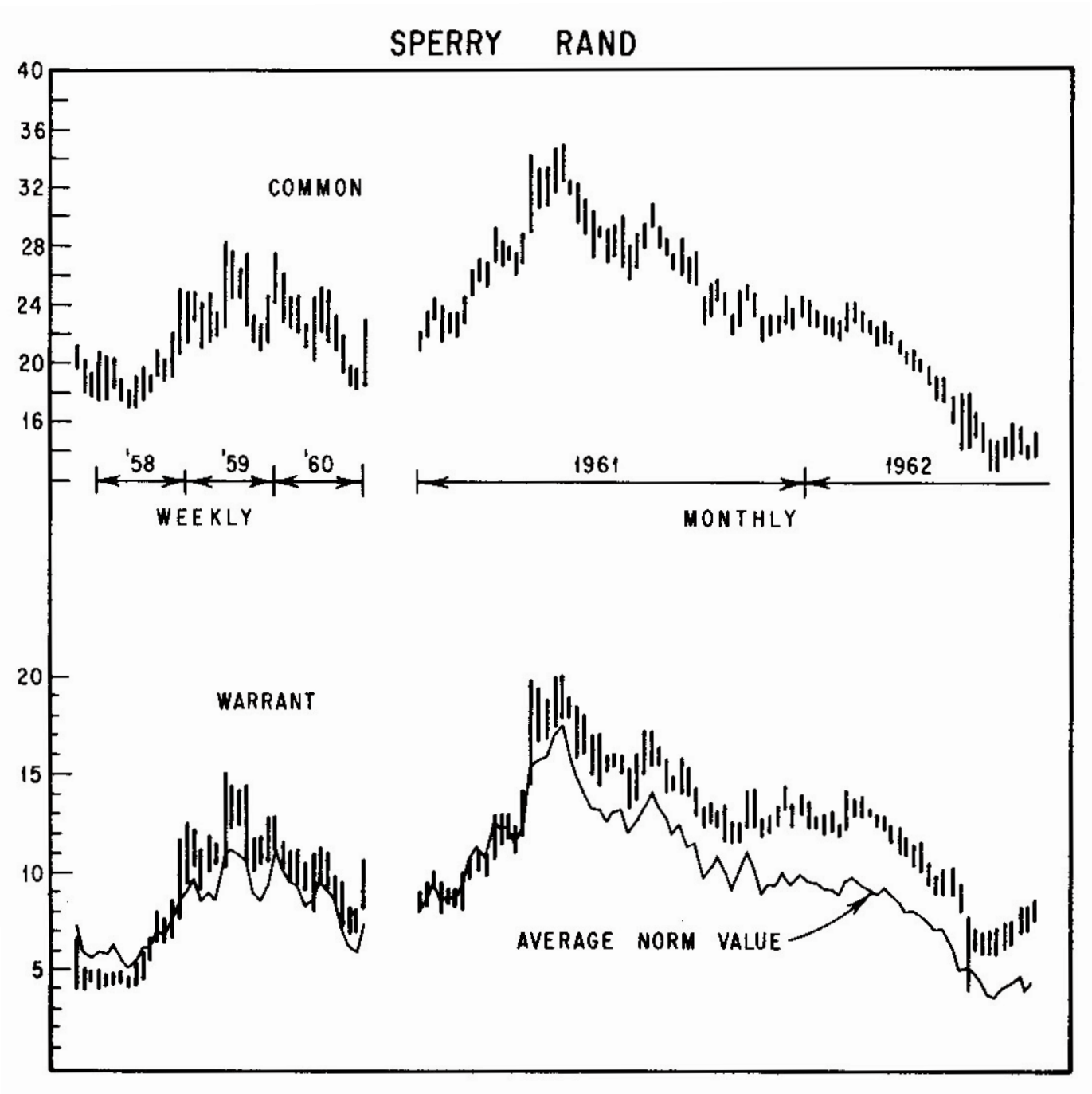
An almost perfect adherence to norm value throughout time and at different price levels.



A constantly underpriced warrant, possibly due to the large potential dilution.



A constantly overpriced warrant. It is difficult to find any explanation for this. It may be noted, however, that many Canadian oil and mining companies have a large bullish following. Perhaps their exuberance is reflected here in the warrant, since speculative investors would tend to choose the warrant over the common. As this warrant approaches expiration, it will be interesting to see how quickly the premium decreases. If it remains overpriced it may prove suitable for the hedging operation described on page 10.


