AN INVESTIGATION OF THE APPLICABILITY OF METHODS OF LOGIC TO THE ANALYSIS OF ACCOUNTING PROBLEMS

Thesis for the Degree of Ph. D.

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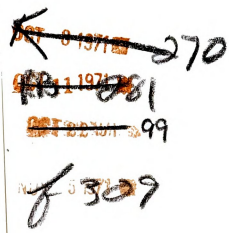

ABSTRACT

AN INVESTIGATION OF THE APPLICABILITY OF METHODS OF LOGIC TO THE ANALYSIS OF ACCOUNTING PROBLEMS

by Geraldine F. Dominiak

This study was undertaken because of the intense current interest in research into the foundations of the accounting process. The use of "logic" has been suggested for investigations of all kinds of things in accounting--concepts, principles, postulates, etc.--predicting that, with the help of logical techniques, a general theory of accounting will be found which would present an interrelated combination of these categories in its structure. Such a theory would presumably show what should be done in accounting and bring an end to today's disputes, while at the same time providing a basis for resolving tomorrow's problems. Current works by several researchers have been heralded as evidence that logical studies have been made and can produce such a theory. The overall purpose of this study was to critically examine these suggestions, predictions and presumptions regarding the utilization of logical methods in accounting, in the light of the nature of logic and logical methods and the state of accounting argumentation.

The simple suggestion for "logic" in accounting being far from precise, the early chapters of the study are devoted to showing what logic is available by examining the nature

of logic and its methods. The limitations and problematic aspects of each method are particularly explored, apart from specific applications, with limited comments relating to possible accounting utilizations.

Since the selection of a logical tool to apply in a particular case should be dictated by the nature of the thing being investigated, terminological inconsistencies occurring in accounting literature were found to seriously hamper the selection process. Consequently, a terminology proposal is made which allows a distinction between "theory," "concept," "postulate," "principle," and "convention" in such a way that, though all retain applicability generally coincident with current usage, yet specific logical interrelationships are established. Methods of logic are suggested for investigations related to matters in each of the categories defined. Inductive and statistical generalization and analogy are appropriate methods for investigations of postulates and concept definitions. Principles, as theorems of a particular theory (informal axiomatic system), result directly from applications of the deductive rules of inference in that theory; practices and conventions are not generally subject to investigation by methods of logic. There is still a place for creativity, ingenuity and inspiration, the accountant continuing to be confronted with matters requiring exercise of his judgment.

With explicit meanings attached to these terms, and uses for logical methods suggested, it was possible to

evaluate the predictions concerning what the construction of a general theory might do for accountants and to assess the advisability of seeking such a theory.

It is shown that the benefits expected to be gained should a general theory be constructed utilizing the suggested logical methods have been greatly overestimated. New problems will arise, and several difficult problems of today will continue to be problems. The following are some examples discussed in the study.

1. A general theory showing what should be done cannot be expected, for no method of logic will allow the inferring of what should be solely on the basis of what is. Hence, it will be necessary to have previously arrived at a notion of what should be, this decision being related to the proposed objective. Whether the theory is right or wrong, then, is a relative matter, depending entirely on the extent to which it achieves what it was intended to achieve.

2. Construction of "a" general theory does not rule out alternative theories, for no rules of logic limit the number of theories possible on a given subject. The acceptance of a single theory will depend on acceptance of its postulates. Questions of truth or falsity are largely meaningless. Further, since accounting practices involve the application of definitions of basic concepts to individual business facts, elimination of alternative practices depends upon acceptance of a single set of definitions of the concepts of the general theory. But acceptance is not a problem of logic alone. Consequently, today's questions concerning

general acceptance will not disappear with the advent of a general theory.

3. Acceptance of a single general theory would not destroy the need for special and less abstract theories involving additional specific postulates and definitions designed to cover specific problems.

4. After one theory was accepted, new business facts might necessitate re-examination of previously accepted postulates and definitions, bringing new conflicts which cannot be resolved with logical methods alone.

Devoting our primary efforts at this time to the construction of the elusive general theory is not advocated, on the basis of experiences in other disciplines, in view of predictable resistance to the use of new and complex argument presentation methods, and for reasons of progress and practicality.. Because of this conclusion, the final section of the study includes an analysis of the several studies pointed to as evidence that a general theory with the help of logic is a reality or near reality. Critical examination of these studies[1] fails to give support even to a contention that the use of logical methods has, or soon can, produce a general theory in the sense in which the phrase is currently used.

As evidenced by the several common misunderstandings pointed out in the study, most accountants are unfamiliar with many of the most fundamental aspects of logical inferences. At this stage in the development of formalization

of accounting discussions, use of any methods of logic is strongly recommended in rather simple, limited, perhaps even noncontroversial matters.

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[1]Studies selected were: Marvin Lee Carlson, "Accounting Theory as a Logical System," Unpublished Ph.D. dissertation (Commerce, The University of Wisconsin, 1964); R. J. Chambers, Towards a General Theory of Accounting (Melbourne, Australia: The Australian Society of Accountants, 1962); Maurice Moonitz, The Basic Postulates of Accounting (New York: American Institute of Certified Public Accountants, 1961); Maurice Moonitz and Richard T. Sprouse, A Tentative Set of Broad Accounting Principles for Business Enterprises (New York: American Institute of Certified Public Accountants, 1962); Richard Mattessich, Accounting and Analytical Methods (Homewood, Illinois: Richard D. Irwin, Inc., 1964); and Study Group at the University of Illinois, A Statement of Basic Accounting Postulates and Principles (Urbana, Illinois: Center for International Education and Research in Accounting, 1964).

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CHAPTER I

INTRODUCTION TO THE PROBLEM

In the accounting literature of the past ten years we have seen what might be termed a "return to nature" movement, wherein academicians and practitioners have called for and undertaken investigation and research into the very foundations of the accounting process. The reason most repeated by practitioners and well-informed people outside the profession for this return to fundamentals is dissatisfaction with the present acceptability in accounting practice of two or more alternative procedures which produce substantially different results in the financial statements, an important output of the accounting process. In a given firm, for a given transaction, event or situation, alternative procedures are available. For firms in the same industry, accounting treatments differ for seemingly similar transactions, events or situations.

Concerned accountants recognized that published financial statements, from which they obtained their evidence of the current problems in accounting, were accompanied by an auditor's report stating that such statements were in accordance with "generally accepted accounting principles." If these reports were assumed to be made in good faith, the auditors must have believed that the accounting practices adopted <u>were</u> the principles mentioned, or were consistent

with some unmentioned accounting "principles." But, in either case, it was the principles referred to which seemed to be in need of careful investigation for the source of the practice multiplicity problem.

The ideal solution to the question, of course, consisted in comparing the troublesome practices with an exhaustive list of "generally accepted accounting principles." However, review of any number of accounting texts and reference works made it plain that no such list actually existed. That is, no such list existed prior to the publication of Accounting Research Study No. 7[1], and that study does not, as yet, have complete regulative authority. The problem of what caused or justified the various practices remained unsolved.

The possibility that alternative practices were alternative principles and equally accepted generally was swiftly eliminated. First, new practices were being adopted every year, and it was difficult to conceive that "generally accepted accounting principles" could be multiplying annually. It seemed equally inconceivable that new practice-principles, with the stability which the latter word implied, could receive general acceptance with such rapidity. Literature spoke of both practices and principles, and the latter were presumed to be of a more theoretical or at least a more general character than the former. Moreover, if practices were principles, it would seem to follow that the principles

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[1]Paul Grady, Inventory of Generally Accepted Accounting Principles for Business Enterprises (New York: American Institute of Certified Public Accountants, 1965).

were inconsistent. It was seen that there were cases where substantially different results could be reported in terms of the income of one entity by selecting one or another of the alternative practices. If it is granted that there is such a thing as income, then, while several numbers (stated in dollars, common dollars, units of product, or whatever) might all be approximations of that income, it was not possible that (1) all could be income, or that (2) none of the numbers of the set possessed the property of being a closer approximation. Thus, if practices were principles, the principles referred to in reports were immediately lacking in an important feature and could be called inconsistent. Practices so conceived could not be the "principles" so carefully considered in determining the appropriateness of accounting information. It must be the case that practices are not principles, and the latter are to be found elsewhere.

