

MAINTENANCE OF WORKING
CAPITAL OF INDUSTRIAL CORPORATIONS
BY CONVERSION OF
FIXED ASSETS.

BY

Arthur H. Winakor.

UNIVERSITY OF ILLINOIS BULLETIN

ISSUED WEEKLY

VOL. XXXI

JANUARY 23, 1934

No. 21

[Entered as second-class matter December 11, 1912, at the post office at Urbana, Illinois, under the Act of August 24, 1912. Acceptance for mailing at the special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 31, 1918.]

BUREAU OF BUSINESS RESEARCH

COLLEGE OF COMMERCE AND BUSINESS
ADMINISTRATION

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ARTHUR H. WINAKOR



BULLETIN No. 49

PUBLISHED BY THE UNIVERSITY OF ILLINOIS, URBANA
1934

It is the purpose of the Bureau of Business Research of the University of Illinois—

- (1) to study and as far as possible to explain economic and industrial conditions within the State;
- (2) to direct attention to experience-tested practices of good business management; and,
- (3) to investigate methods for securing the best executive control of business.

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1800—1-34—5021

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PREFACE

During the past few years it was a common experience to read in the newspapers that large companies had dismantled their inefficient plants, or even abandoned them, and had concentrated their work in fewer and more favorably located, more efficient, and newer plants. The financial press was full of the news of losses incurred by corporations, and numerous instances of reduction or stoppage of dividends. From these reports it has been a common inference that many companies, in their efforts to bolster earnings statements, had failed to provide reasonable and necessary amounts of depreciation. And many companies have been, and no doubt are, foregoing what under more prosperous circumstances would be considered needed maintenance of physical assets.

Many writers currently suggest that the capital assets of corporations are rapidly becoming obsolete, and that instead of providing only "normal" depreciation or "normal" maintenance, exceptional charge-offs and rehabilitation of facilities should be made.

These changes, which have drastically affected the physical plant and book values of fixed capital, raise the question as to what the effects of such problems have been upon the working capital. Has the working capital of corporations been maintained, has it been reduced commensurately with changes in fixed assets and present economic needs, or has it been depleted?

The purpose of this study is to shed some light on a few of the problems relating to fixed assets and working capital, although all these problems are intimately related and pertinent to the subject. It is intended to show the extent to which corporations have maintained their working capital position through the operation of a simple economic principle. This principle may be briefly stated as follows: When there is promise of an "adequate" return on the investment, the flow of funds will go to expand capital assets; when economic conditions in any industry are such that an "adequate" return is not forthcoming, new capital will not venture into permanent forms, and if conditions are severe enough, capital in fixed assets will be allowed to revert gradually to a liquid form wherever possible.

The operations of this principle will be related in the following pages primarily to one factor which affects both fixed assets and working capital, namely, the "depreciation fund." Although it is recognized that the same principles apply to several other kinds of "prepaid assets," e.g., prepaid insurance, rent, leasehold, etc., the analysis is not extended to these, partly because the same principles apply to them, and also because they are of lesser importance. In addition, it is in-

tended to restate and emphasize some generalizations as to the relationship of the "depreciation fund" to fixed assets and to working capital, and possibly to suggest what types of concerns have greater "survival" power, or resistance to the onslaughts of depression.

The study is based on the years 1927 to 1932 inclusive, thus covering both "prosperity" and "depression." Although considerable space and emphasis are given to the facts as produced in depression years, this should not be construed as indicating that the principles and generalizations apply only to depression. In fact, they are of universal applicability either in prosperity or in depression. The "depression" period has merely accentuated their operations and made it easier to analyze and see the facts involved.

Grateful acknowledgment is made to Dr. Daniel Borth for helpful suggestions at the inception of the study, to Professor A. C. Littleton for constructive criticism throughout the course of the investigation, and to Professor P. H. Brown for reading the completed manuscript.

Members of the Bureau staff, particularly Joseph Cerny, R. C. Parmelee, and C. F. Dunham, assisted in the assembling and preparation of the material.

ARTHUR H. WINAKOR

January, 1934.

TABLE OF CONTENTS

	PAGE
I. PREMISES OF THE PROBLEM	7
II. CHANGES IN AMOUNTS AND RELATIONSHIPS OF FIXED ASSETS, DEPRECIATION, AND WORKING CAPITAL . .	20
A. Changes in Value of Capital Assets and Depreciation Policies	21
B. Depreciation Earned, Recovered, and Fixed Assets Converted into Working Capital	26
C. Analysis of Working Capital	31
III. CONCLUSION	39

I. PREMISES OF THE PROBLEM

The study which is here presented is an analysis of the shifting of assets from fixed capital into working capital.¹ It is intended to show the importance of conversion of fixed assets in ordinary business operations as a means of enabling corporations to maintain their working capital. In addition, some attention is given to the items of cash and marketable securities, and to their relationships to the working capital. The study is based on published corporate statements for 182 companies from 1927 to 1932 inclusive.

The explanation of the problem may be approached by the statement of some simple business propositions. In a fundamental sense the business man may be viewed as engaged in making outlays of funds for various kinds of assets. Some of these outlays are of short duration; i. e., they expire quickly and are soon recovered by sale. Others are more durable; they neither expire quickly nor are they soon sold. As a whole the assets of a corporation gradually shade from the least fixed—cash—to the most fixed, such as land. Between these extremes are various gradations of liquidity and fixity in assets. In other words, "fixed" and "current" are relative terms.

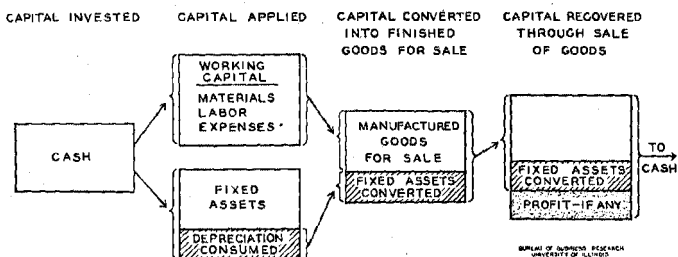
Outlays of short duration are inventories, productive labor, insurance, and the like, which soon appear in the final product—goods or services for sale. Outlays of long duration are buildings, machinery, and leaseholds, which do not appear in the final goods or services except "indirectly." As these "fixed" assets are used in production to create services or salable products, a certain value is transferred from the fixed to the current, or to working capital.

In other words, a certain amount of the fixed assets has expired in production and reappeared in the finished goods which have been created. Fixed assets have expired in part—tentatively this expired portion may be related to depreciation; current assets and working capital, on the other hand, have been increased in some degree from the product created by fixed assets.

The assets of a business may thus be considered as outlays which have been incurred, and which ultimately must be recovered in the sale price of the goods sold to enable the enterprise to "break even." The ability of the company to do more than recover these outlays for the cost of all long- and short-lived properties will determine its ability to earn a profit. Failure to recover them will result in loss.

¹Unless otherwise stated, the term "working capital" is used here and throughout this study in the ordinary sense, i. e., the excess of current assets over current liabilities. In this way changes due to short term borrowings, trade accounts, and the like, are eliminated.

The accompanying diagram illustrates the flow of capital of an enterprise in a somewhat simplified manner. Here the enterprise has its capital in cash before the commencement of operations. The cash is then applied to the purchase of two broad classes of goods and services. One of these is acquisition of materials, labor, and supplies, as well as certain other direct expenses. These constitute part of the working capital. The other class of goods consists of machinery, buildings and the like. A flow of products is established. Through the service of the fixed assets the working assets are processed and



GRAPHIC FLOW OF FUNDS, ILLUSTRATING THE CONVERSION OF FIXED CAPITAL INTO WORKING CAPITAL AND INTO CASH

enhanced in value. Presumably in a short period of time, such as a year, all the working capital processed, but only a part of the fixed assets, passes into goods for sale. A certain portion of the fixed assets has changed its nature, and instead of being fixed has been converted into working capital. It appears in the finished product. In the accompanying chart these transferred or converted fixed assets are labelled "fixed assets converted."

The final step in the operations is to sell these goods, thus eventually transforming them into cash, with perhaps another intervening step, the collection of accounts receivable. In the diagram this is illustrated by "capital recovered."

With the recovery of the outlays in cash, the transformation cycle is ready for renewal. Cash is then applied to the purchase of new raw materials, labor, expenses, and the like. Certain expenditures may be made to repair and maintain the plant. Perhaps the problem will arise as to whether the plant is large enough; perhaps it may be too large.

It should be noted that the working capital of the enterprise was increased from two different sources. It was enhanced by the amount of the profit, if any. But more important in this study, however, working capital was increased by the amount of value transferred from

fixed assets into salable goods,—that is, by the depreciation productively consumed, converted into goods sold, and recovered in the sales price.

Premises and Generalizations

The remaining pages in this chapter are devoted to a discussion of the conditions underlying the conversion of fixed assets, and to the statement of basic generalizations. Although some of these ideas are drawn from and based upon facts which appear in later sections of the study, they are presented at this point because it is believed that they will enable the reader to grasp the problem more readily and to understand better the facts presented later.

The question arises, "What should be done with the fund converted from fixed assets into working capital?" The answer will, of course, be dependent upon many factors, such as age of plant and machinery, profitableness of operations, managerial policies for the future, and the like. It involves the broad problems of proportionality, not only proportionality as between fixed assets and working capital, but also as among the various kinds of current assets and among the various kinds of fixed assets.

The amount of working capital which will be needed to provide a proper relationship for a given investment in fixed assets is dependent upon many factors. Among these may be enumerated the price level, the rate of industrial activity, the length of the production cycle, the policies of companies in financing their creditors, their terms of sale, their policy of financing themselves, the present and prospective needs of business, etc.

The price level is, of course, one of the most important factors, and has been a particularly disturbing element during the depression and at the present time. The lag in prices and values between various assets provides a fluctuating and disturbing intermediary in corporations' finances. Current assets, particularly inventories and receivables, feel the influence of price changes. Cash changes in its command over other goods, commanding either more or less of them. Current assets and working capital for the most part have a turnover cycle of substantially less than one year. Since these are currently being converted into new goods or cash, their values will quickly adjust themselves to changes in market prices.

Not so with fixed assets. Fixed assets are generally built or acquired over a period of years; and the extent to which the cost values of fixed assets lag behind changes in the value of the dollar is fairly well related to the life of the asset. Cost values of fixed assets cannot be quickly brought into harmony with dollar changes, except by arbitrary revaluations. Only as they are consumed as depreciation and replaced by reinvestment of the depreciation fund or by new invest-

ments, can their cost value and the value of the dollar be brought into agreement.

In times of rising prices, or even of increasing activity without rising prices, working capital requirements for inventories, receivables, etc., may and generally do increase more rapidly than fixed asset requirements. In such circumstances additional funds must be injected into the working capital stream, and these must come largely from borrowing or stock sales, unless the company is fortunate enough to have considerable cash or "cash assets," or is able to wait until the necessary funds are provided by accumulation of profits.

On the other hand, in a period of falling prices and/or a period of declining industrial activity, requirements for both fixed assets and circulating capital will decline. In such circumstances, there will be a liquidation of assets into cash. The liquidation of current assets will, of course, be much more rapid than that of fixed assets. Unless heavy losses are incurred, debts paid off, or large unearned dividends and interest paid, corporations will find themselves with increasing amounts of cash on hand.

In times of prosperity funds are readily obtained by most corporations, either to provide fixed assets or to replenish working capital, or for both purposes; and it is therefore relatively easy to adjust the relationship of working capital and fixed assets to one another and to proportion the various subdivisions of each as desired. New securities are easily sold when corporations are operating profitably.² Furthermore, in such times, reinvestment of retained profits in the enterprise provides an important source of new corporate capital.