SPERRY RAND
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WEEKLY
1961
1962
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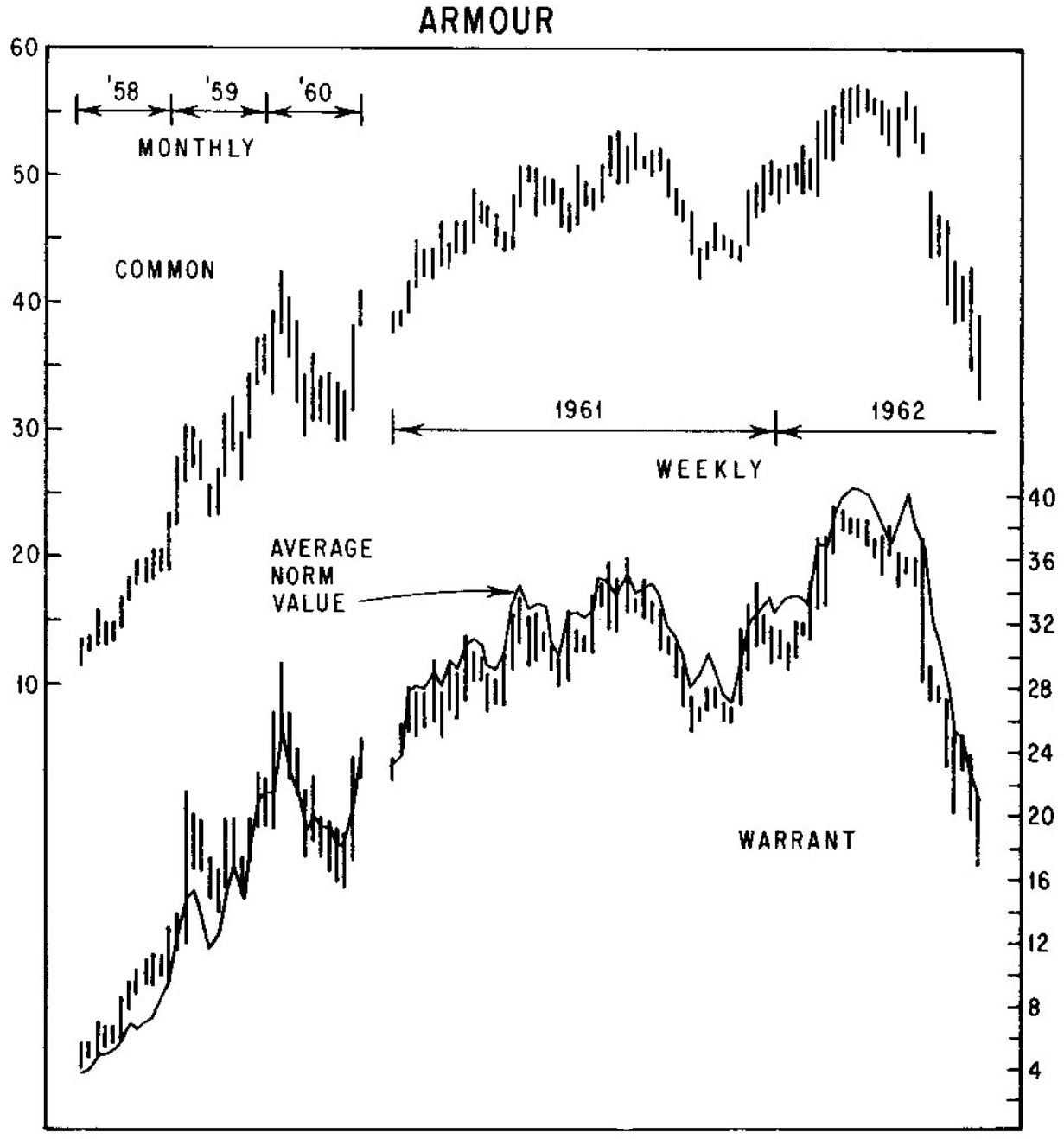
WARRANT
AVERAGE NORM