The Search for Principles-Problems Uncovered

Alternative practices seemed to receive justification in accounting literature. Professional journals published articles about specific accounting procedures which articles made use of many general statements concerning accounting. Some honest men were convinced by these articles and alternative practices were approved as could be seen by the reports of the auditors. It was not unreasonable to assume that if the practices themselves were not principles, the justificatory articles must have appealed to whatever the

principles were and shown that the practices were consistent with those principles. The general statements concerning accounting which appeared as parts of the justifications either were or might lead to the principles being adhered to according to the auditor's report—or, it was possible that while the arguments might appear convincing, the reasoning involved therein was somehow in error.

A brief examination of the literature justifying alternative practices produced several interesting observations.

1) Justifications of practices in the same situations sometimes turned partially on disagreements regarding common terminology. For example, advocates of flow-through investment credit treatment often deny the expense nature of income taxes and the resulting applicability of matching of costs and revenues.

2) Justifications of practices in the same situations did not always refer to the same general statements about accounting. For example, a statement of the necessity of conservatism and objectivity generally appears in support of some practices relating to the immediate write-off of certain expenditures, while references are made to matching of costs and revenues and fairness of financial position presentation in support of deferral practices.

3) Justifications of practices in the same situations sometimes inferred a hierarchy of general

statements about accounting. For example, the necessity of adherence to acquisition costs was considered subordinate to the need to provide for foreseeable losses in the reporting of inventory amounts at the lower of cost or market; and, matching of costs with revenues, among other things, seemed to justify the departure from the continued historical cost reporting of plant, property and equipment investments.

4) The general statements concerning accounting which were appealed to in the justificatory articles were neither succinctly stated nor uniquely titled or worded. No simple statements could be recognized as an exact formulation of one of the well-known accounting "principles." Title confusion is exemplified when references are made to accounting adherence to historical costs as the cost concept or the cost principle or the cost convention. Arguments sometimes mentioned the entity theory, the entity concept or the entity postulate.

5) Various discussions of alternative practices, appearing in the form of prose arguments which purported to show that the practices followed readily from certain general statements about accounting, were, while convincing to some, lacking in the rigor or certainty which accountants attributed to mathematical and scientific argumentation.

Disagreements of the type noted in (1) above indicate

the absence of a uniform interpretation of basic accounting terminology. Arguments of the type noted in (2) seem to indicate that there might be some inconsistency between the general statements about accounting which, when considered alone, are quite acceptable. The third observation introduces the possibility that perhaps some general accounting statements are more general than others--an idea of basic and subsidiary principles. The situation found in cases of type (4) both reinforced the possibility of a hierarchy, or series of levels of accounting generalizations, and at the same time pointed out that terminology disagreements among accountants extended beyond basic terms of the discipline itself. Clearly, attempts to identify generally accepted accounting "principles" revealed a Pandora's box of related problems.

The final observation is, perhaps, the most far-reaching in its implications, for it relates not to specific accounting problems but to the way in which all accounting problems are approached--the method of investigation, argumentation and justification. If problems exist in accounting, as the first four observations indicate they do, attempts to solve them must adopt some method of investigation and presentation of results which will be accepted as appropriate and convincing so as not to create further problems. If past investigations of accounting problems did not make impossible the inconsistencies found in present day accounting, the methods used in developing present day accounting must not

have been altogether appropriate. Along with the problems pertaining to the subject matter of accounting, it appeared that the topic of investigative methodology deserved consideration.

The Methodology Problem

Current literature contains numerous articles on research methodology.[1] There are references to "the scientific method," "rigorous reasoning," statistical research, empirical studies, etc. The common thread which runs through these writings of both accounting practitioners and accounting academicians relates to the use of "logical" methods. Professor Storey said, in his recent monograph, The Search for Accounting Principles—Today's Problems in Perspective:

> The decision to rely on "distillation of practice" in the early days for the development of principles was probably a sound one. Accounting has now outgrown the stage in which a process of this type is sufficient. . . . Accounting has developed about

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[1] For example, Norton M. Bedford and Nicholas Dopuch, "Research Methodology and Accounting Theory-Another Perspective," The Accounting Review, XXXVI (April, 1961), pp. 351-361; Carl Thomas Devine, "Research Methodology and Accounting Theory Formation," The Accounting Review, XXXV (July, 1960), pp. 387-399; Myron J. Gordon, "Scope and Method of Theory and Research in the Measurement of Income and Wealth," The Accounting Review, XXXV (October, 1960), pp. 604-618; Brother LaSalle, "Basic Research in Accounting," The Accounting Review, XXXIV (October, 1959), pp. 603-608; Olin Park, "Thought Processes in Creative Accounting," The Accounting Review, XXXIII (July, 1958), pp. 441-444; Milton H. Spencer, "Axiomatic Method and Accounting Science," The Accounting Review, XXXVIII (April, 1963), pp. 310-316; I. Kleerekoper, "The Economic Approach to Accounting," Journal of Accountancy, CXV (March, 1963), pp. 36-40.

> as far as it can without more reliance on the use of logic in the formulation of principles, and logical methods will become increasingly important in future developments.[1] (Underscore added.)

A strong display of confidence in logical methods and their applicability to accounting is evidenced in this comment of Professor Spencer: "Accounting, of course, may also be viewed as a logical 'game,' and hence an axiomatic structuring is certainly possible."[2] Confidence and hopefulness in the beneficial use of logic is expressed by John W. Queenan, former president of the American Institute of Certified Public Accountants, in his comment: "The process of developing the postulates and principles envisaged by the research program is one in which abstract reasoning and logic can play an important part."[3]

The suggestion that "logical techniques" be utilized by accountants is not entirely new. Professor Leo A. Schmidt wrote, in the Journal of Accountancy in 1949, "What we really need in accounting is the practical application of

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[1] Reed K. Storey, The Search for Accounting Principles—Today's Problems in Perspective (New York: American Institute of Certified Public Accountants, 1964), p. 62.

[2] Spencer, op. cit., p. 316.

[3] John W. Queenan, "Postulates: Their Place in Accounting Research," Journal of Accountancy, CXIV (August, 1962), p. 32.

the very simplest principles of logic."[1] Professor Littleton suggested, in 1939, that accountants engage in "syllogistic analysis" which permits "conclusions to be deduced from perceiving relationships between obviously true propositions" or puts "principles to the test of being logically linked to premises. . . ."[2] But, Professor Storey's comments indicate that accountants have not usually adopted the techniques of logic, or at least not the proper ones, in developing present day accounting. The continued pleas for "more logic" in accounting seem to bear out Professor Storey's conclusion.

The suggestions for "more logic" have related to the investigations of all kinds of things in accounting: principles, postulates, axioms, practices, concepts, theories, problems. There has been, however, no precise explanation of exactly what this logic is that is supposed to be used nor in which accounting investigations. Some of the recent research in accounting fundamentals has apparently been considered more "logical" than that of the past. Professor Storey remarks:

> The work of the American Accounting Association, that of several individuals, and the early Accounting Research Studies are ample evidence that logical studies of accounting are not only possible but can be important contributions.[3]

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[1] Leo A. Schmidt, "Practical Uses of the Device of Formal Logic in Accountants' Daily Work," Journal of Accountancy, LXXXVIII (November, 1949), p. 378.

[2] A. C. Littleton, Essays on Accountancy (Urbana, Illinois: University of Illinois Press, 1951), p. 374. This volume is a collection of comments by A. C. Littleton in earlier years.

[3] Storey, op. cit., p. 62.