But when depression makes retrenchment the order of the day, the proper proportionality of productive facilities to working capital may be seriously disturbed. Operating and other losses, deterioration, obsolescence and depreciation of inventories, unwise investments, etc., deplete the working capital. Investments in fixed assets, which were greatly expanded in boom times, become excessive in view of readjusted needs and current decreases in purchasing power. Not only are there wastes due to excessive facilities, but the burdens of taxes and

²At the end of the period of prosperity culminating in 1929, corporations found themselves in possession of what many of them considered ample working capital. In fact, many were able to become independent of bank loans and possessed of surplus funds to invest in securities or "in the market." Through the accumulation of retained profits over several years, these corporations built up large surpluses which enabled them to distribute liberal dividends, both in cash and in stock. Whereas industrial corporations had been able to sell new capital issues to the amount of \$1,897,000,000 in 1929, by 1932 this had declined to \$17,000,000 (data from the Annual Summaries of the *Commercial and Financial Chronicle*). Profits earned and surplus available for reinvestment in numerous cases showed even more drastic declines, so that instead of increasing working capital, they reduced it. Industrial earnings of the 182 companies studied here declined from \$1,756,099,000 in 1929 to a loss of \$135,344,000 in 1932.

of the continued maintenance and repair of these fixed assets wipe out profits entirely and deplete the liquid assets.

The pressure in times of depression thus falls almost entirely upon working capital, since fixed assets are not readily susceptible to sale or change into more liquid forms to meet the new conditions. Not only do certain losses deplete the working capital, but contractual claims, in the form of interest, preferred dividends, payments of bond and note principal, and the like may drain off the liquid funds. The pressure of all these varied and insistent demands may thus lead not only to efforts to maintain working capital relative to fixed assets, but also to endeavors to conserve it for future contingencies.

The financial problem, however, is still one of proportionality. But now good proportionality of assets requires an adjustment downward of the values of unneeded capital assets and a stabilization of working capital adequate to present and prospective needs. Many corporations can hope to tide themselves over such situations only by conservation of working capital, and by the conversion of capital into forms more useful for immediate needs through productive consumption of fixed assets and the sale of goods manufactured, but without a full replacement of fixed properties thus consumed.

It has been surprising to find that many corporations have maintained dividends, either in full or at reduced payments, although they have had small or no earnings, and have obtained no outside funds, and yet have maintained or increased working capital through the normal operations of the enterprise.

Although this phenomenon cannot be attributed to any single cause, one of the important, if not the most important, explanations is to be found in the conversion of capital from fixed asset forms³ into working capital. This conversion of fixed assets into working capital has largely occurred through operations whereby fixed assets have been productively consumed in producing inventory.

The extent to which the fixed capital may be converted into working capital depends largely on competitive conditions and on the ability of the corporation to "earn" its depreciation, i.e., upon the question of

³The terms "fixed assets" and "capital assets" are here used to include plants, machinery, buildings, leaseholds, patents, and all other items in which a prepaid value is converted into products over a period of several years. This would exclude goodwill, which does not enter into cost of production and cannot be changed in value except by unusual acquisitions, write-ups, or write-downs. Land is in the same category as goodwill in this respect: it does not depreciate physically nor expire from passage of time. The corporation with such assets should have some differential advantage over those renting land or not having goodwill. This differential should be convertible into working capital, since the firm having owned land or goodwill presumably will report more "profit" than its competitors. This extra "profit" is the differential or rent.

In Part II of this study "fixed assets" is used in the usual narrow meaning of buildings, machinery, and the like.

whether the sale price is sufficient to cover all costs including "normal" depreciation. That this concept is known to business executives is indicated by the common expression that it is better to operate at a loss than not to operate at all, if thereby part of the fixed charges—notably depreciation—can be earned in whole or in part. Depreciation of fixed assets is, of course, a measure of the fixed asset value expired, but it is not a measure of the fixed assets converted into working capital, except under ideal conditions.

As illustrated in the following pages, there are at least three situations which may arise in the operations of a corporation with respect to its conversion of fixed assets.⁴ In one of these the company will show net earnings (or at least have no net loss). In such a situation depreciation is usually considered to be earned or recovered⁵ and converted into working capital; if no other changes occur, working capital may be considered to have been increased by an amount equal to the depreciation (in addition to profits, if any).

In the second situation, the company incurs a loss from its operations (i.e., before providing for interest and dividends), but the loss does not exceed the depreciation. Under such circumstances there need not be a loss of working capital. In other words, the amount of depreciation could reduce fixed assets, but if fixed assets expired are converted into working capital, this will offset the loss of working capital due to operations.

In the third case the loss exceeds the depreciation. Under such conditions the working capital could decrease to the extent by which the loss exceeds the depreciation. The fixed assets could be reduced by the full amount of depreciation, and the remainder of the loss could appear as a reduction in working capital.

In order to aid in a clearer presentation of the problem and to explain the situation involved, a few abbreviated illustrations have been inserted. Although greatly simplified and omitting many of the factors which enter into actual financial operations, they present the case

⁴Here and throughout the study the corporation is considered as an entity in which the capitalization is a secondary matter. That is, the corporation may obtain all its capital from common stocks, or stocks and bonds, etc. In the long run a return must be earned by the corporation to pay interest on bonds (if any) and to pay dividends on stocks. Whether the cost of capital shall take the form of interest or dividends is a matter of financial policy. The term "net earnings" is used to mean the net corporate income, i.e., income available for distribution among security holders of all kinds.

⁵"Earned depreciation is depreciation for which compensation has been received through revenue." E. A. Saliers, *Depreciation Principles and Applications* (The Ronald Press Co., New York, 1923), p. 51.

"Recovered depreciation," is that part of the depreciation which may not have been earned, but which was made good or replaced in the corporate funds by earnings from other sources or other operations. That is, in such cases there are sufficient earnings to compensate for the unearned depreciation.

in a clear manner.⁶ Each of the three situations enumerated above is analyzed in the following pages. In addition numerous supplementary factors are discussed in their relationships to the entire problem.

Assume a corporation whose financial condition is as follows as of January 1, 1929, and whose operations for the year are as shown.

Illustration No. 1
Company A, January 1, 1929.

Current Assets.....\$100,000 Fixed Assets..... 100,000 <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> <p style="text-align: right;">\$200,000</p>	Current Liabilities.....\$ 25,000 Common Stock..... 125,000 Surplus..... 50,000 <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> <p style="text-align: right;">\$200,000</p>
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Profit and Loss Statement, January 1, 1929 to December 31, 1929

Sales.....	\$225,000
Operating Costs (other than depreciation).....	\$190,000
Depreciation @ 10% on 100,000.....	10,000
	200,000
Net Earnings.....	\$ 25,000

A "balance sheet"⁷ prepared at the end of the year, after taking into consideration the changes due to operations during the year, might conceivably look like this below.

Illustration No. 2
Company A, December 31, 1929

Current Assets.....\$135,000 Original Amount..\$100,000 A. From Profits... 25,000 B. From Converted Fixed Assets (depreciation) 10,000 <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> Fixed Assets..... 90,000 Original Sum..... 100,000 Less Depreciation 10,000 <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> <p style="text-align: right;">\$225,000</p>	Current Liabilities.....\$ 25,000 Common Stock..... 125,000 Surplus..... 75,000 Original Sum.....\$50,000 Net Earnings..... 25,000 <hr style="width: 80%; margin-left: auto; margin-right: 0;"/> <p style="text-align: right;">\$225,000</p>
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⁶Certain writers on finance and accounting have analyzed a few of the factors of depreciation and working capital, but few of them appear to have seen the full implications or possibilities of these simple operations. One of the clearest expositions is contained in *Principles of Accounting* by W. A. Paton and R. A. Stevenson, (Macmillan Company, New York, 1920), pp. 497-505. A less adequate discussion is to be found in *Depreciation Principles and Application* by E. A. Saliers (The Ronald Press, New York, 1923), pp. 15-18. Both these books contain illustrations similar to Number 2 given in accompanying pages. A clear accounting presentation, although accompanied by little or no explanation of its financial implications, is to be found in H. A. Finney, *Principles of Accounting* (Prentice-Hall, Inc., 1931), Vol. I, Ch. 25, p. 16.

⁷This is really a crude statement of application of funds rather than a true balance sheet.

On January 1, 1929, the company had a working capital of \$75,000 (Current Assets of \$100,000 minus Current Liabilities of \$25,000), whereas on December 31, 1929, the working capital was \$110,000. The increase in working capital would be attributable entirely to the earnings of \$25,000 and to the conversion of \$10,000 from fixed into working capital. In other words \$10,000 of fixed assets (depreciation) was charged into the cost of goods sold, and the sale which later took place completed the conversion of just that much fixed assets into current assets.

The situation just presented, in which the depreciation converted is all held in current assets, does not picture the actual conditions of healthy corporations in normal times. What would ordinarily happen would be that the \$10,000 "depreciation fund" would be reinvested in new fixed capital, betterments, or other needs which might arise. In that case working capital might stand at \$100,000, and fixed capital consist of \$110,000 gross value less \$10,000 depreciation, giving \$100,000 as net value. Thus the fixed capital would be replaced and maintained intact at its original value through reinvestment of the depreciation recovered.

Under depression conditions, however, many corporations reinvested only a part of this "depreciation fund" in replacing units of fixed capital. With demand for goods and services in a state of depression, it might well be unwise for corporations to reinvest the annual "depreciation fund" in fixed capital, for to do so would be to extend still further the existing over-capacity. They could convert fixed capital into working capital in the usual way, and then decline to reinvest that working capital in fixed capital.

It is also possible that in many companies the increased purchasing power of the dollar during depression made it possible to reinvest only a portion of the "depreciation fund" and still fully maintain productive capacities. In many companies, the very fact that the price level was declining has been a deterrent from the reinvestment of the "depreciation fund," since it seemed possible for a time that the plants might be replaced at even lower costs in the future if prices should continue downward.

Certain industries may have reached a static state; with them the problem is merely one of maintaining the capital intact rather than of providing for expansion out of profits. An even more extreme case is presented by a hydro-electric company or a coal mine. In the former the dam is the greatest investment, and ordinarily cannot be expanded or replaced except all at once. It is therefore necessary to accumulate the depreciation fund until there is need for replacement of the old dam or for an additional plant or other properties. The coal mine extracts its fixed ore reserves, and if the company does not purchase

new acreage, it will have excess liquid funds on hand which may be distributed as capital.

It would appear that, although the conversion of fixed assets into working capital operates at all times and in all industries in varying degrees, the extent to which this "depreciation fund" is reinvested in new fixed assets is subject to many conditions. Thus in times of prosperity practically all industries may reinvest this "fund" in new fixed assets. In times of depression, many of them may not. Even when most industries are "prosperous" and feel the need for reinvestment of funds, certain groups may not. Likewise certain companies within each industry may be faced with declining demand for fixed asset facilities, at a time when the other units in the industry may be expanding, or at least reinvesting funds in fixed assets. Furthermore, certain companies, and certain industries, even in prosperous times, because of the nature of their assets may find it desirable not to reinvest the "depreciation fund" in fixed assets.

Illustration No. 2 assumed that the returns from sales were sufficient to cover full depreciation. But what will be the effect upon working capital and fixed assets if the depreciation is not "earned," or if the company reduces the amount charged to cost as depreciation, in an effort to bolster "profits" or reduce "losses"?

Return to the example of Company A, and assume that the balance sheet is the same as given in Illustration No. 1 for January 1, 1929. Let it be assumed, however, that the company is able to sell its goods for only \$190,000, and that \$10,000 is the fair "normal" depreciation.

Illustration No. 3

Profit and Loss Statement January 1, 1929, to December 31, 1929

Sales.....		\$190,000
Operating Costs (other than depreciation).....	\$190,000	
Depreciation.....	10,000	200,000
<i>Net Loss</i>		<u>\$ 10,000</u>

The financial condition on December 31, 1929 might then conceivably be:

Company A, December 31, 1929

Current Assets.....	\$100,000	Current Liabilities.....	\$ 25,000
Original Sum.....	\$100,000	Common Stock.....	125,000
<i>Net Loss</i>	10,000	Surplus.....	40,000
Fixed Assets Con- verted (Depreci- ation).....	10,000	Original Sum.....	\$50,000
		<i>Net Loss</i>	10,000
			<u>\$190,000</u>
Fixed Assets.....	90,000		
Original Sum.....	100,000		
Depreciation.....	10,000		
	<u>\$190,000</u>		

Fixed Assets have declined by the amount of depreciation charged and not reinvested (\$10,000), and surplus has declined by the loss of \$10,000. There has been a loss of capital of \$10,000 and an equal shrinkage of Net Worth. This loss may have come entirely out of working capital, but by not renewing fixed capital, the working capital receives \$10,000 from fixed assets, which offsets the net loss of \$10,000 so far as working capital is concerned. Therefore, although there has been a net loss of \$10,000, the working capital has remained the same as at the first of the year, namely \$75,000.