VALUE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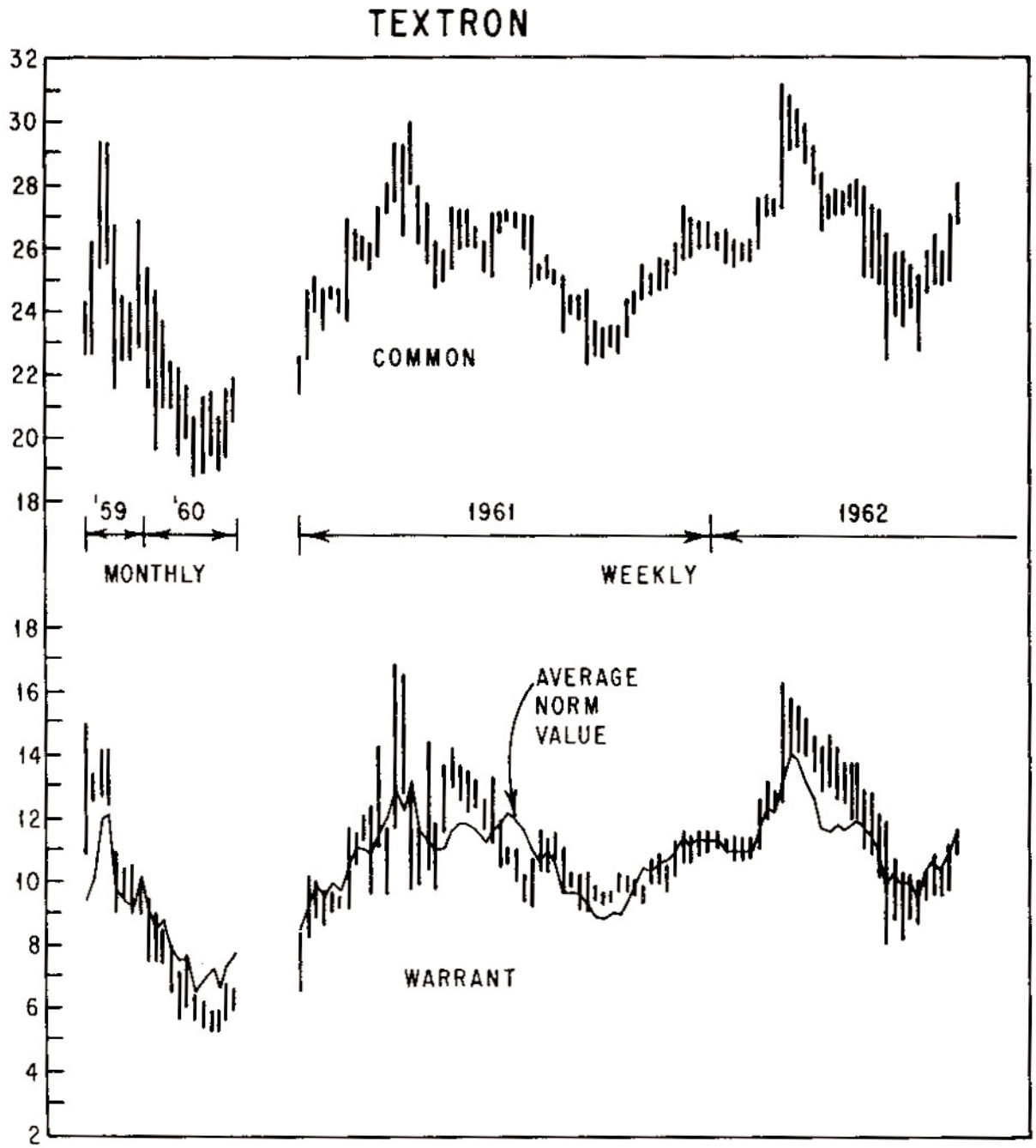
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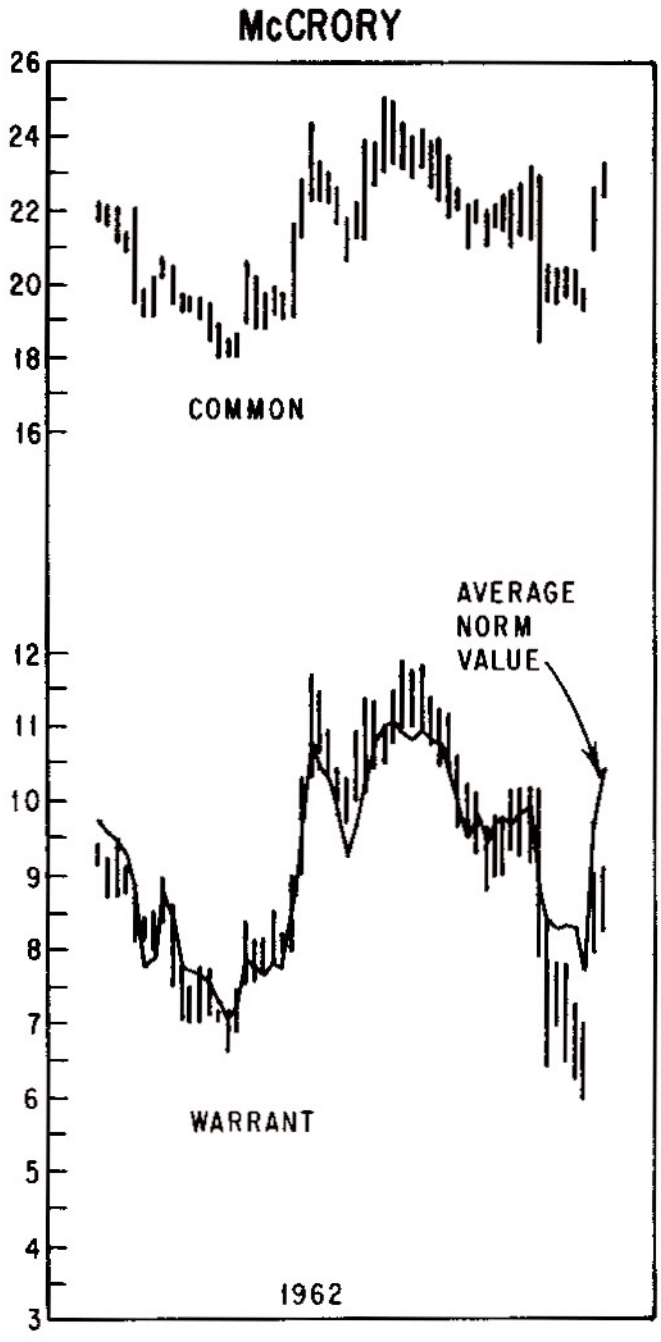
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WARRANT
1962