Most authors consider the current works of Professor Richard Mattessich[1] and Professor R. J. Chambers[2] to be more rigorous than the accounting investigations of the past. But all these comments about rigor and logic exhibit a certain amount of vagueness. It is no more sufficient or appropriate to suggest a "logical analysis" or "deductive" treatment of accounting problems, or theories, or whatever, without investigating whether such problems are capable of being treated in this manner than to discuss the depreciation of an asset without investigating the nature of the asset. And, carrying the analogy further, the selection of a particular method of depreciation is made only after carefully reviewing the methods available and the characteristics of each, and trying to match these characteristics to the nature of the depreciation problem at hand.

Some of the suggestions regarding the use of logical techniques in the discussing of accounting problems have included reference to specific subject areas of logic such as "deduction," "induction" and "axiomatization." However, these terms, when used, convey what might be termed a

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[1]For example, "Towards a General and Axiomatic Foundation of Accountancy," Accounting Research, VIII (October, 1957), pp. 328-355, and Accounting and Analytical Methods (Homewood, Illinois: Richard D. Irwin, Inc., 1964).

[2]For example, "Blueprint for a Theory of Accounting," Accounting Research, VI (January, 1955), pp. 17-25, and Towards a General Theory of Accounting (Melbourne, Australia: The Australian Society of Accountants, 1962).

layman's understanding of the techniques suggested. As a result, the advantages (and disadvantages) of using "logic" have sometimes been, to some extent, misrepresented. Many words from other fields of knowledge or activity have found their way into the everyday vocabulary of the accountant; accountants have appropriated words from economics, mathematics, statistics, banking, law, engineering, etc. These words may have had quite specific meanings in their original fields, and, in most cases, such meanings were preserved when adopted into the language of the accountant. Just as the accountant has adopted the terms used in other fields, so has he selected, for his own use, many of the tools of other disciplines. Auditors are utilizing the statistician's tools; management accountants are investigating new ways to apply the tools of higher mathematics. Now accountants are advocating the employment of the terms and tools of logic.

> The profession has in the past consisted of some able men armed with a kit of practical rules; and conceivably it could move in this more or less haphazard manner to meet the future needs of society, but the systematic structure of logic will certainly become an increasingly important influence. . . . Such stock intellectual cliches as "it is logical to assume," etc. are now on occasion examined to see whether they are or are not in fact "logical."[1]

But, if logic is to become an implement in the accountant's tool kit, it is the logician's understanding of terms and methods that the accountant must know—just as he is now coming to realize that it is the statistician's and not

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[1]Devine, op. cit., p. 389.

the layman's concept of probability that is to be understood and utilized.

It is the first objective of this paper to give an explanation of what "logic" is available to the accountant-investigator should he desire to incorporate logical tools into his investigation of problems in accounting. The methods of analysis and argumentation previously used in accounting literature will be compared with the available logical methods, and it will be demonstrated that the advocates of logical techniques in accounting must be supporting the use of formal logic. The suggested advantages of adopting formal methods will be presented and evaluated. In this connection, some of the serious difficulties encountered by the researchers in other fields when attempting to adopt the methods of the logician will be presented and parallels with accounting will be drawn which should suggest the parameters of application of logical techniques to accounting investigations.

A Hierarchy of Accounting Statements

The possibility that there are various levels of accounting generalizations, as mentioned earlier, might be considered further justification for finding out in which accounting investigations logical techniques would prove fruitful investigative tools. The very term which accountants

use to identify certain generalizations, i.e., "principles," suggests an analogy with the sciences and the existence of different levels of abstraction or importance. If there are, in fact, principles, their source may be more general statements to which the principles are related in some discernable way. These more general statements might be called postulates or assumptions, again, not unlike the terminology in the sciences.

This position was firmly adopted in connection with the present research programs of the AICPA. In the report of the special committee on research programs of the Council of that organization is found the statement: "Postulates are few in number and are the basic assumptions on which principles rest."[1] The titles of Accounting Research Studies Numbers 1 and 3[2] are prime examples of the adoption of this position. Very early in modern accounting literature we find Professor Paton referring to certain general statements of accounting as basic "postulates" of accounting.[3] Some type of structured whole consisting of assumptions,

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[1] Journal of Accountancy, CX (December, 1958), p. 63.

[2] Maurice Moonitz, The Basic Postulates of Accounting (New York, 1962), Study No. 1, and Maurice Moonitz and Robert Sprouse, A Tentative Set of Broad Accounting Principles for Business Enterprises (New York, 1962), Study No. 3, both published by the American Institute of Certified Public Accountants.

[3] William A. Paton, Accounting Theory (Ann Arbor, Michigan, 1922).

principles and practices is implicit in the writings of Professor Littleton when he states:

> Fundamental truths of accounting (principles) may either be generalized out of practical experience, or deduced from stated premises which are accepted as true in themselves.[1]

That there may be several levels of accounting generalizations, and an investigation of them, may help to answer other questions now being posed by the members of the accounting profession. There is a growing unrest concerning certain individual general statements about accounting which appear to have strongly influenced accounting practice. In particular, the recording and reporting of historical cost amounts almost exclusively has received severe criticism. The problems related to this criticism are associated with the problem of variety in practice, for the question is raised as to the status of such general statements. How important is cost recording to the smooth functioning of the accounting process? What other areas of accounting are related to this statement—what areas would be affected by the discontinuance of carrying on the accounting process in accordance with historical costs? What sort of research, argument or evidence would, or could produce a change in this part of the accounting process? If the levels of accounting generalizations could be distinguished and explained, some of these questions might also be answered.

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[1] Littleton, op. cit., p. 391.

A very serious impediment to an explicit and complete statement of a hierarchy of accounting generalizations has been the terminological inconsistency of accounting authors. What were considered by Professor Paton and some others as postulates were designated by others as concepts, by some as principles, by others as theories, and by still others as practices. To give just a few examples, Professor Windal writes of the realization "concept,"[1] Professor Paton speaks of a realization "postulate" and the Study Group of the University of Illinois proposes some realization "principles."[2] Dr. Moonitz suggests entity "postulates,"[3] Dr. Lorig discusses the problems of the entity "theory,"[4] and Dr. Li explores the effects of adopting the entity "concept."[5] Whether the accountant's interest in "conservatism" is called a "principle" or a "convention" depends on the individual author. All these terms--concept,

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[1]Floyd W. Windal, "Legal Background of the Accounting Concept of Realization," The Accounting Review, XXXVIII (January, 1963), pp. 29-36.

[2]A Statement of Basic Accounting Postulates and Principles (Urbana, Illinois: Center for International Education and Research in Accounting, 1964).

[3]Moonitz, Basic Postulates.

[4]Arthur N. Lorig, "Some Basic Concepts of Accounting and Their Implications," The Accounting Review, XXXIX (July, 1964), pp. 563-573.

[5]David H. Li, "Alternative Accounting Procedures and the Entity Concept," The Accounting Review, XXXVIII (January, 1963), pp. 52-55, and "The Funds Statement Under the Entity Concept," The Accounting Review, XXXVIII (October, 1963), pp. 771-775.

principle, postulate, theory, practice, even convention--have been used so often there seems no doubt that accountants consider them worthy of retaining in accounting terminology. Distinctions between them have been implicit in many statements about accounting, including those of the AICPA committee and Professor Littleton, quoted earlier. If these terms are to be retained, it is these which should be structured into a hierarchy in which accounting ideas and statements can be placed--a structure such that individual known methods of logic can be seen to be applicable at specific levels and the interrelationships and interdependency can be established.

It is the second objective of this paper to suggest a structure of accounting knowledge. The structure will allow for the distinction of theories, concepts, postulates, principles, practices and conventions. The proposed relationships within the structure will be such that the logical tools for investigation of the levels of the structure can be suggested, wherever some tool is appropriate. The problems which remain after the applications of logical techniques will be explained, and suggestions will be made as to those areas of accounting interest in which formal logic seems completely inappropriate.