On the other hand, the loss may be attributable in part or in whole to ineffective fixed capital. If the fixed assets are greatly overvalued in relation to present day replacement costs, competition of concerns with new, and therefore low cost, plants may make it impossible for the company with old fixed assets, or even relatively new fixed assets which are of high cost, to earn its depreciation. It is immaterial at this point, however, which situation holds true for this illustration. In either event, the books of the corporation show a loss of \$10,000, either from working capital which has been made good by conversion of fixed assets, or of fixed assets which have neither been made good nor converted, or, as is more likely to be the actual situation, partly because of partial loss of working capital made good from fixed assets and partial loss of fixed assets not converted or replaced. Regardless of which situation occurred, fixed assets might conceivably decline by the full amount of the loss, and working capital still be maintained, for the decline of fixed capital would offset any loss of fixed capital or working capital, or both.

Another situation to be illustrated assumes that "normal" depreciation was \$10,000, but that, in an effort to bolster profits, the corporation recorded only \$5,000 in the accounts as depreciation. Start again with the original balance sheet⁸ as of January 1, 1929 (Illustration No. 1) and assume that the company was able to sell its goods for only \$190,000 (as in Illustration No. 3). The results then would be:

Illustration No. 4

Profit and Loss Statement, January 1, 1929, to December 31, 1929

Sales.....		\$190,000
Operating Costs (other than depreciation).....	\$190,000	
"Depreciation".....	5,000	195,000
"Net Loss".....		\$ 5,000

⁸It will be recalled that this showed Current Assets of \$100,000, Fixed Assets of \$100,000, Current Liabilities of \$25,000, Common stock of \$125,000, and Surplus of \$50,000.

Company A, December 31, 1929

Current Assets.....	\$100,000	Current Liabilities.....	\$ 25,000
Original Sum.....	\$100,000	Common Stock.....	125,000
"Net Loss".....	5,000	Surplus.....	45,000
From Converted		Original Sum.....	\$50,000
Fixed Assets		"Net Loss".....	5,000
("Depreciation")	5,000		
Fixed Assets.....	95,000		
Original Sum.....	100,000		
"Depreciation"....	5,000		
	<u>\$195,000</u>		
			<u>\$195,000</u>

A comparison of this balance sheet and the one on page 15, (Illustration No. 3) reveals the effect of manipulating the depreciation. In both these illustrations all the facts and assumptions were identical with the exception of the depreciation charged. In both instances the working capital is exactly the same, namely, \$75,000, showing that neither the failure to charge proper depreciation nor the charging of excessive depreciation changes the working capital from what it would otherwise be.

In this example the working capital was maintained intact and was unaffected by manipulations in the amount of depreciation recorded in the accounts. The overstatement or understatement of depreciation did not affect working capital, nor did it affect the amount of fixed assets which could be converted into working capital. The determining factors here were the sales price and the competitive conditions which might or might not permit the earning of depreciation.

The manipulation of the depreciation, however, does have some other direct and indirect consequences. It results (in the illustration used) in the overstatement of both fixed assets and profits by \$5,000. Since both the surplus and profit are made to appear \$5,000 larger than they would otherwise have been, there may be greater temptation to pay dividends because of this showing. The consequences of such understatements of depreciation may therefore be the payment of unwarranted dividends and a commensurate depletion of working capital. This may amount to a virtual payment of dividends out of fixed assets, since, in many cases of this kind, no dividend would be paid if the working capital were not replenished by conversion of fixed assets.

The financial practice of revaluing fixed assets has as yet been given little or no attention in this discussion. Nevertheless it is closely related to Illustrations Nos. 3 and 4. In comparing these two examples, it was stated that failure to state depreciation accurately did not directly affect working capital or the conversion of fixed assets into working capital. Similarly, the revaluation upward or downward

of fixed assets may alter the amount of depreciation charged in the accounts, but it does not affect the conversion of fixed assets, or the current assets or liabilities, as was shown in Illustrations Nos. 3 and 4. Of course, it changes book profits and surplus, and makes a material difference in the amount of funds which needs to be reserved for renewal or replacement of fixed assets.

From this last illustration the conclusion may be drawn and the principle stated that: The manipulation of depreciation charged or the revaluation of fixed assets—which indirectly accomplishes the same thing—does not directly change the amount of working capital, or the amount of the “normal” depreciation which can be earned and converted into working capital, except in so far as the overstatement (or understatement) of fixed assets, profits, surplus, etc., may result in an unwarranted distribution of the working capital as dividends or its dissipation in other ways.

As has been intimated several times in the preceding discussion, it is quite obvious that not all the depreciation will necessarily be converted into working capital. Some of it may be, and doubtless will be, lost. Some companies with several plants may abandon the less efficient for the time being, with the intention of using them again when production needs warrant. In such instances the depreciation will be a charge against the company's earnings. It is doubtful if such depreciation can be considered a cost of operations to be applied to the product produced in other plants. The plant is not earning its keep—the depreciation is unearned and is not converted directly into working capital. Somewhere in the profit and loss statement, however, the accountant will show depreciation on idle plants. He will consider that there has not been any profit earned unless depreciation on idle plant has been covered. Thus sufficient funds will be retained in the business to make good this lost depreciation. Perhaps these funds will come from the earnings of some other plants, but this issue is immaterial at this point. The net result of the accountant's actions (and also the intent of the economic principles of business) is to recover this depreciation as long as there are any earnings. Obviously, if the depreciation on idle plants is “recovered” by offsetting it against earnings from other plants, it may be retained in working capital instead of being reinvested in fixed assets where it is not needed.⁹

Whether the depreciation is fully earned or partly earned, however, it affords a powerful buffer in certain of those industries in which depreciation is a large item, in offsetting losses which might otherwise fall directly upon working capital, and in maintaining working capital. In those industries in which depreciation is large relative to working

⁹Several other interesting situations may arise in the problems of ascertaining how much depreciation is earned and converted into working capital, but space does not permit their discussion.

capital, even though only part of it is converted and transferred to working capital, this flow to working capital may aid in maintaining it against drains from inventory shrinkage, interest payments, certain operating losses (other than those due to fixed asset expiration), and the like. Similar operations may occur in those industries in which depreciation is relatively smaller compared with working capital, but in which most of it is converted and transferred to working capital.

II. CHANGES IN AMOUNTS AND RELATIONSHIPS OF FIXED ASSETS, DEPRECIATION, AND WORKING CAPITAL

The material in this part of the study provides a definite linking of a quantitative sample of data with the generalizations already made. In a sense, it provides a demonstration of the statements made in the first section, and affords a rough measure which enables one to judge the reasonableness of these ideas and the extent to which they hold good. However, the data afford much more than this—they provide a quantitative picture of some fundamental corporate policies and results of operations.

The data used in the following pages are based upon the financial statements of 182 companies operating in 16 different industries from 1927 to 1932 inclusive. As will be noticed in the tabulation, the number of companies in the different industries varies considerably. Companies were selected which had published reasonably complete financial data for each of the years studied. The group of corporations analyzed was identical throughout the period. Naturally this criterion restricted the sample of data. It should also be noted that for the most part the companies used were the larger and stronger enterprises. Obviously, they cannot be considered as fully typical of the respective industries, but the data doubtless do demonstrate the general trends in each.

List of Industries Studied and Number of Companies

<i>Industry or Product</i>	<i>Number of Companies</i>
Agricultural Implements.....	5
Amusements & Supplies.....	12
Apparel.....	11
Automobiles.....	14
Aviation and Auto Accessories.....	17
Can Manufacturers.....	2
Cement & Cement Products.....	5
Chemicals.....	12
Coal & Coke.....	12
Copper Mining.....	11
Cotton (textiles).....	7
Food Products (biscuit, bread, and bakeries).....	8
Machinery & Tools.....	23
Petroleum.....	16
Railway Equipment.....	9
Steel.....	18
Total.....	182

A. Changes in Value of Capital Assets and Depreciation Policies

Since the flow of funds in the process of conversion is from fixed assets to working capital, the analysis deals first with fixed assets and depreciation; second, with an appraisal of what portion of fixed assets (depreciation) is converted; and third, with the relationship of the converted fixed assets to the working capital. This section is largely concerned with the fixed assets and changes which have taken place therein. The other topics follow in sections B and C.

In order to convert fixed capital into working capital and to retain it in the form of working capital, there must of necessity be a reduction in the value of these assets due to their consumption in production,—in other words, a transfer of value from fixed to working capital. Furthermore, it is ordinarily impossible for the value of fixed assets to decline greatly because of failure to reinvest the "depreciation fund" for a period of more than two or three years, except in certain industries or under certain conditions such as are discussed below. The discussion which follows affords an explanation of why fixed assets have declined in certain industries and under recent conditions.

There are certain industries in which large fixed assets are a normal situation. The coal company, copper company, oil and gas producing company, hydro-electric plant, etc., are examples in which it is the usual situation to find large fixed assets which greatly exceed present needs, or even near-future needs. Ore reserves, oil-productive lands, water sites and large water dams must be purchased or built to care for present and for distant future needs. After the necessary outlay has once been made for properties, there is always the discretionary problem of how much should be, and even can be, reinvested in fixed assets as the old wear out or are depleted.

On the other hand there are other industries in which the whole investment in fixed assets is used more directly and immediately in production, and fixed assets do not need to be acquired or constructed for many years in the future, but only for the reasonably anticipated normal near-time growth. In this latter case the buildings and machinery are unlike the ore reserves in that they depreciate rapidly whether used or not used. In these industries an important factor determining the extent to which the depreciation may be converted into working capital and not reinvested in fixed assets is the extent to which the capacity of the plant is used. A great deal of idle capacity provides an excess margin of fixed assets, some of which may not need to be maintained in repair, or replaced at all.

A great many other situations must be considered as determining the ability of the company to convert fixed assets into working capital and its ability and willingness to refrain from expending them or reinvesting them in fixed assets. One of these is the age of the plant at

the beginning of this policy, or at the time when capacity becomes excessive. A relatively new plant can be allowed to depreciate for several years without the heavy repairs or replacements which would be found essential to maintain an old plant at full efficiency. Not only is there considerable leeway for the management of a new plant, but likewise in the case of an old plant which has been kept in a high state of efficiency and repair, the properties may be allowed to depreciate for several years without unusual outlays, thus permitting the liquidation of fixed capital into working capital.

There are always, however, certain plants and machines which are at the border line; they are still useful, but are approaching the point of replacement, either because of old age and usage, or because of obsolescence, or for both reasons. Frequently the policy of the management will be to allow such a plant to go unrepaired, except if it is absolutely essential, with the idea of replacing the entire plant or large parts thereof in a wholesale fashion later. Here depreciation may greatly exceed outlays until replacement is made.

The price level is also a powerful consideration with business men in relation to their policies of replacements. When prices are declining, and as long as the future holds forth possibility for further declines, corporations will and do hesitate to venture liquid funds into permanent forms. It is conceivable that a company could have set aside reserves for depreciation on a plant, which, had they been retained in a fund, would have been more than ample to replace it. The unused portion of the "depreciation fund" might in this case become a permanent part of working capital, or be available for distribution among investors, if not needed for operations.

In addition to the factor of normal capacity as compared with output, there is the question as to what will be the future potential demand for this product or similar products. If the future demand will continue small relative to present plant capacity, part of the plant probably should not be replaced or repaired. If demand in the future is likely to be on a greater scale than present demand, then the capacity now idle may well be maintained for future needs.