APPENDIX E - INTEREST LEVERAGE

Frequently when convertible bonds are purchased on margin, the interest yield of the bond is magnified or leveraged. Consider for example the Bloomfield Building 6fis of '77. In October 1966 when the capital markets were under stress, these bonds sold for less than 50 on the American Stock Exchange. An investor who purchased them for cash at 50 would have realized a return of 13% per annum if the price of the bonds remained at 50. Consider instead an investor who purchased these bonds at 50 on 70% margin. For each bond purchased, he would advance $350, borrowing the remaining $150 from his broker. If he paid his broker 6.5% on this loan his interest cost for one year would be $9.75. The interest received from the bond in one year was $65.00, so that his net interest return would have been $55.25. On his investment of $350, this represents 15.8% per annum neglecting any price movement in the bond. (Actually, one year later the bond sold for approximately 75 so that the <u>total</u> return from his investment would have been about 87%.) In general, the more he could have borrowed at a rate less than the current yield of the bond (13%) the more he would have earned on his investment.

It is usually assumed that bonds selling at steep discounts reflect high risk situations. This is usually true. But it is also true that this is one of the neglected areas of security analysis; occasionally the steep discount represents nothing more than a thin market and refusal by most bond buyers to take on modest degrees of risk. If there is the slightest doubt about a bond, or if there is scant information, bond buyers tend to avoid the issue. This often creates superb buying opportunities for analysts who have made a thorough appraisal of the risks involved.

The above analysis applies to any bond, convertible or not. Non-convertible bonds are limited on the upside -- they will seldom exceed par by very much since they are usually callable. Convertibles, on the other hand, although callable, are unlimited on the upside. (When a convertible bond is called, the holder usually has at least 30 days in which he may convert the bond into stock.) Therefore good quality convertibles selling well below par are fine investments in uncertain periods.

The realized interest return on a cash investment in any situation utilizing margin can be calculated with the following formula:

$$R = (C - B(1 - M))/M, \text{ where}$$

R = realized interest on cash invested neglecting price movement in price of bond

C = current yield of bond

B = rate of interest charged on loan

M = rate of margin

In the above example, C = . 13, B = .065, and M = .70.

APPENDIX F - WARRANT PRICES, 1945-1964

The warrant-common price relationships shown on pages 32 and 33 are based upon the actual behavior of prices for the period 1945-1964. All of the warrants listed on the American Stock Exchange during this period were studied. The table below gives the data for these warrants for the months of November in the years indicated. The following symbols were used: y = adjusted price of warrant/adjusted exercise price; x = price of common/adjusted exercise price; t = number of months remaining before expiration; d = number of new shares resulting from conversion/number of outstanding common shares; r = dividend yield of common stock. The prices used were the mean of the month's high and low. The data were collected from Standard and Poor's Stock Guides and from Moody's Manuals.

Observation	y	x	1/t	d	r
			1945		
1 Am. For. Power	0.0775	0.3000	.0	2.9790	0.0
2 Atlas	0.2925	0.8850	.0	0.8761	0.0226
3 Colorado Fuel	0.3571	0.8857	.0198	1.0302	0.0323
4 Com. South.	0.0083	0.1104	.0	0.5152	0.0
5 Elec. Power	0.2575	0.7150	.0	0.1548	0.0
6 Int'l. Mineral	2.8462	3.8615	.0690	0.1004	0.0379
7 Manati Sugar	0.5000	1.0250	.0422	0.4302	0.0195
8 Merritt Chap.	0.2625	0.6666	.0	0.1370	0.0
9 NYC Omnibus	1.1429	2.1536	.0645	0.0008	0.0796
10 Pan American	0.5382	1.2465	.0392	0.3333	0.0111
11 RKO	0.4167	1.0083	.0198	0.8527	0.0
12 Richfield Oil	0.1625	0.8063	.0625	0.3117	0.0465
13 Tri-Continent.	0.1582	0.5079	.0	0.5068	0.0213
14 United	0.0250	0.1591	.0	0.2569	0.0
15 Ward Baking	0.4100	1.0650	.0080	0.4047	0.0113