Current Studies of Accounting Problems

Since the accounting profession has expressed its concern over the state of the body of accounting knowledge, many

publications have been forthcoming relating to fundamental accounting matters. Some of these investigations, it has been suggested, are the result of response to pleas for logic in accounting and represent instances of logical methods being utilized to obtain more rigor in analysis and reasoning. Investigations generally represent full scale attacks on the whole of accounting. Especially well-known among the recent works are the following:

1) American Institute of Certified Public Accountants, Accounting Research Studies Numbers 1 and 3

2) Towards a General Theory of Accounting, by R. J. Chambers

3) A Statement of Basic Accounting Postulates and Principles, Study Group of the University of Illinois

4) Accounting and Analytical Methods, by Richard Mattessich

An equally ambitious project was undertaken by Dr. Marvin Carlson, in his "Accounting Theory as a Logical System," an as yet unpublished doctoral dissertation submitted at the University of Wisconsin.

The third objective of this paper is to examine each of the studies mentioned above, identify the logical methods or techniques utilized, and determine whether the methods used coincide with those proposed as most advantageous for that area of accounting (concept, postulate, etc.) in the suggested interrelated structure of accounting knowledge.

CHAPTER II

THE NATURE OF LOGIC

In general usage, the words "logic" and "logical" are taken as synonymous with "reasonable," with the "logical" being the "reasonable" and the "illogical," the "unreasonable." The terms are often, but not always used to characterize arguments, i.e., justifications for the holding of some position or other. This usage is basically in keeping with the meaning intended by the logician; for the logician is concerned, not with the actual physiological or psychological processes of reasoning but with the acceptability of the final, completed process as a whole. More emphatically, only this usage coincides with the logician's. Acceptability may be characterized by an affirmative answer to the question: In an argument, does the conclusion (position held) really <u>follow</u> from the premisses[1] (assumptions, stated or otherwise)?

> Whereas the connection between premisses and conclusions is thus grounded in logic, ordinarily the premisses and conclusions themselves are not; and herein precisely lies the <u>application</u> of logic to fields other than itself.[2]

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[1]This spelling follows the use of C. S. Peirce, A. Church and others in referring to the logical term and distinguishing it from "premise" in other senses including the legal application of the plural.

[2]Willard Van Orman Quine, <u>Methods of Logic, Revised</u> (New York: Holt, Rinehart and Winston, 1959), p. xiv.

The logician is not concerned with the truth or falsity, acceptability or reality of the premisses or conclusions, but with the form of the argument comprised of premisses and conclusions.

> The distinction between correct and incorrect reasoning is the central problem with which logic deals. The logician's methods and techniques have been developed primarily for the purpose of making this distinction clear. The logician is interested in all reasoning, regardless of its subject matter, but only from this special point of view.[1]

The logician will be interested then, in all areas of knowledge where reasoning is purported to play a part in the investigations concerning that knowledge. Insofar as accounting discussions rely on reasoning (argumentation) to support a stated position, the logician does have an interest in them. But, as Copi says, "only from this special point of view." The logician has developed certain tools with which some problems can be attacked. Students of other disciplines who would use them are admonished:

> To appreciate the value of logical tools, it is important to have realistic expectations about their use. If you expect a hammer to do the job of a screwdriver you are bound to be disappointed, but if you understand its function you can see its usefulness. Logic deals with justification, not with discovery. Logic provides tools for the analysis of discourse; such analysis is indispensable to intelligent expression and understanding.[2]

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[1] Irving M. Copi, Introduction to Logic (New York: The Macmillan Company, 1961), p. 6.

[2] Wesley C. Salmon, Logic (Foundations of Philosophy Series; Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 14.

A reading of the nontechnical and popular literature on logic and the literature of most other subjects, as well, tends to leave the reader with three somewhat erroneous impressions.

1. The word "logic" is often modified by the adjective "formal," giving the distinct impression that logic may be formal or informal.

2. There is a division of logic into inductive and deductive which is mutually exclusive and jointly exhaustive.

3. While many researchers in the sciences using logical tools may still find themselves having disagreements, the logicians themselves know (a) what the tools are, and (b) how they are to be used, and are in agreement in their knowledge of these two matters.

The objectives of this chapter will be to correct these erroneous impressions and to establish a basis for examining the characteristics of the methods of logic, paying heed to Professor Salmon's warning to "appreciate the value" of these tools.

Righting Wrong Impressions

Formal and Informal Logic

The logician deals formally with both formal and informal arguments. Logic is a subject of individual study, investigating forms of argumentation and codifying those rules which allow the recognition of correct and incorrect arguments. Logic cannot deal informally with arguments, for it is the essence of logic to deal formally with them. Nor

should informal arguments be construed as arguments which have no form, for logic deals only with forms, and hence could not be relevant in such a case. In fact, argument is a term of the logician, and an argument without some form is simply not an argument at all.

By informal argument is generally meant something quite like Suppes' description of an informal proof, "enough of an argument is stated to permit anyone conversant with the subject to follow the line of thought with a relatively high degree of clarity and ease, . . ." obvious premisses are left unstated and only "the essential, unfamiliar, unobvious steps" are given while omitting the "trivial and routine inferences."[1] From this description it is clear that an informal argument should be capable of being transformed into a formal one. The advantage of formal proof or argument as opposed to an informal formulation seems apparent from the use of so many words in the definition whose meanings are imprecise, such as "essential," "obvious" and "trivial." It is imperative to understand that the logician dealing with informal arguments will apply the same rules as when he deals with a formal argument, but in the former case, these rules must be applied to both the stated and the unstated premisses and inferences. And since the same rules are to be applied, it is usually more con-

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[1] Patrick Suppes, Introduction to Logic (The University Series in Undergraduate Mathematics; Princeton, New Jersey: D. Van Nostrand Company, Inc., 1957), p. 122.

venient for the logician to transform informal arguments into formal ones.

There is another sense in which logicians have used the term "informal" in connection with logic. This usage is common in discussions of so-called "informal fallacies," but this is not to be understood as some kind of informal logic. Some arguments appear to possess, by the nature of the individual words or whole premisses used, qualities which cannot be attributed to the form of the argument itself. Yet, such qualities may seem to affect an individual's acceptance of the argument. It is customary among logicians for the term "fallacy" to be used in connection with an argument which, although not correct, is in some manner "psychologically persuasive." Examples of the type of problems involved are the use of words such as "fair," "good" and "patriotic" which carry with them certain emotive force that may have an influence on the effectiveness of an argument in which they appear. But the effectiveness of an argument is not to be equated with the correctness of that argument. The feelings which certain words may produce are not, in any strict sense, logical. Nor are they a part of the logician's realm of study, but rather that of the psychologist. However, when the logician investigates such an argument, he may, and often does, find that the use of certain words may be considered a means of asserting certain premisses which can, and in fact do, play some part

in establishing the correctness of that argument. The statement "Since Jones is a communist he won't make a good certified public accountant" is a sample of a brief, informal argument. Perhaps its proponent fully expects the designation of Jones as a communist to support his conclusion. If so, the argument is not deductively correct, for nothing has been said about any relationship between communists and CPAs. The logician, upon examining the argument, might suggest that it is a shortening of the more formal argument:

Jones is a communist. (Premiss 1)
No communist is able to report impartially. (Premiss 2)
Jones is not able to report impartially. (Intermediate inference)
Good CPAs must be able to report impartially. (Premiss 3)
Jones cannot be a good CPA. (Conclusion)

This longer argument, with premisses 2 and 3 added to the original statement, is correct in terms of its logical form The expansion of the original statement shows that not one, but at least three premisses are involved in the argument. The logician, in his analysis, has not changed the reasoning of the argument at all, but has simply brought out that an acceptance of more than the formal correctness of the argument requires the acceptance of at least three assumptions.