It does not require a great deal of proof to conclude that there is and has been in most industries a substantial excess of productive capacity over present operative needs. The excess, however, varies widely from industry to industry.¹⁰

Certain industries such as automobile production, manufacture of locomotives, mining of copper, steel and iron, etc., suffered drastic declines in operations during the depression. Others, e.g., textiles,

¹⁰See *Conference Board Bulletin* (National Industrial Conference Board, Inc.), January 20, 1933, Vol. VII, No. 1; also "Industry Control and Obsolescence," *The Business Prospect* (Standard Statistics Company, Inc.), June 28, 1933, Vol. 38, No. 38.

TABLE I
RELATIVE CHANGES IN THE NET BOOK VALUES OF FIXED ASSETS OF 182
CORPORATIONS IN 16 INDUSTRIES, 1927 TO 1932

Industry	Book Value 1927 (000 omitted)	Relative Numbers (1927 = 100)				
		1928	1929	1930	1931	1932
Total.....	\$9,183,858	103	108	112	110	104
Agricultural Implements.....	147,414	110	124	125	124	120
Amusements and Supplies.....	180,920	122	170	195	196	177
Apparel.....	47,070	93	96	97	88	67
Automobiles.....	624,816	105	113	107	99	89
Aviation and Auto Accessories.....	120,150	113	136	134	127	101
Can Manufacturers.....	139,043	113	123	131	136	130
Cement and Cement Products.....	126,742	108	107	104	101	97
Chemicals.....	261,089	108	120	131	124	123
Coal and Coke.....	369,734	102	104	103	101	97
Copper Mining.....	923,691	98	102	101	100	101
Cotton (textiles).....	85,220	99	98	95	91	88
Food Products.....	205,979	110	114	114	112	102
Machinery and Tools.....	133,370	103	106	108	106	92
Petroleum.....	2,870,031	104	114	120	114	104
Railway Equipment.....	221,760	100	100	98	99	93
Steel (Bethlehem and U. S.).....	2,187,762	97	91	100	101	99
Steel (Others).....	539,067	108	114	121	124	121

petroleum and petroleum products, have had relatively moderate reductions in their volumes of operations.

In a general way, one would expect that those industries which are most excessively provided with productive facilities would be the very ones to show the greatest liquidation in their fixed assets. A close or direct relationship is not necessarily to be found, however, since many other important considerations enter into the determination of such important policies as the investments in fixed assets.

As shown in the accompanying table (No. I) there are wide differences from industry to industry. The 182 companies had fixed assets of \$9,184,000,000 in 1927. Between the end of 1927 and 1930 they increased by 12 per cent, and since then have declined, so that the net value of these assets was only 4 per cent larger in 1932 than in 1927; that is, if the 1927 value is taken as equal to 100, the 1932 fixed assets stood at 104.

The peak for all these industries as a group was about 1930, with a relative number of 112. Specific industries which reached their peak at or about this time are Agricultural Implements, Chemicals, Foods, Machinery and Tools, and Petroleum. Most of them reached their peaks in fixed asset investments either before or after 1930, although this is apparently the "average" for all. All the industries showed smaller investments in fixed assets in 1932 than in 1931, except Copper Mining, although four showed increases in 1931 over 1930. The year 1929 was the most common peak year, with 1930 next.

Certain industries show unusual trends. By 1931 Amusements had

increased to 196 per cent of the 1927 figure.¹¹ The two Can Manufacturers increased from 100 in 1927 to 136 in 1931, and then declined to 130 in 1932. At the opposite extreme was the Apparel industry, which declined irregularly from 100 in 1927 to 67 in 1932.

An adequate picture of the trends and basis for conversion of fixed assets cannot be obtained without giving consideration to the unusual changes therein, such as revaluation due to appreciation, reappraisal downward, and the like. These latter items, write-ups and write-downs, play a significant role in explaining certain changes noted in the preceding table.

Thus from 1928 through 1932 nearly one billion dollars was written off by the companies studied. An amount equal to about one-tenth of this item constituted write-ups during the same period. The combined changes in all industries are shown below year by year.

	"Write-Ups"	"Write-Downs"	Net Change
1932.....	\$ 3,307,000	\$302,844,000	\$299,537,000
1931.....	22,252,000	309,685,000	287,433,000
1930.....	26,372,000	28,573,000	2,201,000
1929.....	5,594,000	139,195,000	133,601,000
1928.....	28,121,000	114,456,000	86,335,000
Total.....	\$85,646,000	\$894,753,000	\$809,107,000

The write-ups amount to .9 per cent of the net fixed assets as of 1927, the write-downs, to about 9.7 per cent, and the net figure of \$809,107,000 is 8.8 per cent of the total fixed assets. If this net figure is added to the fixed assets as of 1932, the relative number in Table I for the total becomes 113 instead of 104. This is a material difference. Each of the other years, of course, would likewise be much higher.

Certain industries largely account for most of the changes. Petroleum companies accounted for about one-half of all such changes. The net write-offs constituted about one-seventh of the 1927 fixed assets of Petroleum companies. Other industries which show material changes are Apparel, in which the relative number for 1932 becomes 97 instead of 67 as given in Table I; Aviation and Automobile Accessories, 123 instead of 101; Chemicals, 142 instead of 123; Machinery and Tools, 100 instead of 92; Petroleum, 119 instead of 104.

Directly related to the fixed assets are the depreciation charges made thereon. The charges for depreciation are both dependent upon and determine the fixed asset values. Depreciation is a crude measure of the change in value of fixed assets; a certain portion of deprecia-

¹¹In certain companies and industries, fixed assets (as well as other balance sheet items) increased because of absorptions, mergers and the like. Wherever possible, an effort was made to eliminate the effects of such changes from the data. Thus if a small company was absorbed in 1930, its assets were added to the data for the earlier years also. In this way the homogeneity of the data was maintained. In certain industries, however, such as Amusements, this was not feasible, since many of the absorbed companies did not publish statements. To this extent the trends are biased.

TABLE II
RELATIVE CHANGES IN THE AMOUNTS CHARGED AS DEPRECIATION ON FIXED ASSETS
OF 182 CORPORATIONS IN 16 INDUSTRIES, 1927 TO 1932
(Includes depletion on wasting assets)

Industry	Amount Charged 1927 (000 omitted)	Relative Numbers (1927 = 100)				
		1928	1929	1930	1931	1932
Total.....	\$578,382	108	118	111	106	89
Agricultural Implements.....	8,804	125	149	137	110	85
Amusements and Supplies.....	8,511	114	171	231	252	211
Apparel.....	2,557	112	111	110	123	114
Automobiles.....	54,004	106	137	127	123	113
Aviation and Auto Accessories.....	9,311	107	134	148	139	131
Can Manufacturers.....	3,118	105	123	134	139	139
Cement and Cement Products.....	7,251	111	117	118	114	113
Chemicals.....	14,976	110	121	124	116	111
Coal and Coke.....	9,255	105	117	114	105	87
Copper Mining.....	25,053	117	122	100	76	57
Cotton (textiles).....	4,048	101	103	101	96	93
Food Products.....	9,965	105	104	109	113	102
Machinery and Tools.....	12,037	72	77	75	67	57
Petroleum.....	271,744	106	112	106	109	90
Railway Equipment.....	7,315	96	109	99	93	79
Steel { Bethlehem and U. S.....	102,218	113	125	109	83	63
Steel { Others.....	27,315	106	112	103	93	90

tion may under normal conditions be converted into working capital. The immediate task is to measure the changes in depreciation. Later analysis is made of the amount of depreciation (fixed assets) transferred to working capital.

The data in Table II, and the subsequent discussion, also provide a partial answer to criticisms and statements frequently made or implied as to depreciation policies. During the past few years there has been a feeling among some financial writers that many corporations were failing to make what in ordinary times would be considered ample provision for depreciation. There can be no doubt that this has been true of specific instances, but as a common premise it is well worth scrutiny.

The charge for depreciation, which in 1927 amounted to \$578,382,000 for the 182 corporations studied, increased 18 per cent by 1929, and then declined so that the charge in 1932 was 89 per cent of the 1927 figure. By comparing the data in Tables I and II it is evident that the item of depreciation has fluctuated more widely than the amount of fixed assets.

Fixed Asset investments reached their peak towards the end of 1930, but depreciation charges reached their maximum in 1929. That there is a close relationship between industrial activity and expiration of properties through depreciation cannot be denied. Some of the differences among industries, which at first appear inexplicable, disappear upon closer scrutiny and clearer statement of factors involved. It is probable that an important consideration accounting for the de-

cline in the charges of Copper and large Steel companies is the lessened depletion of ore reserves. Not only have plant and machinery been used less, but ore reserves have been depleted less. Both these industries have operated at low percentages of capacity in recent years.

It was in the year 1932 that the drastic declines occurred. Only eight out of sixteen industries still charged off as much or more for depreciation in 1932 as in 1927. Agricultural Implements declined 43 per cent from the peak of 1929. Other large declines were recorded by Copper Mining companies, which reduced charges by 53 per cent from the peak figure; Machinery and Tools, which charged off 57 per cent of the 1927 figure; and the two large Steel companies, which showed a decline of approximately 50 per cent from the 1929 figure.

Depreciation charges of Automobile companies declined 18 per cent from 1929, but were still well above the 1927 figures. Other industries showing well sustained charges were Amusements and Supplies, Apparel, Aviation and Auto Accessories, Can Manufacturers, Cement and Cement Products, and Chemicals. The sustained figures for Apparel and Automobiles are better than at first appears, because the fixed assets of both industries had declined substantially. Other interesting comparisons and contrasts are found by comparing trends of fixed assets and depreciation in specific industries.

Earnings are evidently not a prime consideration in setting depreciation. For the 182 companies earnings, which were \$1,756,099,000 in 1929, declined 47 per cent by 1930, but depreciation declined less than 6 per cent. Although earnings in 1931 were only 14 per cent of their 1927 figure (of \$1,151,654,000), depreciation was still above the corresponding figure for 1927. Specific industries, of course, reflect wide variations which are not so definite in their implications, but in general the above inferences appear reasonable. Earnings declined 108 per cent from their peak year 1929 to 1932, reflecting a drop from \$1,756,099,000 to a deficit of \$135,344,000, but depreciation declined only 24.6 per cent in the same interval.

B. Depreciation Earned, Recovered, and Fixed Assets Converted into Working Capital

In the following pages data are presented which show in an approximate way the extent to which depreciation has been earned and/or recovered, and fixed assets thereby converted into working capital, by corporations from 1928 to 1932.

In arriving at the amount of depreciation which has been converted into working capital two methods have been used. Both of these are rather crude, but were used in view of the lack of detailed and accurate information as to corporate operations.

The first of these, which is presented in Table III, presents a rather extreme viewpoint of the problem. In calculating the depreciation

earned or recovered it has been assumed first, that if there was a loss instead of net earnings, then depreciation would be the residual item, and therefore the loss would indicate that depreciation was either unearned, or at least not recovered.

This method has the weakness of overstating the depreciation earned in years of profit and in those industries which regularly earn profits. On the other hand, it probably understates the amount of depreciation converted into working capital in the years of heavy losses, and in those industries which have large losses. This latter situation for the most part occurred in the years 1930 to 1932, those more particularly scrutinized. Consequently, it may be said that this method provides a conservative picture of the situation, in so far as it tends to understate the earned and recovered depreciation in these later years. To avoid part of these weaknesses, the amount of "depreciation earned or recovered" was measured from individual corporate statements. This also obviated the possibility that the earnings or losses of one or two large companies might too greatly influence the results.

In addition Table III contains the approximate amounts of funds which were reinvested in fixed assets, from sources other than new security issues.¹²

By subtracting the "Reinvestment of Working Capital in Fixed Capital" from the "Depreciation Earned or Recovered," a figure is arrived at indicating approximately the extent to which the fixed assets contributed to the increase of working capital, or to the reduction of working capital by using working capital funds for investment in excess of depreciation earned and/or recovered. The total rows at the top of the table summarize the 16 industries. The first row shows that \$681,289,000 was recovered from fixed assets in 1929 and that about one-half of this amount, or \$355,700,000, was recovered in 1932.