Observation	y	x	1/t	d	r
			1946		
16 Am. For. Power	0.0525	0.2500	.0	2.9790	0.0
17 Atlas	0.2425	0.9600	.0	0.9443	0.0417
18 Colorado Fuel	0.2750	0.6821	.0260	1.0302	0.0503
19 Com. South.	0.0063	0.1188	.0	0.5152	0.0
20 Elec. Power	0.2425	0.6475	.0	0.1548	0.0
21 Hussmann	0.7083	1.3125	.0238	0.1705	0.0635
22 Int'l. Mineral	2.5000	3.6154	.4000	0.0279	0.0340
23 Manati Sugar	0.3150	0.8300	.0870	0.4302	0.0241
24Merritt Chap.	0.2250	0.5042	.0	0.1747	0.0331
25 Pan American	0.2153	0.7361	.0741	0.3320	0.0377
26 Penn. Dixie	0.4375	0.9781	.0328	0.1501	0.0
27 RKO	0.3792	1.1083	.0260	0.6576	0.0541
28 Richfield Oil	0.0594	0.7186	.2500	0.3117	0.0557
29 Tri-Continent.	0.1221	0.3758	.0	0.5068	0.0432
30 United	0.0341	0.1432	.0	0.2569	0.0
31 Ward Baking	0.5700	1.3050	.0089	0.4047	0.0766
			1947		
32 ACF Brill	0.2550	0.5800	.0117	0.2911	0.0
33 Am. For. Power	0.0050	0.1150	.0	2.9790	0.0
34 Atlas	0.2125	0.9300	.0	0.9507	0.0688
35 Colorado Fuel	0.3036	1.0429	.0377	1.0302	0.0575
36 Com. South.	0.0026	0.0979	.0	0.5152	0.0
37 Elec. Power	0.1925	0.6525	.0	0.1548	0.0
38 Hussmann	0.7249	1.5754	.0333	0.0202	0.1127
39 Merritt Chap.	0.2070	0.6446	.0	0.0171	0.0776
40 Niagara Hud.	0.0175	0.1886	.0	0.0519	0.0
41 Pan American	0.0061	0.5139	.6667	0.3325	0.0270
42 Penn. Dixie	0.3375	0.9094	.0540	0.1499	0.0687
43 RKO	0.1833	0.7292	.0377	0.6488	0.1097
44 Tri-Continent.	0.0999	0.3657	.0	0.5068	0.0741
45 United	0.0182	0.1000	.0	0.2569	0.0
46 Ward Baking	0.3300	0.9450	.0099	0.4042	0.1143
			1948		
47 ACF Brill	0.1000	0.2700	.0136	0.2911	0.0
48 Atlas	0.1875	0.8300	.0	0.9888	0.0771
49 Colorado Fuel	0.2964	1.0893	.0690	1.0302	0.0656
50 Elec. Power	0.2450	0.8375	.0	0.1548	0.0
51 Hussmann	0.6213	1.5533	.0556	0.0191	0.0952
52 Merritt Chap.	0.1833	0.7028	.0	0.1706	0.0785
53 Niagara Hud.	0.0081	0.1621	.0	0.0519	0.0
54 Penn. Dixie	0.1844	0.9875	.1538	0.1421	0.0759
55 RKO	0.0833	0.5083	.0690	0.6487	0.0788
56 Tri-Continent.	0.1193	0.4232	.0	0.4462	0.0717

Observation	y	x	1/t	d	r
			1948 (Cont'd.)		
57 United	0.0148	0.1000	.0	0.2569	0.0
58Ward Baking	0.3950	1.2200	.0113	0.4022	0.1213
			1949		
59 ACF Brill	0.0723	0.1915	.0163	0.2911	0.0
60 Atlas	0.2125	0.9000	.0	0.9960	0.0711
61 Colorado Fuel	0.0429	0.8786	.4000	1.0140	0.1301
62 Hussmann	0.9172	1.9083	.1667	0.0114	0.0930
63 Merritt Chap.	0.1682	0.6856	.0	0.1588	0.0805
64 RKO	0.0036	0.4917	.4000	0.6487	0.0813
65 Tri-Continent.	0.1221	0.4605	.0	0.4549	0.0776
66 United	0.0080	0.1773	.0	0.2569	0.0205
67 Ward Baking	0.3600	1.2400	.0131	0.3793	0.1290
			1950		
68 ACF Brill	0.0792	0.2375	.0202	0.2911	0.0
69 Atlas	0.2075	0.9950	.0	0.9995	0.0643
70 Merritt Chap.	0.2457	1.0774	.0	0.1300	0.0574
71 Tri-Continent.	0.1249	0.5654	.0	0.4549	0.0929
72 United	0.0040	0.1455	.0	0.2569	0.0500
73 Ward Baking	0.5350	1.5200	.0155	0.1706	0.1053
			1951		
74 ACF Brill	0.1333	0.4750	.0267	0.2911	0.0
75 Atlas	0.2700	1.0750	.0	1.0000	0.0595
76 Merritt Chap.	0.4333	1.4214	.0	0.1281	0.0136
77 Tri-Continent.	0.1691	0.7601	.0	0.9952	0.0704
			1952		
78 ACF Brill	0.0750	0.4083	.0392	0.2911	0.0
79 Atlas	0.2475	1.0700	.0	0.9912	0.0598
80 Eureka	0.3500	1.0000	.1538	0.3333	0.0
81 Merritt Chap.	0.3342	1.1758	.0	0.1022	0.0561
82 Tri-Continent.	0.1939	0.9326	.0	0.9952	0.0628
			1953		
83 Alleghany	0.5583	0.9833	.0	0.6468	0.0
84 ACF Brill	0.0292	0.3250	.0741	0.2911	0.0
85 Atlas	0.2300	1.1625	.0	0.9936	0.0642
86 Eureka	0.2000	0.5750	.1538	0.2730	0.0
87 Merritt Chap.	0.8538	1.5055	.0	0.0057	0.0674
88 Tri-Continent.	0.1496	0.8833	.0	0.9952	0.0707