Most of the so-called informal fallacies deal not with the form of an argument itself, but with the manner in which the premisses are stated (or unstated), the attitude of the arguer, or the psychological effects of specific terminology or attitude. What is to be emphasized here is that in any

argument, the truth of the premisses, or the acceptance of them, is a matter apart from the logical correctness of the argument itself. It is not strictly appropriate to refer to dealing with such problems as an application of "informal logic" but rather as the investigation of the logical problems of dealing with informality.

In the later discussion of deductive logic, reference will be made to informal axiomatic systems. Here, the impression that there are formal axiomatic systems and informal ones is a correct one. It is important to understand that both of these types of system are part of formal logic; i.e., introducing the adjective "informal" at that time is not to be construed as in contradiction to what has been stated above.

Division and Disagreement

The second and third general impressions listed earlier may conveniently be discussed together. In a statement relevant to both impressions, H. S. Leonard comments:

> Some earlier authors have thought of deduction and induction as only two among many types of proof. . . . But other authors have used the terms in . . . a jointly exhaustive sense. . . . Many logicians insist that perfect induction is a form of deduction.[1]

The much talked-about dichotomy is here seen to be not above question—and by logicians! In a more explicit comment, likewise indicative of disagreement, but more

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[1]Henry S. Leonard, Principles of Right Reason (New York: Henry Holt and Company, 1957), pp. 434-435.

basically concerned with the subject matter, A. P. Ushenko suggests:

> It would contribute to clarity and order of thought to have inductive logic completely disassociated with logic, to discard its misleading name, and to reorganize its contents by their incorporation into a more comprehensive study, the "Methodology and Philosophy of Science."[1]

That such a statement could be made by a logician becomes more understandable when the nature of inductive logic is explored and the tendency in much of the popular literature to equate "logical" with "certain" is recognized. Admitting that some disagreement does exist, for the sake of simplicity of explanation, an effective method of dichotomizing logic into inductive and deductive will be employed later in this paper.

Disagreements among logicians exist not just in connection with discussing the organization of the subject, but also regarding the subject matter itself. Although there are rules of inference and some terms which, unlike accounting "principles," are universally accepted, there are likewise some few rules which are controversial.[2] The existence and lengthy discussions of logical paradoxes bears witness

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[1] A. P. Ushenko, The Theory of Logic (New York: Harper & Brothers, Publishers, 1936), p. 139.

[2] For example, proof by contradiction and proofs involving the use of Zorn's lemma (a well-known formulation regarding a maximal element as considered in set theory) are considered by many as controversial. For those who question the validity of this reasoning, a conclusion not acceptable to them and whose argument includes the use of these rules, is simply not proved.

to the fact that some logical tools and suppositions are not altogether without hazards. Lewis and Langford have defined a paradox to arise "whenever we seem to have two incompatible propositions true on logical grounds or for logical reasons."[1] This definition is more optimistic than the later comments of these authors suggest is warranted, for after classifying the paradoxes according to the nature of the difficulty involved, the authors stated:

> We shall then try to get some notion of the theories which can be advanced by way of explaining their occurrences, as well as the technique that has been used for the purpose of avoiding them in practice.[2] (Underscore added.)

In fact, it might be suggested that incompatibility is, in a sense, the result of the logical suppositions relating to what are called the laws of contradiction and excluded middle. (These say, briefly, that no proposition is both true and false and every proposition must be either true or false.) Although technically the law of excluded middle does not require the use of a two-valued (true-false) logic in the sense that one need not deny the law in order to accept a three-valued or n-valued logical system, the two-valued logic is, to a great extent, essential to the whole conceptual scheme. Logical laws, and hence applications of them, should not be considered beyond revision

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[1] Clarence Irving Lewis and Cooper Harold Langford, Symbolic Logic (New York: Dover Publications, Inc., 1932), p. 438.

[2] Ibid.

and expansion.

> There have been suggestions, stimulated largely by quandaries of modern physics, that we revise the true-false dichotomy of current logic in favor of some sort of tri- or n-chotomy.[1]

There has, in fact, been some research done in connection with many-valued logical systems, and use is often made of three-valued systems in proofs of the independence of the axioms of some axiomatic systems.

There are many other areas in which logicians have disagreements or questions about their own field of knowledge, the resolutions of which may very well significantly affect the methodology of those other subjects choosing to utilize the tools of the logician. The above discussion should be sufficient to indicate that in the study of logic as in most other fields, complete harmony is not to be found. It is appropriate to note here also, that the foundations of what will be termed later "mathematical or symbolic logic" were laid relatively recently (the nineteenth century), and as an indication of the state of development of that discipline, Lewis and Langford stated, as late as 1932:

> We find ourselves in a lively period of new discoveries; an old subject, which has been comparatively stagnant for centuries, has taken on new life. We stand today, with respect to logic, where the age of Leibnitz and Newton stood with respect to what can be accomplished in terms of number; or where Riemann and Lobatchevsky stood with respect to geometry. A wealth of new facts

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[1] Quine, op. cit., p. xiv.

dawn on us, the significance of which we are only beginning to explore.[1]

Preliminary Considerations for the Accountant

From this preliminary discussion of logic in general, accountants who would wish to utilize the methods and techniques of the logician must be aware of four important considerations.

1. Only arguments in the logician's sense of the word (premisses, intermediate inferences, if any, and conclusions) are the proper subject matter for logical methods. For this reason, discussions of accounting topics must be separated into formal and informal arguments, and simple discussions.

2. Only the form of those arguments will be on trial, and not the value, reliability or acceptability of a series of assumptions or premisses.

3. It should be seen immediately that if an objection is raised to a particular assumption in some argument under consideration, logical analysis may offer further assistance only if that assumption can be formulated as the conclusion of still another argument whose form can be analyzed in accordance with the rules of logic.

4. The use of logic, as opposed to the study of it, must be coupled with an understanding that there are what might be termed conventions employed, that methods and the conventions are subject to change, and that the field of logic is still developing.

How these matters may limit the use of logical tech-

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[1] Lewis and Langford, op. cit., p. 4.

niques in accounting and also help to isolate problem areas will be further discussed in later sections of this paper. What can be stated, unequivocally, now, is that whatever assistance the accountant may receive from the utilization of logical techniques,it will come from methods of formal logic. Hence, it is these methods which will be examined here.

Basis for Examination

Much insight can be gained into the application of formal logical methods through an examination of their characteristics. To simplify this examination, it is desirable to categorize these methods in some way, and despite what has been said thus far, the inductive-deductive division will be used. As was stated earlier, the division of logic into inductive and deductive is a common but not universally accepted one. It is not desirable to prejudice the case for use of methods of either type, so an explanation will be given for rejecting certain distinctions commonly proposed. The basis of division to be used in this paper will be explicitly stated.

Logic and Discovery

A distinction is sometimes made between induction and deduction which may give the impression that induction is the logic of discovery. Such a distinction characterizes

deductive arguments as those in which

> . . . all of the information or factual content in the conclusion was already contained, at least implicitly, in the premisses . . .

while in inductive arguments,

> . . . the conclusion contains information not present, even implicitly in the premisses.[1]

Such a distinction may produce an immediate prejudice in favor of using inductive methods. This distinction suggests that deductive techniques will not extend knowledge while inductive techniques will. This suggestion is most distressing, and has, I believe, influenced some members of the accounting profession[2] to conclude immediately that attempts to utilize deductive techniques would make no contribution to the organization and content of the body of accounting knowledge and ought to be discontinued (or, perhaps, not started at all would be more appropriate).

Even assuming that no new general statements about accounting could be "deduced" from already known ones, would it be considered constructive and valuable to know that such deduction is possible? To the writer, it seems that the value of such a contribution to the organization

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[1] Salmon, op. cit., p. 14.

[2] See, for example, the comments of William J. Vatter, "Postulates and Principles," Journal of Accountancy, CXVIII (July, 1964), pp. 59-64; LaSalle, op. cit.; Malcoln L. Pye, "Reasons, Probabilities, and Accounting Principles," The Accounting Review, XXXV (July, 1960), pp. 437-443; and, to some extent, Spencer, op. cit.