The table contrasts the amount of fixed assets purchased from year to year. This reached a peak in 1929. In that year \$1,287,476,000 was invested in new fixed assets, but approximately \$518,689,000 came from new security issues, so the amount shown in the table is the difference, or \$768,787,000. By 1932 this drain on working capital had declined to \$252,802,000. In each year except 1932 net purchase

¹²Perhaps this may be made clearer by an explanation of how these amounts were calculated. The amount of new capital invested in fixed assets was calculated for each year, after making allowance for write-ups, and the like, and from this there was deducted the amount of the new fixed assets which had been financed by new security issues. The net result, i.e., the figure given in the table, is the estimated amount of new fixed assets purchased from working capital funds. In estimating these figures, great care was exercised to obtain reasonable accuracy. Write-ups, write-offs, sales of fixed assets, etc., were all considered. In computing the amount of fixed assets financed by new security sales a number of sources were used for the information. Besides the indications of changes in the balance sheets themselves, information was obtained from financial magazines and services.

TABLE III
 AMOUNTS OF DEPRECIATION EARNED AND/OR RECOVERED AND REINVESTMENT OF
 WORKING CAPITAL IN FIXED ASSETS FOR 182 CORPORATIONS IN
 16 INDUSTRIES, 1928 TO 1932
 (000 omitted)

Industry and Item		1928	1929	1930	1931	1932
Total	Depreciation Earned or Recovered.....	\$619,895	\$681,289	\$629,984	\$473,691	\$556,700
	Reinvestment of Work. Cap. in Fixed Assets.....	709,422	768,787	715,935	639,696	252,802
	Excess of Deprac. over Fixed Assets.....	(89,527)	(87,498)	(85,952)	(166,005)	102,898
Agricultural Implements	Depreciation Earned or Recovered.....	11,048	13,079	11,437	8,254	580
	Reinvestment of Work. Cap. in Fixed Assets.....	13,798	15,678	11,148	4,256	2,568
	Excess of Deprac. over Fixed Assets.....	(2,750)	(2,599)	289	4,098	(1,988)
Amusements and Supplies	Depreciation Earned or Recovered.....	9,671	13,315	18,541	20,092	6,748
	Reinvestment of Work. Cap. in Fixed Assets.....	25,787	42,965	6,437	19,946	2,137
	Excess of Deprac. over Fixed Assets.....	(16,116)	(29,650)	12,104	146	3,611
Apparel	Depreciation Earned or Recovered.....	2,870	2,590	2,063	2,358	1,179
	Reinvestment of Work. Cap. in Fixed Assets.....	1,611	3,390	3,821	865	823
	Excess of Deprac. over Fixed Assets.....	1,259	(790)	(1,758)	1,565	356
Automobiles	Depreciation Earned or Recovered.....	57,217	75,310	66,529	56,704	41,951
	Reinvestment of Work. Cap. in Fixed Assets.....	92,996	123,978	39,084	22,325	11,778
	Excess of Deprac. over Fixed Assets.....	(35,779)	(48,668)	27,495	34,379	30,173
Aviation and Auto Accessories	Depreciation Earned or Recovered.....	9,928	12,307	13,176	9,325	4,264
	Reinvestment of Work. Cap. in Fixed Assets.....	24,432	25,212	11,171	4,801	4,949
	Excess of Deprac. over Fixed Assets.....	(14,504)	(12,905)	2,005	4,524	(685)
Can Manufacturers	Depreciation Earned or Recovered.....	3,268	3,827	4,185	4,319	4,343
	Reinvestment of Work. Cap. in Fixed Assets.....	7,141	8,183	15,646	4,124	1,599
	Excess of Deprac. over Fixed Assets.....	(3,873)	(4,356)	(11,461)	(6,708)	2,747
Cement and Cement Products	Depreciation Earned or Recovered.....	8,039	8,493	8,553	6,590	2,823
	Reinvestment of Work. Cap. in Fixed Assets.....	2,482	7,835	4,750	4,480	2,540
	Excess of Deprac. over Fixed Assets.....	5,557	858	3,803	2,110	283
Chemicals	Depreciation Earned or Recovered.....	16,543	18,169	17,642	15,246	16,637
	Reinvestment of Work. Cap. in Fixed Assets.....	15,167	10,522	22,345	35,853	18,906
	Excess of Deprac. over Fixed Assets.....	1,376	7,647	(4,704)	(20,607)	(1,969)
Coal and Coke	Depreciation Earned or Recovered.....	8,543	9,983	9,891	6,940	5,510
	Reinvestment of Work. Cap. in Fixed Assets.....	17,041	14,689	7,623	3,889	558
	Excess of Deprac. over Fixed Assets.....	(8,498)	(4,706)	2,268	3,051	4,952
Copper Mining	Depreciation Earned or Recovered.....	20,149	30,480	24,372	15,780	1,493
	Reinvestment of Work. Cap. in Fixed Assets.....	26,463	42,024	18,280	11,308	30,090
	Excess of Deprac. over Fixed Assets.....	2,686	(11,544)	6,092	4,472	(28,597)
Cotton (textiles)	Depreciation Earned or Recovered.....	4,097	4,181	1,702	1,258	1,490
	Reinvestment of Work. Cap. in Fixed Assets.....	3,405	2,302	1,586	2,016	1,145
	Excess of Deprac. over Fixed Assets.....	692	1,879	116	(758)	345
Food Products	Depreciation Earned or Recovered.....	10,436	10,370	10,876	11,299	9,951
	Reinvestment of Work. Cap. in Fixed Assets.....	15,938	19,136	6,855	10,872	1,369
	Excess of Deprac. over Fixed Assets.....	(5,502)	(8,766)	4,021	427	8,582
Machinery and Tools	Depreciation Earned or Recovered.....	8,671	9,287	8,373	3,923	950
	Reinvestment of Work. Cap. in Fixed Assets.....	6,301	11,887	11,974	6,189	2,106
	Excess of Deprac. over Fixed Assets.....	2,370	(2,620)	(3,601)	(2,266)	(1,156)
Petroleum	Depreciation Earned or Recovered.....	288,811	303,418	287,244	211,292	239,748
	Reinvestment of Work. Cap. in Fixed Assets.....	329,560	327,485	273,802	369,036	144,124
	Excess of Deprac. over Fixed Assets.....	(40,749)	(24,068)	13,442	(157,744)	95,624
Railway Equipment	Depreciation Earned or Recovered.....	6,914	8,007	7,277	1,761	893
	Reinvestment of Work. Cap. in Fixed Assets.....	5,386	6,784	3,084	4,090	450
	Excess of Deprac. over Fixed Assets.....	1,528	1,223	4,193	(2,329)	443
Steel—Bethlehem and U. S.	Depreciation Earned or Recovered.....	115,769	127,900	110,948	84,888	12,200
	Reinvestment of Work. Cap. in Fixed Assets.....	92,056	55,938	210,851	102,209	19,916
	Excess of Deprac. over Fixed Assets.....	23,763	70,962	(99,903)	(17,321)	(7,716)
Steel—Others	Depreciation Earned or Recovered.....	28,921	30,593	27,185	13,562	5,940
	Reinvestment of Work. Cap. in Fixed Assets.....	29,848	49,988	57,528	26,436	8,047
	Excess of Deprac. over Fixed Assets.....	(927)	(19,395)	(30,343)	(12,874)	(2,107)

Note: Figures in parentheses indicate cases in which the reinvestment of working capital in new fixed assets exceeded the fixed assets earned and/or recovered as depreciation and converted into working capital.

of fixed assets exceeded depreciation earned or recovered. In the peak year 1929, \$87,498,000 was taken from working capital and invested in fixed assets in addition to the replacement fund from depreciation. In 1932, however, \$102,898,000 was recovered from fixed assets in excess of the amounts invested from working capital.

Again there are widespread variations in operations and policies among the industries. Outstanding among these are the Automobile industry, the Cotton industry, and the Railway Equipment industry. In the Automobile industry the companies studied invested about \$290,111,000 in fixed assets from working capital during the period studied, and they earned or recovered through depreciation of fixed assets the sum of \$297,711,000, leaving a net accretion of funds to working capital of \$7,600,000. In the past three years these companies have had a net inflow to working capital of \$92,047,000 in excess of their needs for new fixed capital. The Railway Equipment companies had an excess of depreciation earned and recovered over fixed assets additions of \$5,058,000 during the period surveyed. Cotton companies withdrew the net sum of \$2,274,000 from fixed assets.

Industries recording a substantial excess of funds earned or recovered from fixed assets in excess of funds invested in fixed assets from working capital during 1931 and 1932 are Amusements, Apparel, Automobiles, Aviation and Auto Accessories, Cement and Cement Products, Coal and Coke, and Food Products.

A second approach to the problem was made from a somewhat more realistic viewpoint. It was assumed that the proportion of depreciation earned (ignoring the factor of additional "conversion" from depreciation not earned but recovered) has a definite relationship to the rate of activity of the enterprise, i.e., to its volume of operations.¹⁸ In the final analysis, however, this too is a rough measure of depreciation earned and converted into working capital. Because of the difficulty of obtaining accurate data on rates of operative activity, this second procedure was followed for only part of the industries. The data for these are listed in Table IV.

Comparison of the figures in this table with those of the preceding table show important differences in amounts. In general the figures in Table III show a larger figure for depreciation earned, but this is due in part to the fact that the amounts there presented are either earned or recovered, assuming that depreciation is the residual item.

¹⁸This may be defended on the ground that in general the depreciation charge consists of two broad classes of factors. One is the lapse of time and is not influenced by the volume of operations. The second is the consumption of fixed assets, which is directly related to activity or volume of operations. The study sought to measure the depreciation earned by adding the variable depreciation to that portion of the fixed depreciation which could be attributed to the product. Necessarily, no single method was used; several checks on results were employed.

TABLE IV
 AMOUNTS OF DEPRECIATION EARNED AND REINVESTMENT OF WORKING CAPITAL IN
 FIXED ASSETS FOR 104 CORPORATIONS IN 9 INDUSTRIES, 1928 TO 1932
 (000 omitted)

Industry	Item	1928	1929	1930	1931	1932
Total	Depreciation Earned	\$554,077	\$600,437	\$464,174	\$377,696	\$264,308
	Reinvestment of Work. Cap. in Fixed Assets	614,414	642,346	648,884	581,642	237,254
	Excess of Deprac. over Fixed Assets	(60,337)	(41,859)	(184,710)	(303,946)	27,054
Automobiles	Depreciation Earned	58,439	67,651	36,422	32,662	19,039
	Reinvestment of Work. Cap. in Fixed Assets	92,996	123,978	39,034	22,325	11,778
	Excess of Deprac. over Fixed Assets	(34,557)	(56,327)	(2,612)	10,337	7,261
Cement and Cement Products	Depreciation Earned	8,039	7,618	7,108	5,170	3,124
	Reinvestment of Work. Cap. in Fixed Assets	2,482	7,635	4,750	4,480	2,540
	Excess of Deprac. over Fixed Assets	5,557	(17)	2,358	690	594
Chemicals	Depreciation Earned	15,368	18,169	17,221	6,935	6,427
	Reinvestment of Work. Cap. in Fixed Assets	15,157	10,522	32,346	35,853	18,906
	Excess of Deprac. over Fixed Assets	201	7,647	(15,125)	(28,918)	(12,179)
Coal and Coke	Depreciation Earned	9,035	10,860	9,046	8,610	6,322
	Reinvestment of Work. Cap. in Fixed Assets	17,041	14,689	7,623	3,899	558
	Excess of Deprac. over Fixed Assets	(8,006)	(3,829)	1,423	4,721	5,764
Copper Mining	Depreciation Earned	27,919	30,480	19,941	10,323	4,547
	Reinvestment of Work. Cap. in Fixed Assets	26,463	42,024	18,280	11,308	30,990
	Excess of Deprac. over Fixed Assets	1,456	(11,544)	1,661	(985)	(25,543)
Cotton (textiles)	Depreciation Earned	3,818	4,181	3,281	3,082	2,689
	Reinvestment of Work. Cap. in Fixed Assets	3,405	2,302	1,585	2,016	1,145
	Excess of Deprac. over Fixed Assets	413	1,879	1,696	1,066	1,544
Petroleum	Depreciation Earned	288,811	295,833	247,892	241,181	190,330
	Reinvestment of Work. Cap. in Fixed Assets	329,550	327,486	273,802	369,036	144,134
	Excess of Deprac. over Fixed Assets	(40,749)	(31,653)	(25,910)	(127,855)	46,206
Railway Equipment	Depreciation Earned	3,637	7,198	5,902	1,183	623
	Reinvestment of Work. Cap. in Fixed Assets	5,386	6,784	3,084	4,090	450
	Excess of Deprac. over Fixed Assets	(1,749)	414	2,818	(2,907)	173
Steel—Bethlehem and U. S.	Depreciation Earned	111,469	127,900	96,148	55,888	23,679
	Reinvestment of Work. Cap. in Fixed Assets	92,066	56,838	210,851	102,209	19,916
	Excess of Deprac. over Fixed Assets	19,403	70,962	(114,703)	(46,321)	3,763
Steel—Others	Depreciation Earned	27,542	30,597	21,213	12,662	7,528
	Reinvestment of Work. Cap. in Fixed Assets	29,848	49,988	57,528	26,436	8,047
	Excess of Deprac. over Fixed Assets	(2,306)	(19,391)	(36,315)	(13,774)	(519)

Note: Figures in parentheses indicate cases in which the reinvestment of working capital in new fixed assets exceeded the fixed assets earned as depreciation and converted into working capital.