Observation	y	x	1/t	d	r
			1954		
89 Alleghany	0. 8000	1. 3167	. 0	0. 5407	0. 0
90 ACF Brill	0. 0083	0. 6042	. 6667	0. 2797	0. 0
91 Atlas	0. 5226	1. 5200	. 0	0. 8929	0. 0500
92 Eureka	0. 2500	0. 7500	. 2857	0. 2730	0. 0
93 Gen. Accept.	0. 7000	1. 4688	. 0183	0. 4169	0. 0681
94 Tri-Continent.	0. 3547	1. 3021	. 0	0. 9897	0. 0549
			1955		
95 Alleghany	1. 5833	2. 3333	. 0	0. 5407	0. 0
96 Armour	0. 5450	1. 2350	. 0091	0. 1230	0. 0
97 Atlas	0. 7675	1. 7000	. 0	0. 7889	0. 0494
98 Eureka	0. 5750	1. 4250	. 1818	0. 2730	0. 0
99 Gen. Accept.	0. 6063	1. 5500	. 0235	2. 6824	0. 0645
100 Tri-Continent.	o. 4600	1. 4499	. 0	0. 8767	0. 0583
101 Van Norman	0. 2917	0. 9924	. 0089	0. 2505	0. 0611
			1956		
102 Alleghany	1. 5000	2. 0833	. 0	0. 5407	0. 0
103 Armour	0. 5300	1. 3700	. 0103	0. 1156	0. 0
104 Atlas	0. 5800	1. 4000	. 0	0. 6506	0. 0343
105 Gen. Accept.	0. 5750	1. 5063	. 0328	0. 2234	0. 0664
106 Tri-Continent.	0. 5209	1. 5308	. 0	0. 4935	0. 0736
107 Van Norman	0. 2311	0. 8144	. 0099	0. 2505	0. 0744
			1957		
108 Alleghany	0. 8000	1. 3000	. 0	1. 8780	0. 0
109 Armour	0. 2917	0. 8542	. 0117	0. 0864	0. 1000
110 Atlas	0. 4600	1. 1300	. 0	0. 5320	0. 0850
111 Gen. Accept.	0. 4125	1. 4188	. 0540	2. 5186	0. 0705
112 Mack Trucks	0. 2265	0. 7456	. 0095	0. 1761	0. 0804
113 Molybdenum	0. 1625	0. 5479	. 0141	0. 1775	0. 0365
114 Northspan	0. 7813	1. 3125	. 0091	0. 3706	0. 0
115 Tri-Continent.	0. 5902	1. 5907	. 0	0. 2387	0. 0892
116 Van Norman	0. 1061	0. 3220	. 0113	0. 2126	0. 0377
			1958		
117 Alleghany	1. 7667	2. 4500	. 0	1. 8354	0. 0
118 Armour	0. 7000	1. 3542	. 0136	0. 0864	0. 0
119 Atlas	0. 6300	1. 1800	. 0	0. 5297	0. 0703
120 Gen. Accept.	0. 6875	1. 7000	. 1538	2. 4094	0. 0588
121 Mack Trucks**	0. 3933	1. 0735	. 0107	0. 1700	0. 0552
122 Molybdenum	0. 5646	0. 9511	. 0169	0. 1750	0. 0106
123 Northspan	0. 5000	0. 7292	. 0103	0. 3724	0. 0
124 Sperry Rand	0. 3950	0. 9125	. 0094	0. 1238	0. 0351
125 Symington W.	0. 6875	1. 1688	. 0087	0. 2078	0. 0257
126 Tri-Continent.	1. 3024	2. 2241	. 0	0. 2085	0. 1048
127 Van Norman	0. 3182	0. 6212	. 0131	1. 2806	0. 0