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of the body of accounting knowledge would be substantial. Moreover, the use of deductive techniques might be beneficial in another, perhaps negative sense.

> Not only does it rule out impossibilities but it reveals the possibilities of hypotheses other than those usually taken for granted; and in this respect it frees the mind and contributes not only to the fixed form but to the living growth of science.[1]

Such a pessimistic view is not necessary, however. It would have to be a very broad sense of containment that would make all the information in conclusions "contained" in the premisses. "All the possible games of chess that can be played can be deduced from the few rules of that game,"[2] yet one would not want to say that the games are contained in those rules. In discussing the applicability of deductive reasoning, Hempel comments:

> Thus, in the establishment of empirical knowledge, mathematics (as well as logic) has, so to speak, the function of a theoretical juice extractor: the techniques of mathematical and logical theory can produce no more juice of factual information than is contained in the assumptions to which they are applied; but they may produce a great deal more juice of this kind than might have been anticipated upon a first intuitive inspection of those assumptions which form the raw material for the extractor.[3]

It seems impossible to effectively distinguish between

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[1] Morris R. Cohen, A Preface to Logic (Cleveland: The World Publishing Company, 1944), p. 21.

[2] Ibid., p. 27.

[3] Carl G. Hempel, "On the Nature of Mathematical Truth," The American Mathematical Monthly, LII (December, 1945), p. 554.

induction and deduction on the basis of the type of information (new or old) each will produce, and this distinction is rejected for the purposes of this paper.

It is appropriate at this time, however, to consider one sense in which the above comments on deductive logic are extremely important for those who would advocate its use. Whatever form deductive argument may take, it is true that the terms appearing in its conclusion(s) can be those and only those which appear in the premisses of that argument. Some authors have suggested that accounting "principles" are normative in nature, based on and derived from accounting "postulates" which are said to be of an absolute nature. For example, Professor Moonitz reports that after recognizing and defining the problems to be solved, one moves "to their solution by careful attention to what 'ought' to be the case, not what 'is' the case," and that "relatively heavy reliance must be placed on deductive reasoning in the development of accounting postulates and principles."[1]

If the interpretation of "normative" intended by accountants is in the sense of the "should" or the "ought," as I believe it is, there will be an immediate limit on the use of any method of deduction. Although particular statements may be derivable from general ones, normative statements must be deduced from normative statements. One can reason from "All assets ought to be recorded at their

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[1]Moonitz, Postulates, p. 6.

exchange value" to "This asset ought to be recorded at its exchange value." One cannot reason to such a conclusion from the assumption "All assets have exchange value." It is normal and acceptable to find the words "should be" in a conclusion only in the sense indicated by a premiss such as "All assets <u>are</u> recorded at exchange value" and a conclusion stated as the one above; i.e., if you start with the assumption that all assets are recorded in a certain manner, it does follow that whatever asset you look at, you <u>should find</u> that it is recorded in that manner. To deduce norms, it is necessary to hypothesize norms.

The situation is not unlike that in the statement of a theory in economics. A simple statement of identities, such as, for example, income equals consumption plus investment ($Y=C+I$), or the money supply times the velocity of its circulation equals the price level times income ($MV=PY$), is not sufficient to reflect a theory. It is necessary to include at least one behavioral equation in order to contribute empirical content to the concluding equations. Thus, continuing with the examples, to ($Y=C+I$) one might add ($C=a+bY$) and ($I=\overline{I}$), or to ($MV=PY$) one might add ($V=\overline{V}$); and, what results are theories which can be investigated. The behavior of the economy can be compared with the theory because the theory hypothesizes behavior. Hypothesizing a state of affairs allows the exploration of the consequences of that state; without an hypothesis you can deduce nothing

save that which is true by definition in the system.

If one proposes, then, that accounting principles are deducible from postulates, either both groups of general statements must be, in some part, normative, or neither group will be. For, if the principles are normative, their normative aspect must have been present in the postulates. If the postulates are not normative, whatever principles are deducible from them have no such additional characteristic.

Logic and Data Gathering

Under a commonly used distinction, appearing often in accounting literature,[1] those methods of reasoning from the particular to the universal or the less general to the more general have been called inductive, the reverse reasoning being true of deduction. Reflection on this distinction seems to suggest that the process of data gathering and compilation is reserved for those who would use inductive reasoning. The users of deductive reasoning, on the other hand, are less "empirical," and certain prejudices are again provoked.

Such a characterization will not be used in this paper; for, since it leaves some arguments as neither inductive nor deductive, it does not effectively dichotomize all arguments. Examples may make this point clear.

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[1]See, for example, the comments of William J. Schrader, "An Inductive Approach to Accounting Theory," The Accounting Review, XXXVII (October, 1962), pp. 645-649; LaSalle, op. cit.

This bank account is either free or restricted. (Premiss)
This bank account is not restricted. (Premiss)
This bank account is free. (Conclusion)

This argument moves from two statements about a particular bank account to another statement about this particular bank account. Under the suggested distinction above, it would be neither inductive nor deductive. Consider also the following argument.

Machines A and B are both screw machines. (Premiss)
Both machines were produced by the same manufacturer. (Premiss)
Both were purchased in the same month. (Premiss)
Both produce at the same rate. (Premiss)
Both are used to produce the same product. (Premiss)
Machine A required a complete overhaul after 10,000 hours of operation. (Premiss)
Machine B required a complete overhaul after 10,000 hours of operation. (Conclusion)

An argument of the above form has often been called an argument by analogy, characterized as neither inductive nor deductive. It also moves from the particular to the particular, and under the distinction suggested above would be neither inductive nor deductive.

The argument form called perfect induction is exemplified below.

Unprocessed material on hand is inventory. (Premiss)
Partially processed materials on hand are inventory. (Premiss)
Completed materials on hand are inventory. (Premiss)
Raw, partially processed and completed are the only stages in which you find materials on hand. (Premiss)
All materials on hand are inventory. (Conclusion)

In an argument of this form, the premisses exhaustively report the term generalized in the conclusion. It is

reasoning from the particular to the general. However, one would want to attribute to the conclusion a degree of acceptability that reasoning in that direction does not normally receive.

Since the distinction based on the quantity (universal or particular) of premisses and conclusions leaves at least three general types of arguments (those shown in the examples) belonging with neither inductive nor deductive, it will be rejected as not an effective characterization. The examination of the general characteristics of logical methods can, nevertheless, be expedited by an inductive-deductive division. When confronted with an argument, the recognition of its inclusion in the group of inductive or deductive arguments will better enable one to understand its strengths and its limitations. Hence, what is wanted is a distinction which could be applied to effectively categorize all arguments.

Proposed Distinction

The distinguishing characteristic used in this paper relates to the nature of the argument. The distinction will be made for valid arguments (correct arguments), only, since as Leonard says:

> On the whole, there is not much point in trying to classify invalid arguments as deductive or inductive; they are invalid, and that should usually be an end of the matter.[1]

[1] Leonard, op. cit., p. 433.

A deductive argument shall be one such that no other statements, if added to that argument as premisses, can make that argument invalid. An inductive argument shall be one such that at least one statement, if added to that argument as premiss, can make the argument invalid.[1] Stated another way, if an argument is deductive, then if all the premisses are true, the conclusion must be true. If an argument is inductive, then if all the premisses are true, the conclusion is to some extent probably true but not necessarily true.[2]

With this distinction, we can safely call the earlier argument about the bank account deductive; i.e., if the two premisses are true, there is no additional statement which will cause the conclusion to be false. The distinction allows the classification of the machinery argument as inductive, since a single statement about Machine B having surpassed 10,000 hours of operation without need of overhaul will cause the conclusion to be false. The inventory argument is recognized as deductive (despite its common title of perfect induction).

The next two chapters will be devoted to the logical methods which can be categorized as deduction and induction.