The trends of the figures, and the pictures presented in both of them, however, appear sufficiently in agreement to justify the conclusion that certain industries have in recent years received a net accretion to their working capital from conversion of fixed assets.

In general, as shown by the total (See Table IV) and by all the specific industries, depreciation has declined from the peak years 1929 and 1930. But the amount of fixed assets purchased has declined even more rapidly, so that whereas the former had been smaller than the latter, the reverse was true in the year 1932, resulting in a net accretion to Working Capital from Fixed Assets. In the year 1932, seven out of nine industries analyzed indicated that more fixed assets were converted into working capital than working capital was reinvested in fixed assets. In 1930 and 1931, five and four industries, respectively, reported gains to working capital from fixed assets.

C. Analysis of Working Capital

In this section data are presented which analyze changes in the amounts of working capital. Data are also submitted on secondary reserves and current assets. Figures are then presented which measure the amounts of fixed assets converted into working capital in comparison with the working capital itself.

For a number of years it has been recognized that large corporations were relying less and less upon commercial paper and commercial banks for seasonal needs. As the period of industrial growth progressed, this tendency became more pronounced and significant. Some corporations not only ceased to depend upon banks for seasonal accommodation, but began to perform banking functions to such an extent that their "secondary reserves" grew in excess of their seasonal needs, and enabled them to loan money to other corporations, to invest large sums in marketable securities, to loan on call, or to deposit in banks. In other words, these "excess" cash reserves went beyond the usual functions of providing for seasonal needs, and acquired the characteristic of a *cyclic* change. It was a fairly common belief that these "secondary reserves," after the operation of the hard forces of depression, would come into play in providing a buffer to maintain dividends, interest, etc., and that they would thus gradually be distributed. Thereafter corporations might again be forced to go to commercial banks for a larger portion of their seasonal needs than in the recent past.

In certain respects this appears probable. Many companies have paid dividends, interest, and debts, and have used their secondary reserves as the source of these funds. But others have not been forced to draw thus upon their cash reserves, and still others have been able, but unwilling, to do so.

The surprising thing about these secondary reserves is that in spite of payments made, losses suffered, etc., they continued in some cases to increase, even through 1932. In other words, the liquidation of fixed assets into working capital and the liquidation of inventories and receivables into cash have been more rapid than the payments or drains upon the cash and cash resources.

It should not be inferred from these statements that working capital has continued to increase throughout the depression. For many individual concerns this was true, but in general the working capital has been declining since 1929. However, a vastly larger percentage of the working capital is now in the form of cash and cash reserves than was the case a few years ago.

A large amount of interesting and significant data based on the 182 companies studied is contained in Table V. The actual amounts for 1927 and the trends from 1927 to 1932 are given for working capital, secondary reserve, (including cash) and current assets. In addition,

TABLE V
RELATIVE CHANGES IN WORKING CAPITAL, SECONDARY RESERVE (INCLUDING CASH),
AND CURRENT ASSETS FOR 182 CORPORATIONS IN 16
INDUSTRIES, 1927 TO 1932
(Also percentages of Secondary Reserve to Working Capital and to Current Assets)

Industry and Item		Actual Amount 1927 (000 omitted) or Percentage	Relative Numbers (1927 = 100) or Percentage				
			1928	1929	1930	1931	1932
Total	1. Working Capital.....	\$3,956,411	108	116	109	93	80
	2. Secondary Reserve.....	1,483,325	119	118	111	95	87
	3. Current Assets.....	5,012,212	110	116	105	89	77
	Percentage of 2 to 1.....	37.4%	41.0%	37.6%	38.2%	38.3%	40.8%
	Percentage of 2 to 3.....	29.6%	31.8%	29.6%	31.1%	31.5%	33.7%
Agricultural Implements	1. Working Capital.....	276,315	107	127	130	125	117
	2. Secondary Reserve.....	54,832	87	62	76	118	135
	3. Current Assets.....	320,481	114	132	130	120	110
	Percentage of 2 to 1.....	19.8%	15.1%	9.7%	11.9%	18.4%	23.1%
	Percentage of 2 to 3.....	17.1%	13.1%	8.1%	10.1%	16.6%	21.1%
Amusements and Supplies	1. Working Capital.....	102,522	111	101	97	69	53
	2. Secondary Reserve.....	31,670	104	105	94	76	86
	3. Current Assets.....	147,677	101	103	92	80	66
	Percentage of 2 to 1.....	30.9%	28.9%	32.3%	30.9%	34.2%	51.6%
	Percentage of 2 to 3.....	21.4%	22.0%	22.0%	22.1%	28.2%	
Apparel	1. Working Capital.....	69,387	108	102	80	59	45
	2. Secondary Reserve.....	10,405	161	176	148	184	163
	3. Current Assets.....	91,319	111	115	89	69	52
	Percentage of 2 to 1.....	15.0%	22.5%	28.0%	27.7%	41.7%	52.8%
	Percentage of 2 to 3.....	12.8%	18.7%	19.6%	21.3%	30.4%	40.0%
Automobiles	1. Working Capital.....	541,570	107	97	95	89	72
	2. Secondary Reserve.....	333,624	110	73	89	98	83
	3. Current Assets.....	791,591	109	91	82	77	61
	Percentage of 2 to 1.....	61.6%	63.3%	46.3%	57.7%	67.8%	70.7%
	Percentage of 2 to 3.....	42.1%	42.7%	33.9%	45.8%	58.6%	56.7%
Aviation and Auto Accessories	1. Working Capital.....	91,453	120	141	125	103	89
	2. Secondary Reserve.....	45,050	123	144	142	115	105
	3. Current Assets.....	121,118	128	137	110	91	77
	Percentage of 2 to 1.....	49.3%	50.4%	50.1%	56.1%	55.1%	58.2%
	Percentage of 2 to 3.....	37.2%	35.8%	39.1%	48.1%	47.3%	50.8%
Can Manufacturers	1. Working Capital.....	56,692	119	138	127	119	114
	2. Secondary Reserve.....	20,042	153	160	148	78	134
	3. Current Assets.....	68,564	129	140	129	116	111
	Percentage of 2 to 1.....	35.4%	45.9%	48.7%	41.1%	33.1%	41.6%
	Percentage of 2 to 3.....	26.2%	35.9%	39.6%	33.6%	19.6%	35.3%
Cement and Cement Products	1. Working Capital.....	34,769	117	119	127	110	92
	2. Secondary Reserve.....	19,616	121	131	147	119	97
	3. Current Assets.....	41,959	114	114	119	98	83
	Percentage of 2 to 1.....	56.4%	58.5%	62.1%	64.9%	61.4%	59.3%
	Percentage of 2 to 3.....	46.8%	49.5%	54.0%	57.6%	57.0%	54.5%
Chemicals	1. Working Capital.....	143,260	114	169	185	142	116
	2. Secondary Reserve.....	37,179	123	231	242	157	151
	3. Current Assets.....	173,454	112	160	156	135	108
	Percentage of 2 to 1.....	26.0%	28.0%	43.3%	38.2%	28.7%	33.7%
	Percentage of 2 to 3.....	21.4%	23.5%	37.7%	33.2%	25.0%	30.0%
Coal and Coke	1. Working Capital.....	47,478	73	101	98	77	57
	2. Secondary Reserve.....	16,138	103	146	122	108	99
	3. Current Assets.....	78,599	90	99	89	73	62
	Percentage of 2 to 1.....	40.3%	55.6%	57.9%	49.9%	56.1%	57.7%
	Percentage of 2 to 3.....	24.3%	27.7%	35.9%	33.2%	35.7%	37.6%
Copper Mining	1. Working Capital.....	252,651	108	118	94	72	51
	2. Secondary Reserve.....	94,429	144	146	106	69	55
	3. Current Assets.....	325,493	122	134	105	86	70
	Percentage of 2 to 1.....	37.4%	49.8%	46.5%	42.3%	36.1%	40.5%
	Percentage of 2 to 3.....	29.0%	34.4%	31.7%	29.2%	23.2%	22.8%

TABLE V—(Concluded)
RELATIVE CHANGES IN WORKING CAPITAL, SECONDARY RESERVE (INCLUDING CASH),
AND CURRENT ASSETS FOR 182 CORPORATIONS IN 16
INDUSTRIES, 1927 TO 1932

Industry and Item	Actual Amount 1927 (000 omitted) or Percentage	Relative Numbers (1927 = 100) or Percentage					
		1928	1929	1930	1931	1932	
Cotton (textiles)	1. Working Capital.....	67,771	97	94	74	60	53
	2. Secondary Reserve.....	16,212	102	114	81	76	78
	3. Current Assets.....	78,729	100	98	73	60	51
	Percentage of 2 to 1.....	23.9% _o	25.3% _o	29.0% _o	26.3% _o	30.4% _o	35.3% _o
	Percentage of 2 to 3.....	20.8% _o	21.1% _o	24.0% _o	22.8% _o	26.1% _o	31.2% _o
Food Products	1. Working Capital.....	56,602	111	100	115	108	107
	2. Secondary Reserve.....	40,340	99	94	106	122	128
	3. Current Assets.....	75,729	109	107	111	104	99
	Percentage of 2 to 1.....	71.3% _o	63.1% _o	66.7% _o	65.9% _o	80.9% _o	85.6% _o
	Percentage of 2 to 3.....	53.3% _o	48.2% _o	49.7% _o	50.9% _o	62.8% _o	68.8% _o
Machinery and Tools	1. Working Capital.....	192,917	106	109	100	85	71
	2. Secondary Reserve.....	48,967	119	123	127	117	107
	3. Current Assets.....	219,811	106	111	100	85	69
	Percentage of 2 to 1.....	25.4% _o	28.6% _o	28.6% _o	32.1% _o	34.9% _o	38.2% _o
	Percentage of 2 to 3.....	22.3% _o	25.1% _o	24.5% _o	28.2% _o	30.8% _o	34.7% _o
Petroleum	1. Working Capital.....	1,055,179	112	124	114	91	85
	2. Secondary Reserve.....	315,302	120	121	121	92	92
	3. Current Assets.....	1,306,192	113	123	112	89	84
	Percentage of 2 to 1.....	29.9% _o	34.3% _o	29.1% _o	31.7% _o	30.1% _o	32.5% _o
	Percentage of 2 to 3.....	24.1% _o	27.7% _o	23.7% _o	26.0% _o	24.9% _o	26.6% _o
Railway Equipment	1. Working Capital.....	161,949	91	81	85	67	56
	2. Secondary Reserve.....	84,111	94	77	97	74	63
	3. Current Assets.....	181,284	93	92	86	65	54
	Percentage of 2 to 1.....	51.9% _o	53.6% _o	49.5% _o	59.4% _o	57.0% _o	58.5% _o
	Percentage of 2 to 2.....	46.4% _o	46.9% _o	38.8% _o	52.2% _o	52.3% _o	54.4% _o
Steel— Bethlehem and U. S.	1. Working Capital.....	543,738	106	114	108	101	82
	2. Secondary Reserve.....	228,729	121	137	111	88	69
	3. Current Assets.....	683,132	106	116	108	93	74
	Percentage of 2 to 1.....	42.1% _o	48.2% _o	50.5% _o	43.2% _o	36.8% _o	35.6% _o
	Percentage of 2 to 3.....	33.5% _o	38.4% _o	39.6% _o	34.5% _o	31.6% _o	31.3% _o
Steel— Others	1. Working Capital.....	265,148	111	120	107	80	75
	2. Secondary Reserve.....	82,579	124	148	104	85	70
	3. Current Assets.....	317,280	111	120	105	86	71
	Percentage of 2 to 1.....	31.1% _o	34.9% _o	38.6% _o	30.3% _o	29.9% _o	29.1% _o
	Percentage of 2 to 3.....	26.0% _o	29.1% _o	32.0% _o	25.7% _o	25.9% _o	25.6% _o

the percentages of secondary reserve to working capital and also to current assets are given for each year.