Observation	y	x	1/t	d	r
			1959		
128 Alleghany	2.8667	3.6833	.0	1.6522	0.0
129 Armour	1.3792	2.3667	.0163	0.0884	0.1000
130 Atlas	0.4700	0.9600	.0	0.4803	0.0500
131 Mack Trucks	0.5931	1.4877	.0123	0.2061	0.0394
132 Martin	0.6594	1.1531	.0093	0.1220	0.0347
133 Molybdenum	1.0812	1.4833	.0213	0.1657	0.0
134 Pacific Pet.	0.5263	0.6974	.0099	0.2232	0.0
135 Northspan	0.1771	0.3125	.0117	0.0360	0.0
136 Sperry Rand	0.4650	0.9525	.0106	0.1238	0.0336
137 Symington W.	0.5688	1.0688	.0098	0.2048	0.0561
138 Tri-Continent.	1.1444	2.1150	.0	0.1633	0.0753
139 Van Norman	0.3220	0.6666	.0155	1.2806	0.0
			1960		
140 Alleghany	1.9167	2.6333	.0	1.3787	0.0
141 Armour	1.6750	2.6750	.0202	0.0683	0.0256
142 Atlas	0.2200	0.5500	.0	0.4803	0.0500
143 Gen. Accept.	0.2594	0.8934	.0095	0.3906	0.0761
144 Guerdon	0.1736	0.5664	.0385	0.2519	0.0865
145 Hilton	0.1324	0.7366	.0076	0.1664	0.0485
146 Mack Trucks**	0.3613	1.0380	.0144	0.2000	0.0561
147 Martin	0.7171	1.5157	.0105	0.1099	0.0294
148 Molybdenum	0.7975	1.2830	.0286	0.1657	0.0
149 Pacific Pet.	0.3059	0.5099	.0112	0.0899	0.0
150 Rio Algom	0.1038	0.3454	.0136	0.0456	0.0
151 Sperry Rand	0.3060	0.7650	.0122	0.1237	0.0418
152 Symington W.	0.5063	1.2250	.0110	0.2048	0.0612
153 Tri-Continent.	1.0142	1.9883	.0	0.1633	0.0583
154 Van Norman	0.3485	0.7424	.0190	0.8381	0.0
			1961		
155 Alleghany	2.1500	2.9167	.0	0.3604	0.0046
156 Armour	1.6750	2.6750	.0267	0.1505	0.0299
157 Atlas	0.2100	0.4400	.0	0.4803	0.0
158 Gen. Accept.	0.4375	1.2159	.0107	0.7819	0.0613
159 Guerdon**	0.1340	0.4522	.0714	0.2827	0.0
160 Hilton	0.2872	0.8110	.0084	0.1638	0.0440
161 Mack Trucks	0.5431	1.4021	.0174	0.2048	0.0399
162 Martin	1.0095	1.9582	.0120	0.0333	0.0087
163 McCrory	0.4906	1.0813	.0057	0.8272	0.0416
164 Molybdenum	0.5708	1.0753	.0435	0.1139	0.0
165 Pacific Pet.	0.3816	0.6053	.0130	0.0892	0.0
166 Rio Algom	0.2185	0.4443	.0163	0.0442	0.0
167 Sperry Rand	0.5300	1.0061	.0143	0.1295	0.0
168 Symington W.	0.7625	1.5375	.0127	0.1916	0.0520

Observation	y	x	1/t	d	r
			1959		
128 Alleghany	2.8667	3.6833	.0	1.6522	0.0
129 Armour	1.3792	2.3667	.0163	0.0884	0.1000
130 Atlas	0.4700	0.9600	.0	0.4803	0.0500
131 Mack Trucks	0.5931	1.4877	.0123	0.2061	0.0394
132 Martin	0.6594	1.1531	.0093	0.1220	0.0347
133 Molybdenum	1.0812	1.4833	.0213	0.1657	0.0
134 Pacific Pet.	0.5263	0.6974	.0099	0.2232	0.0
135 Northspan	0.1771	0.3125	.0117	0.0360	0.0
136 Sperry Rand	0.4650	0.9525	.0106	0.1238	0.0336
137 Symington W.	0.5688	1.0688	.0098	0.2048	0.0561
138 Tri-Continent.	1.1444	2.1150	.0	0.1633	0.0753
139 Van Norman	0.3220	0.6666	.0155	1.2806	0.0
			1960		
140 Alleghany	1.9167	2.6333	.0	1.3787	0.0
141 Armour	1.6750	2.6750	.0202	0.0683	0.0256
142 Atlas	0.2200	0.5500	.0	0.4803	0.0500
143 Gen. Accept.	0.2594	0.8934	.0095	0.3906	0.0761
144 Guerdon	0.1736	0.5664	.0385	0.2519	0.0865
145 Hilton	0.1324	0.7366	.0076	0.1664	0.0485
146 Mack Trucks**	0.3613	1.0380	.0144	0.2000	0.0561
147 Martin	0.7171	1.5157	.0105	0.1099	0.0294
148 Molybdenum	0.7975	1.2830	.0286	0.1657	0.0
149 Pacific Pet.	0.3059	0.5099	.0112	0.0899	0.0
150 Rio Algom	0.1038	0.3454	.0136	0.0456	0.0
151 Sperry Rand	0.3060	0.7650	.0122	0.1237	0.0418
152 Symington W.	0.5063	1.2250	.0110	0.2048	0.0612
153 Tri-Continent.	1.0142	1.9883	.0	0.1633	0.0583
154 Van Norman	0.3485	0.7424	.0190	0.8381	0.0
			1961		
155 Alleghany	2.1500	2.9167	.0	0.3604	0.0046
156 Armour	1.6750	2.6750	.0267	0.1505	0.0299
157 Atlas	0.2100	0.4400	.0	0.4803	0.0
158 Gen. Accept.	0.4375	1.2159	.0107	0.7819	0.0613
159 Guerdon**	0.1340	0.4522	.0714	0.2827	0.0
160 Hilton	0.2872	0.8110	.0084	0.1638	0.0440
161 Mack Trucks	0.5431	1.4021	.0174	0.2048	0.0399
162 Martin	1.0095	1.9582	.0120	0.0333	0.0087
163 McCrory	0.4906	1.0813	.0057	0.8272	0.0416
164 Molybdenum	0.5708	1.0753	.0435	0.1139	0.0
165 Pacific Pet.	0.3816	0.6053	.0130	0.0892	0.0
166 Rio Algom	0.2185	0.4443	.0163	0.0442	0.0
167 Sperry Rand	0.5300	1.0061	.0143	0.1295	0.0
168 Symington W.	0.7625	1.5375	.0127	0.1916	0.0520