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[1] The substance of the distinction is due to the comments of Leonard, in Principles of Right Reason.

[2] Use of the word "necessary" at this point is not intended to convey the meaning characteristic of necessity in modal logic where something is necessary if and only if its negation is not self-consistent.

CHAPTER III

DEDUCTION

Methods in General

Discussions of deductive logic often differentiate between methods of traditional and methods of symbolic or mathematical logic. The differentiation is misleading for at least two reasons. First, although the methods of modern logic make more extensive use of symbolization, Aristotle himself, the recognized founder of logic, also utilized symbols to implement his work. Secondly, with one minor exception,[1] the inferences which were accepted in traditional logic are likewise accepted in modern logic. Thus, the valid arguments of traditional logic form a proper subset of the valid arguments of symbolic logic.

> The difference between the old and the new logic is one of degree rather than of kind, but

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[1] As generally presented, the logic of Aristotle accepted certain inferences as legitimate which would be precluded by the acceptance of the null class. Thus, from the statement "All Fs are Gs" it could be asserted that "Some Fs are Gs" logically followed. The more modern interpretation of the original statement is that it would be true if all Fs are Gs and also if there are no Fs. Under this interpretation, one could not assert that some Fs are Gs legitimately. The modern interpretation, which does not preclude working with empty classes (or, more specifically, the null class), has proved more effective than the other, older interpretation.

the difference in degree is tremendous.[1]

One argument should be sufficient to exemplify the difference in scope. We should want to be able to say that the following argument is valid without the addition of any more information:

> All marketable securities owned are assets.
> Therefore, the cost of a marketable security owned is the cost of an asset.

The argument is admittedly simple (even trivial), and it would be difficult if not impossible to find someone who refused to accept it as correct reasoning. Nevertheless, it has been established that utilization of all of Aristotelian logic will not allow the inference to be drawn. More modern logic would allow for proof of such an argument by using terms expressing relations.

Unfortunately, several accountants who have discussed the use of formal deductive logic do not seem to be aware that the science of logic has advanced at all since the days of Aristotle. For example, Mr. Malcoln L. Pye treats formal logic as equivalent to syllogistic reasoning (another name for traditional logic).[2] The same misunderstanding appears in Professor Schmidt's article, "Practical Use of the Device of Formal Logic in Accountants' Daily Work,"[3]

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[1] Irving M. Copi, Symbolic Logic (New York: The Macmillan Company, 1965), p. 7.

[2] Pye, op. cit.

[3] Schmidt, op. cit.

and some writings of Professor Littleton.[1] This misunderstanding has caused these writers to underestimate the power and the usefulness of formal logic. However, given that the essence of traditional logic is included in the scope of symbolic logic and that the latter is an immensely more powerful tool, the present study of deduction will pertain to the techniques of the modern logician.

The Systems Approach

When argumentation is analyzed in such a manner that the smallest unanalyzed unit may be smaller than a complete sentence, such argumentation in modern logic is generally presented in the form of systems which are either formal or informal. A system consists of:

1. signs or symbols and an effective method for determining whether a sign or symbol belongs to the system (usually accomplished by making a list);

2. sequences of symbols called formulas, which may be either meaningless or meaningful (called well-formed formulas);

3. rules for constructing sequences of well-formed formulas (creative rules, commonly called axioms, and transformation rules, commonly called rules of inference).

The difference between formal and informal systems, like that between formal and informal arguments in ordinary language, lies in what is left unsaid. Technically, in a formal system, each initial sequence of a proof within

[1] See, for example, Essays on Accountancy.

the system is also a proof within that system while in an informal system, initial sequences of a proof are not always also a proof. In more general terms, a formal system operates with no presupposed knowledge, such as knowledge of accepted logical inferences or meanings of logical symbols.

Axiomatic Methods

"Axiomatic" is the name given by logicians and mathematicians to the method of formalization which

> . . . begins with a list of undefined terms and a list of assumptions, or postulates involving these terms, and the theorems are to be derived from the postulates by the methods of formal logic. If the last phrase is left unanalyzed, formal logic being presupposed as already known . . . the development is by the informal axiomatic method. And in the opposite case we shall speak of the formal axiomatic method.[1]

There is a technical difference between a formal system, as discussed above, and a formal axiomatic system. It is sufficient, for the purposes of this exposition, to explain that the difference again relates to what is left unsaid, and formal systems are generally said to "have deduction itself as its subject matter."[2] In either system type, however, it is not legitimate to omit any premisses in any proof, or the resulting sequence of formulas is not a proof. A formal system, equated in this interpretation with

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[1]Alonzo Church, Introduction to Mathematical Logic, Volume I (Princeton, New Jersey: Princeton University Press, 1956), p. 57.

[2]Copi, Symbolic Logic, p. 184.

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[1]Alonzo Church, Introduction to Mathematical Logic, Volume I (Princeton, New Jersey: Princeton University Press, 1956), p. 57.

[2]Copi, Symbolic Logic, p. 184.

logistic system, is the most rigorous form of deduction. Such rigor is appropriate for the study of deduction, but exceeds that required for the study of most other subjects, including accounting.

There are, then, two methods of deductive logic to be dealt with here—formal and informal axiomatic methods.[1] When a system is to be set up to formalize the discussion of some area of a particular subject, the system builder is said to be using the axiomatic method. The absence of a distinction between logical and subject matter primitive symbols, or of explicit statement of effective rules for recognizing meaningful formulas, or of some of the rules of proof-construction, or some combination of these characterizes an informal system, and the builder of such a system is said to be applying the informal axiomatic method.

In Church's definition quoted above, in a formal axiomatic system the formal or underlying logic is not presupposed. A formal axiomatic system is only slightly less rigorous than a logistic system, since the primary distinction lies in explicit separation of the primitive symbols and axioms into those pertaining to logic and those

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[1]The use of natural deduction systems with no stated postulates is considered here as a special case of the informal axiomatic method. Such systems can be used to explore the consequences of individual premisses which should be stated as part of each deduction in which they are assumed. But, where more than two or three assumptions are dealt with, the establishment of them as axioms is more convenient and the system with these axioms added will be a case of the informal axiomatic systems used here for discussion purposes.

pertaining to the individual branch of knowledge under study.

For the purposes of researchers in fields other than logic, the formal axiomatic system requires unnecessary precision. The formal axiomatic method has been used on occasion by mathematicians. However, most mathematical presentations, even when dealing with highly complex and abstract problems, involve the informal axiomatic method.

Accountants perform mathematical operations such as addition, subtraction, differentiation, etc. without stating at the outset of each discussion the rules by which these operations are performed and the justification for their allowability. If accountants find a use for the axiomatic method, whatever systems are constructed will accept at least one (and probably several) symbol (viz., the equality or identity sign), and the rules for its use without explicit incorporation into the formulation of the system. If accountants were to explicitly include all suppositions within their system, it seems doubtful that the system-builder would include a complete set of effective formation rules which stipulate which symbol sequences are meaningful—persons conversant with accounting and logic will be presumed to have knowledge of what sentences are meaningful. If some accountants become more familiar with logical inferences, it is likely that whatever systems are constructed using the axiomatic method will presuppose the

tautologies of the propositional calculus.[1] Since any axiomatic system constructed with such presuppositions would not qualify as formal, accountants using the axiomatic method will, for good and practical reasons, undoubtedly employ the informal axiomatic method. The degree to which rigor is lost in return for practicality will depend on the degree of informality in the system constructed. Since it is likely that the informal axiomatic method will be the one useful in accounting, the remainder of this chapter will be devoted to that method. Most of these comments apply equally well, however, to formal axiomatic systems.

Informal Axiomatic Method

As explained earlier, informal axiomatics is a deductive method of dealing with a subject by constructing an informal deductive system. At a minimum, the basis of the

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[1] In simple terms, tautologies are sentences that are true for every combination of truth-values (truth and falsity) of the variables in the sentence. One of the many possible translations of several of the more familiar tautologies of the propositional calculus are given below as examples.