The total working capital in 1927 was \$3,959,000,000. Cash and marketable securities ("secondary reserve") amounted to \$1,482,000,000 and were equal to 37.4 per cent of working capital, and 29.6 per cent of current assets. Although these ratios increased after 1927 by 1931 they were only slightly above the figures for 1927. There had been, however, a material decline in the actual amounts of all three items.

Only four industries reported more working capital in 1932 than in 1927, these being Agricultural Implements, Can Manufacturers, Chemicals, and Food Products. In contrast to this there were 7 in-

dustries which reported more cash and securities on hand in 1932 than in 1927; these were Agricultural Implements, Apparel, Aviation and Auto Accessories, Can Manufacturers, Chemicals, Food Products, and Machinery and Tools. Even more outstanding changes are to be found in Agricultural Implements, Apparel, and Food Products, in each of which industries the secondary reserves have increased during the last two or three years. Certain unusual changes occurred in several other industries, but these and other related subjects are deferred for later discussion and analysis.

For the total of 16 industries the percentage of secondary reserves to working capital declined from 41 in 1927 to 38.3 in 1931. In certain important industries this trend was reversed. Even though secondary reserves also declined, the decline in working capital and current assets was more rapid, so that the former constituted an increased proportion of the latter.

In a few industries the secondary reserves in recent years constituted more than half of the current assets and was the equivalent of more than half of working capital. Among these are Automobiles, Aviation and Auto Accessories, Cement and Cement Products, Food Products, and Railway Equipment.

In order to make possible some definite measures between working capital and depreciation, the data in Table VI are inserted at this point. The table shows for each industry the depreciation charged, expressed as a percentage of the net working capital at the end of each year. This percentage measures the maximum amount of fixed assets which can be converted into working capital, and thus affords an idea as to the importance (under maximum conversion) of fixed assets (i.e., depreciation) to the maintenance of working capital. The second figure for each industry shows the percentage of depreciation earned and recovered as compared with working capital. This approaches a more realistic measure of the maintenance of working capital from depreciation.

Needless to say, there is great variation in the relationship of "depreciation charged" to working capital from one industry to another. It may be well to recall at this point that these relationships are not mere chance, but are dependent upon important financial factors. The proportion of working capital to fixed assets partly determines the relationship of depreciation to working capital, since depreciation is based upon fixed assets. Of course, policies as to depreciation, volume of operations, etc., will also condition the figures given in Table VI.

It is very interesting to notice, first, that the percentage of depreciation charged to working capital for the 182 companies increased from 14.6 in 1927 to 16.2 in 1932. From data previously presented, it is obvious that depreciation charged declined less rapidly than work-

TABLE VI
 PERCENTAGE OF DEPRECIATION CHARGED TO WORKING CAPITAL, AND PERCENTAGE
 OF DEPRECIATION EARNED AND/OR RECOVERED TO WORKING CAPITAL
 FOR 182 CORPORATIONS IN 16 INDUSTRIES, 1927 TO 1932

Industry and Item		1927	1928	1929	1930	1931	1932
Total	Depreciation Charged to Working Capital..	14.6	14.5	14.9	14.9	16.6	16.2
	Depreciation Earned and Recovered to Working Capital	14.3	14.4	14.8	14.7	12.9	11.2
Agricultural Implements	Depreciation Charged to Working Capital..	3.2	3.7	3.7	3.3	2.8	2.3
	Depreciation Earned and Recovered to Working Capital	3.2	3.7	3.7	3.2	2.4	.2
Amusements and Supplies	Depreciation Charged to Working Capital..	8.3	8.5	14.1	19.7	30.3	33.9
	Depreciation Earned and Recovered to Working Capital	8.2	8.5	12.9	18.6	28.4	10.9
Apparel	Depreciation Charged to Working Capital..	3.7	3.8	4.0	5.1	7.7	9.1
	Depreciation Earned and Recovered to Working Capital	3.7	3.8	3.7	3.7	5.8	3.7
Automobiles	Depreciation Charged to Working Capital..	10.1	10.1	14.3	13.5	14.0	15.9
	Depreciation Earned and Recovered to Working Capital	10.0	9.9	14.3	12.9	11.8	10.8
Aviation and Auto Accessories	Depreciation Charged to Working Capital..	10.2	9.1	9.7	12.1	13.8	15.0
	Depreciation Earned and Recovered to Working Capital	9.2	9.1	9.5	11.5	9.9	5.2
Can Manufacturers	Depreciation Charged to Working Capital..	5.5	4.8	4.9	5.8	6.4	6.7
	Depreciation Earned and Recovered to Working Capital	5.5	4.8	4.9	5.8	6.4	6.7
Cement and Cement Products	Depreciation Charged to Working Capital..	20.9	19.8	20.5	19.3	21.6	25.6
	Depreciation Earned and Recovered to Working Capital	20.9	19.8	20.5	19.3	17.3	8.8
Chemicals	Depreciation Charged to Working Capital..	10.5	10.1	7.5	7.9	8.5	10.0
	Depreciation Earned and Recovered to Working Capital	10.5	10.1	7.5	7.5	7.5	10.0
Coal and Coke	Depreciation Charged to Working Capital..	19.5	28.0	22.6	22.7	26.5	25.4
	Depreciation Earned and Recovered to Working Capital	14.7	24.5	20.8	21.2	18.9	17.3
Copper Mining	Depreciation Charged to Working Capital..	9.9	10.7	10.3	10.5	10.6	11.2
	Depreciation Earned and Recovered to Working Capital	9.8	10.6	10.3	10.3	8.7	1.2
Cotton (textiles)	Depreciation Charged to Working Capital..	6.0	6.2	6.5	8.2	9.6	10.5
	Depreciation Earned and Recovered to Working Capital	6.0	6.2	6.5	3.4	3.1	4.2
Food Products	Depreciation Charged to Working Capital..	17.6	16.5	18.3	16.7	18.5	16.8
	Depreciation Earned and Recovered to Working Capital	17.6	16.5	18.3	16.7	18.5	16.5
Machinery and Tools	Depreciation Charged to Working Capital..	6.2	4.2	4.4	4.7	4.9	5.0
	Depreciation Earned and Recovered to Working Capital	6.2	4.2	4.4	4.3	2.4	.7
Petroleum	Depreciation Charged to Working Capital..	25.8	24.4	23.2	23.9	31.0	27.3
	Depreciation Earned and Recovered to Working Capital	25.2	24.4	23.2	23.9	22.0	26.9
Railway Equipment	Depreciation Charged to Working Capital..	4.5	4.8	6.1	5.3	6.3	6.3
	Depreciation Earned and Recovered to Working Capital	4.4	4.7	6.1	5.3	1.6	1.0
Steel—Bethlehem and U. S.	Depreciation Charged to Working Capital..	18.8	20.1	20.6	18.8	15.5	14.3
	Depreciation Earned and Recovered to Working Capital	18.8	20.1	20.6	18.8	15.5	2.7
Steel—Others	Depreciation Charged to Working Capital..	10.3	9.8	9.6	10.0	10.7	12.4
	Depreciation Earned and Recovered to Working Capital	10.3	9.8	9.6	9.6	5.8	3.0

ing capital. Even the item of depreciation earned and recovered to working capital, although it declined from 14.3 per cent in 1927 to 11.2 per cent in 1932, showed an unusual stability. Both the percentages of depreciation charged to working capital, and of depreciation earned or recovered to working capital reached higher figures in 1929 and 1930 than in 1927.

The depreciation charged varied from the low of 2 to 3 per cent of working capital in Agricultural Implements to a maximum of 34 per cent in Amusements and Supplies in 1932. Automobiles, Aviation and Auto Accessories, Cement and Cement Products, Chemicals, Coal and Coke, Copper Mining, Food Products, Petroleum, and Steel companies are groups which consistently show large percentages of depreciation charged to working capital. The high percentage for Petroleum companies is doubtless ascribable to the inclusion of depletion with depreciation; the same holds true for some others. The conclusion may be drawn that in the above mentioned industries, there is *normally* a heavy accretion to working capital from those fixed assets which are converted. It is possible in these industries to strengthen working capital materially by reducing investments in new fixed assets (provided funds are not drained by bond payments, interest, etc.).

In industries such as Agricultural Implements, Can Manufacturing, Machinery and Tools, and Railway Equipment, the depreciation is small relative to working capital, and it would not be so easy to build up working capital by refraining from investment of the depreciation fund in fixed assets.

In some industries, such as Amusements and Supplies, the percentage of depreciation charged to working capital has increased rapidly in the last two or three years. Primarily this is ascribable to the depletion or loss of working capital.

Reference to the percentages of depreciation earned and recovered to working capital shows that it held up quite well until as late as 1931. Even in 1932 depreciation earned and recovered amounted to 10.9 per cent of working capital for Amusement companies, 10.8 per cent for Automobile companies, 8.8 per cent for Cement, 10.0 per cent for Chemicals, 17.3 per cent for Coal and Coke (including depletion), 16.5 per cent for Food Products, and 26.9 per cent for Petroleum companies (including depletion). In the Apparel industry, Can Manufacturers, and Cotton (textiles) the percentage remained relatively constant, although normally low.