Observation	y	x	1/t	d	r
			1963 (Cont'd.)		
210 Textron**	0.5245	1.3444	.0039	0.2036	0.0371
211 TWA	0.6000	1.2813	.0083	0.4543	0.0
212 Tri-Continent.	1.5933	2.5373	.0	0.1207	0.0550
213 Univ. Amer.	0.1182	0.4818	.0247	0.4356	0.0
214 Uris	0.8502	1.6341	.0073	0.2442	0.0260
			1964		
215 Alleghany	2.3500	3.0500	.0	0.3344	0.0096
216 Armour	1.7313	2.7344	.0667	0.0447	0.0256
217 Atlas	0.1850	0.3900	.0	0.4764	0.0
218 First Nat. R'lty.	0.1198	0.4912	.0117	0.6655	0.0
219 Gen. Accept.	0.2719	1.0563	.0174	0.2848	0.0521
220 Hilton	0.1073	0.4688	.0120	0.1270	0.0
221 Jeff. Lake Pet.	0.4139	1.1003	.0127	0.2744	0.0358
222 Mack Trucks**	0.3738	1.1380	.0465	0.0956	0.0463
223 Martin**	0.4390	1.1908	.0210	0.0532	0.0510
224 McCrory	0.1969	0.7156	.0071	0.8305	0.0559
225 Pacific Pet.	0.3487	0.6695	.0244	0.0860	0.0
226 Rio Algom	0.0938	0.4064	.0392	0.0442	0.0427
227 Realty Eq.**	0.1784	0.9235	.0116	0.4520	0.0323
228 Sperry Rand	0.2344	0.5474	.0294	0.1267	0.0
229 Bunker Ramo	0.1250	0.5788	.1818	0.0035	0.0
230 Textron	0.8542	1.6479	.0041	0.2249	0.0324
231 Tri-Continent.	1.8593	2.8611	.0	0.1248	0.0327
232 TWA	1.4788	2.3530	.0092	0.4543	0.0
233 Univ. Amer.	0.1864	0.5864	.0351	0.4356	0.0
234 Uris	0.5651	1.3635	.0080	0.2442	0.0374

BIBLIOGRAPHY

The Speculative Merits of Common Stock Warrants, by Sidney Fried. A highly readable account of many aspects of warrants. The popularity of this book is well deserved.

"Speculative Opportunities in Stock Purchase Warrants", by Paul Hallingby, Jr. Article in the Analysts Journal, Third Quarter, 1947 (now the Financial Analysts Journal). This article, with an appended Editor's note is an early attempt to define "correct" price for a warrant. Surprisingly, this line of thought was never carried further.

Investment Opportunities in Convertible Securities, by Helen Jane Stofer, 1938. An unpublished manuscript, Columbia University Business Library. A detailed examination of convertible bond hedges that were possible during the 1930s.

Arbitrage in Securities, by Meyer H. Weinstein, 1931, Harper and Brothers, N.Y. An interesting description of the activities of "pure" arbitrageurs circa 1930. A chapter entitled "Arbitrage in Equivalent Securities" reveals the remarkable fact that warrants in this period very often sold for less than intrinsic value, thereby allowing conventional arbitrage.

A Theory and An Econometric Model For Common Stock Purchase Warrants, by S.T. Kassouf, Doctoral Dissertion completed at Columbia University in 1965. A technical discussion of warrants and their behavior during the period extending from 1945 to 1964. The variables affecting warrant price are discussed in detail and methods for adjusting the norm value with changes in these variables is given in mathematical form. (Available in mimeographed form from Analytical Publishers Company, $10.)

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