Similar comparisons are presented in the following table (No. VII) as to the percentages for depreciation earned to working capital for a few of the industries. The amounts of depreciation earned were based on estimates of operations. These figures are generally lower than those preceding, but they show that earned depreciation was of material size (relative to working capital) even in 1932 for Cement and

TABLE VII
PERCENTAGE OF DEPRECIATION EARNED TO WORKING CAPITAL FOR 104
CORPORATIONS IN 9 INDUSTRIES, 1928 TO 1932

Industry	1928	1929	1930	1931	1932
Total.....	16.5	16.7	13.9	13.4	11.0
Automobiles.....	10.1	12.8	7.1	6.8	4.9
Cement and Cement Products.....	19.8	18.4	16.0	13.6	9.8
Chemicals.....	9.4	7.5	7.3	3.4	3.9
Coal and Coke.....	25.9	22.6	19.4	23.4	19.8
Copper Mining.....	10.2	10.3	8.4	5.7	3.5
Cotton (textiles).....	5.8	6.5	6.6	7.6	7.5
Petroleum.....	24.4	22.6	20.7	25.2	21.3
Railway Equipment.....	2.5	5.5	4.3	1.1	.7
Steel {Bethlehem and U. S.....	19.4	20.6	16.3	10.2	5.3
{Others.....	9.4	9.6	7.5	5.4	3.8

TABLE VIII
PERCENTAGE OF DEPRECIATION EARNED AND/OR RECOVERED (LESS AMOUNTS RE-
INVESTED FROM WORKING CAPITAL IN PURCHASE OF FIXED ASSETS) TO
WORKING CAPITAL FOR 182 CORPORATIONS IN 16 INDUSTRIES,
1928 TO 1932

Industry	1928	1929	1930	1931	1932
Total.....	(2.1)	(1.9)	(2.0)	(4.5)	3.3
Agricultural Implements.....	(.9)	(.7)	.1	1.2	(.6)
Amusements and Supplies.....	(14.2)	(28.7)	12.1	.2	6.8
Apparel.....	1.7	(1.1)	(3.2)	3.4	1.1
Automobiles.....	(6.2)	(9.2)	5.3	7.2	7.7
Aviation and Auto Accessories.....	(13.2)	(10.0)	1.8	4.8	(.8)
Gas Manufacturers.....	(5.7)	(5.6)	(15.9)	(10.0)	4.3
Cement and Cement Products.....	13.7	2.1	8.6	5.5	.9
Chemicals.....	8	3.2	(6.2)	(10.1)	(1.2)
Coal and Coke.....	(24.4)	(9.8)	4.9	8.3	15.5
Copper Mining.....	1.0	(3.9)	2.6	2.5	(22.3)
Cotton (textiles).....	1.1	2.9	.2	(1.9)	1.0
Food Products.....	(8.7)	(15.5)	6.2	.7	14.2
Machinery.....	1.2	(1.2)	(1.9)	(1.4)	(.8)
Petroleum.....	(3.4)	(1.8)	1.1	(16.5)	10.7
Railway Equipment.....	1.0	.9	3.1	(2.1)	5
Steel {Bethlehem and U. S.....	4.1	11.4	(17.0)	(3.2)	(1.7)
{Others.....	(.3)	(6.1)	(10.7)	(5.5)	(1.1)

Note: Figures in parentheses indicate cases in which the reinvestment of working capital in new fixed assets exceeded the fixed assets earned and/or recovered as depreciation and converted into working capital.

Cement Products, Coal and Coke, Cotton (textiles), and Petroleum companies.

Having shown that the items of depreciation, depreciation earned and/or recovered, and depreciation earned are of substantial importance compared with working capital, the following paragraphs carry the analysis one step further.

Using the data presented in Tables III and IV on pages 28 and 30, the net fixed assets purchased¹⁴ from working capital has been de-

¹⁴See page 27, footnote 12.

ducted from the amounts for depreciation earned and recovered. These net balances representing the accretion from working capital after deducting net fixed assets purchased are then compared with the working capital. These results are shown in Table VIII.

As shown in Table VIII, even after deducting purchases of fixed assets, there was a net accretion to working capital of 3.3 per cent from fixed assets earned or recovered in 1932. The increment to working capital in 1932 computed on this basis was 6.8 per cent for Amusements and Supplies, 7.7 per cent for Automobiles, 4.3 per cent for Can Manufacturers, 15.5 per cent for Coal and Coke, 14.2 per cent for Food Products, and 10.7 per cent for Petroleum companies. Several other industries reported smaller increments to working capital. Several industries recorded such a situation in several other years also.

Of course just the opposite situation was recorded by some industries. Many of them drew upon their regular working capital to acquire fixed assets in excess of the amounts available from depreciation funds. The only industry showing a very heavy outlay of this nature in 1932 was Copper Mining. In other years, of course, it was more common.

A second set of figures for nine of the industries was computed comparing the excess (or deficiency) of depreciation earned with the working capital after deducting the purchase of fixed assets from the depreciation earned. In general, these data showed somewhat smaller accretion to working capital from conversion of fixed assets in excess of new fixed assets purchased than was obtained on the basis of depreciation earned and/or recovered.¹⁵

¹⁵The data are not presented in table form because of similarity to the preceding table. For a list of the nine industries, see Table VII, p. 37.

III. CONCLUSION

The foregoing pages have been devoted first, to an abstract, or somewhat theoretical, discussion of the relationship of fixed capital to working capital through the operation of depreciation, and second, to a rough factual measurement of these relationships as they were found to operate in 182 industrial companies.

The importance of the relationship of depreciation to working capital has been clearly demonstrated by the ability of some companies and certain industries to maintain their working capital, or at least supplement it, in the years of depression. During the past few years conditions have changed greatly. At the beginning of the depression most corporations were well endowed with working capital and special reserve funds of marketable securities.

Whereas funds were readily available in years of prosperity to increase working capital, primarily from profits and new security sales, it was quickly demonstrated that in times of depression neither of these sources was to be relied upon. In addition, the pressure of operating losses, security depreciation, interest outlays, sinking-fund payments, and dividend disbursements fell upon the working capital for the most part. Many corporations which had seemed well fortified with marketable securities and ample working capital in 1928 and 1929 saw both diminish rapidly during the next three or four years.

The study of 182 companies indicated that certain companies, and certain industries, however, showed a far better than average ability to maintain working capital intact. These companies, even though they earned practically nothing, and although they paid interest and dividends, nevertheless maintained their working capital. This, of course, was not due to security financing or the like.

The important consideration in this phenomenon appeared to be the operation of the economic principle that fixed assets would be allowed gradually to be converted into working capital when there was no longer an immediate or shortly anticipated adequate demand for existing fixed asset investments.

The importance of the conversion of fixed assets into working capital may be judged from the fact that the depreciation earned (estimated on basis of operations), and presumably converted, amounted to 11.0 per cent of the working capital for nine industries, even in the least favorable year, 1932. For certain industries, notably Coal and Coke,¹⁶ and Petroleum,¹⁶ this figure was as high as 20 per cent. Large Steel companies, Cotton, Cement, and Automobiles showed recoveries from fixed assets of 5 to 10 per cent of their working capital.

Even after deducting fixed assets purchased (other than those financed by security sales), certain industries still reported a net accretion to working capital from fixed assets converted. For Coal and

¹⁶Depletion is included.

Coke this amounted to 18 per cent of the working capital, for Petroleum, 5 per cent, for Cotton, 4 per cent, and various other percentages, depending on the industry.

This flow of funds from fixed assets to working capital is not, of course, solely a depression phenomenon. It operates at all times wherever fixed goods are productively consumed in creating circulating goods. Certain aspects of this phenomenon are, however, accentuated in depression. Whereas normally new fixed assets acquired exceed the conversion of old fixed assets into working capital, the depression forced a curtailment of new outlays. The recent result was that in many companies the conversion of fixed assets exceeded the outlay for them, thus providing a net flow into working capital.

Certain companies normally have a net inflow of working capital from fixed assets. Examples are coal mines, petroleum extraction, certain hydro-electric plants, etc. Other industries, with excessive productive facilities being retired from service, may experience such conditions.

Still others on the downgrade—i.e., those operating at losses, perhaps ultimately to fail—may refrain from new outlays and permit fixed asset conversion to maintain working capital. The importance of working capital, both to the sound corporation and to the weak company, justifies the statement that any material factor contributing to the maintenance of working capital will greatly assist in maintaining solvency. Sufficient attention has not been given to the problem in this study to warrant any conclusions as to the importance of the conversion of fixed assets into working capital as a means of preventing failure. But some generalizations may be tentatively stated.

Naturally, competitive conditions in the specific industry, extent of operating losses, contractual obligations previously assumed, age and condition of fixed assets, etc., will be prime considerations conditioning or even primarily determining the final outcome. But an ability to convert fixed assets into working capital will be an important factor contributing to financial solvency. First of all, the size of the depreciation charges relative to working capital must be considered. Second, the size of that part of depreciation (fixed assets) which can be converted under competitive conditions must be appraised relative to working capital. And third, there must be offset against this conversion of fixed assets, which increases working capital, those activities which are a drain on the working capital. Among these drains are interest, essential new capital outlays, non-deferable repairs and maintenance, and those losses which must be borne by working capital, such as heavy operating losses, bad debts, inventory shrinkage, etc.

It appears reasonable at this time to raise further fundamental questions as to the significance and importance of this transfer of capital.

It is not implied that the actual shifting of capital through the

decision to delay or forego making good the normal depreciation of plant, is as complete as the illustrations in the first part of the study might suggest, or that such shifting will account for all or even most of the changes which have occurred in the maintenance of corporate working capital. The data presented, however, indicate that this method of maintaining working capital is sufficiently general to be a very great factor in times of depression in enabling corporations to remain solvent, to pay interest and similar fixed charges, and in some cases to maintain limited dividends, and maintain a position of liquidity and strength which would otherwise be entirely impossible, unless far more severe changes were made in dividend payments, interest payments, etc.

A well-planned working capital policy may have a deeper significance, involving the fundamental relationship of debtor and creditor, the welfare of the corporation itself, and that of its investors. It is possible for certain corporations to convert fixed capital into working capital in sufficient amounts to enable them to pay interest and to pay dividends not currently earned either on the preferred stock, or on both common and preferred. This may be especially true of public utility enterprises, such as electric light and power, gas, water, railway companies, etc. In such concerns working capital is a very small amount relative to fixed assets; annual depreciation (i.e., fixed assets) which can be converted frequently may exceed the entire working capital. It is possible for an enterprise which has a large surplus accumulated from past years to continue dividend payments which are virtually payments out of the fixed assets. This process may continue so far as to impair the equity of bondholders in fixed assets, or at least reduce the mortgaged property in value. Unless the mortgage requires that the property be replaced as it wears out, in addition to the usual covenant for repair and maintenance, it would readily be possible for the bondholders' equity to be seriously impaired, depending on the policies relating to working capital and depreciation.

By way of a rough illustration, assume that a corporation had a statement such as this, which reflects the sale of a new bond issue:

Current Assets.....	\$2,000,000	Current Liabilities.....	\$ 500,000
Fixed Assets.....	5,000,000	Bonds.....	2,000,000
		Common Stock.....	3,500,000
		Surplus.....	1,000,000
	\$7,000,000		\$7,000,000

It is quite probable that bond investors relied on the financial condition and earnings in making their investment. If now a situation of adversity or curtailment should arrive, the company might conceivably convert \$1,000,000 of fixed assets into working capital and pay it all

out as interest or dividends instead of retiring bonds. This would still leave the same amount of working capital as existed originally, but would have materially reduced the bondholders' protection in fixed assets, even though the provisions of the bond contract as to maintenance of ample working capital and fixed assets to protect the bond were still met. One might argue that the \$1,000,000 surplus which was paid out belonged to the stockholders anyway, but this position is not tenable when future interest and bonds are not provided for.

Furthermore, as is frequently the case, it is quite possible that the corporation may neglect too long adequately to maintain and repair its fixed assets, in addition to allowing them to be reduced in nominal value through failure to offset "normal" depreciation by the reinvestment of the depreciation fund. Here again bondholders may find their security further impaired. With a great decline in corporate earnings, the bondholder must look to assets and potential earnings rather than to immediate earnings for protection.

What will be the status of stockholders and bondholders thus situated when production revives? With reduced values of fixed capital which has neither been maintained nor renewed, a sustained increase in demand might even necessitate sale of additional securities to provide needed facilities for production and thus tacitly reveal that capital had previously been paid out which was later needed.

Yet there is no harm in paying dividends even though fixed assets decline in amount, if there is ample earned surplus and working capital can be maintained at an adequate amount. But before doing so the corporation should ascertain that fixed capital is adequate for probable future needs and that the bondholder is not going to be left "holding the sack."

Just as there is a liquidation of fixed capital into working capital and a liquidation of receivables and inventories into cash in times of depression, so it is possible that upon the reappearance of a sustained demand for goods and increased production, there will be a great drain upon liquid funds to repair, rebuild, and replace plants, and to furnish large sums for expansion of inventories and receivables. When this demand comes the banks may not be in a position to provide it, except to a limited degree, because the need will be in a large measure for permanent assets and additional permanent working capital as distinguished from seasonal capital.

Any sustained rise in prices would greatly complicate the situation and further embarrass some corporations. Especially would this be the situation under a persistent and arbitrary inflation of prices. Even though profits should greatly expand, past experiences (still within contemporary memory) have demonstrated that the need for capital outstrips profits when prices rise. Securities must then be sold or

capital obtained from sources other than profits. A company which had retained sufficient working capital throughout the depression to be able to finance a large part of returned "prosperity" would then be in an enviable position.

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