$(p \vee -p)$	A proposition is either true or false. (The law of excluded middle.)
$-(p \,\&\, -p)$	A proposition is not both true and false. (The law of contradiction.)
$(p \supset --p)$	If a proposition is true, then it is not true that it is false. (Converse law of double negation.)
$(p \supset p)$	If a proposition is true, then it is true. (The reflexive law of implication.)
$(p \supset q) \supset (-q \supset -p)$	If, whenever one proposition is true a second is true also, then, whenever that second proposition is false, the first is false also. (The law of contraposition.)

system must include

1. a list of undefined terms relating to the subject matter;
2. a list of axioms;
3. some reference to at least some of the rules of inference to be allowed; and
4. an intended interpretation of the undefined terms.

Rigor and the Importance of Rules

The rigor of reasoning reflected by a given system in its proofs is a function of the nature of the allowable transformation rules and the extent to which the system-builder has explicitly stated them. The following comment appeared in an editorial in the Journal of Accountancy immediately after the publication of Accounting Research Study No. 3:

> Dr. Sprouse and Dr. Moonitz have given great weight to the word co-ordinated, and have accordingly constructed their set of principles in accordance with rigorous rules of logic.[1] (Underscore added.)

Dr. Moonitz presents fourteen general statements about accounting and other things which, he suggests, form a foundation for accounting principles. However, the principles suggested in Accounting Research Study No. 3 have not, in any way, been shown as having been the logical consequences of the postulates, inferrable from them through

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[1] Editorial, "The Approach to Accounting Principles," CXIII (May, 1962), p. 37.

the use of rules of formal logic.[1] No rules for allowable inferences were given! Professor Devine, as quoted earlier, referred to "stock intellectual cliches" utilized in accounting literature and discussions. I believe he would agree that "it follows logically that . . ." falls in this class. The specification of rules of inference in an axiomatic system is a precise statement of what the individual author actually means when he says "it logically follows." The reference to an explicit rule of inference stated at the outset of an argument is the support for the use of the cliche on a particular occasion. Without such a statement, any reader of such argument (proof, justification) may legitimately ask "How does it follow?"

The more explicitly stated the rules, the less open to criticism are the system-builder-arguer's proofs (assuming, of course, that the rules are followed). In the way of more general example, one system may require, by its more explicit statement of the allowable inferences and the types of inferences allowed, six steps to construct a proof of a given theorem, while another, composed of the same undefined terms and axioms, might allow the proof of that theorem in one step. Assuming the systems are of equal quality (characteristics of quality to be discussed shortly), the proof in the first system is said to be more

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[1] More complete discussion of these studies can be found in Chapter VI.

rigorous than that in the second. Less is left to the imagination. Inferences which are obvious to some are not so apparent to others; rules of inference which are familiar to some are unfamiliar to others.

Scope of the Problem To Be Solved

The use of the informal axiomatic method does not by itself limit the scope of the problems to which it can be applied. It is often noted that completeness is a requirement of an axiomatic system, and this requirement is interpreted by some as dictating the type and scope of problems to be attacked with this method. But, completeness is misunderstood if interpreted in this manner. A system is complete if its theorems are all those which the system-builder intended to find as theorems of the system. As such, the requirement suggests that the system is suited to the problem at hand, and in no way demands a certain scope or complexity of the problem to be handled. G. Peano (1858-1932) devised a system to derive the entire arithmetic of natural numbers. There have been several formulations of Euclidean geometry.[1] There have likewise been proposals, at

[1]Formalization was valuable since, despite literary references to Euclidean geometry as an outstanding example of the axiomatic method, Euclid's formulation was extremely informal by modern standards of rigor. No rules of inference were stated and, in fact, some of the proofs required assumptions other than those stated as axioms and postulates. Later references in this paper to Euclidean geometry are to be understood as pertaining not to the system as proposed by Euclid, but as formalized by later geometers.

least, for outlining and formalizing a general "theory"[1] of accounting as well as suggestions that certain areas of accounting be axiomatized. DR Scott, in 1949, views the theory of accounting and suggests:

> As the system of accounts has become more complex and the variety of services rendered by it has increased, the general concepts and rules governing its operation have become correspondingly broader. The logical outcome of this evolution would be a consistent hierarchy of rules and principles proceeding from the specific and detailed to the more and more general until the broadest accounting principles merged into still broader principles of social organization. Throughout its modern history accounting has been moving towards such a perfected system of theory.[2]

In what way can the experience of others be related to the accountants' proposed use of the axiomatic method?

Though the scope of those formalizations mentioned above is immense, they do have some limits, and there is no basis for concluding that all those who resort to the axiomatic method did have, or need have, such grand-scale objectives. The systems constructed by mathematicians[3] have not

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[1] "Theory," "concept," "postulate" are generally not presented in quotation marks in this paper in two contexts: (1) when the usage is common in a field other than accounting, as in relativity theory, and (2) when the usage coincides with that suggested in Chapter V.

[2] DR Scott, "The Influence of Statistics upon Accounting Technique and Theory," The Accounting Review, XXIV (January, 1949), p. 85.

[3] Historical facts stated in this paper relating to mathematics, physics and other sciences were synthesized from various sources, but especially from the following: R. Blanché, Axiomatics, translated by G. B. Keene (New York: The Free Press of Glencoe, 1962); Albert Einstein, "Fundaments of Theoretical Physics," published originally

all started out to axiomatize the whole of mathematics. The Peano system was concerned with only the natural numbers. One of Tarski's interests was the algebra of real numbers. Woodger[1] has utilized the axiomatic method in his formulation of certain parts of biology, primarily genetics. It is true that in some ways the Newtonian and earlier theories are made obsolete by the presentations of relativity theory; but, in one sense at least, the theories are discussing different things. The Newtonian theory coincides with the Einsteinian theory when the velocities of bodies are small as compared with the velocity of light. This fact suggests the notion of a theory holding "over a relevant range," a phrase used often also with economic theories. A related example of this same notion is found in the field of geometry where axiomatic systems have been constructed with interpretations that reflect Euclidean and non-Euclidean ideas of space. The

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in Science, XCI (1950); Philipp Frank, "Philosophical Interpretations and Misinterpretations of the Theory of Relativity," published originally in Interpretations and Misinterpretations of Modern Physics (Paris, 1938); and Eugene P. Wigner, "The Limits of Science," published originally in Proceedings of the American Philosophical Society, XCIV (1950); the last three references reprinted in The Philosophy of Science, edited by Herbert Fiegl and May Brodbeck (New York: Appleton-Century-Crofts, Inc., 1953), pp. 212-231, 253-261 and 757-765, respectively; also Carl G. Hempel and Paul Oppenheim, "Studies in the Logic of Explanation," Philosophy of Science, XV, 2 (1948), reprinted in the Structure of Scientific Thought, edited by Edward H. Madden (Boston: Houghton Mifflin Company, 1960).

[1] J. J. Woodger, The Technique of Theory Construction (International Encyclopedia of Unified Science, Foundations of the Unity of Science, Volume II, No. 5; Chicago: The University of Chicago Press, 1939).

theorems of the first have been interpreted (had specific meanings given to the symbols used in them) for use in most of the geometrical operations with objects of our more common experience. The theorems of the latter have been interpreted for use in some geometrical operations pertaining to astronomy and certain branches of modern physics. There is, in fact, still no assurance that physical space corresponds to the postulates of Euclidean or non-Euclidean geometries.

From the very beginnings of the sciences as we know them today, there have been hopes that a basis would be found to unify all the various branches of study in each, and perhaps even an underlying theory unifying all the physical sciences. Research in this direction is continuing. Yet, for the highly developed and co-ordinated science of physics, for example, there is as yet no general theoretical basis.

The hope of formulating a system for a general theory of accounting, of which the systems of, for example, financial accounting, cost accounting and governmental accounting are, for all practical purposes, special cases or subsystems, is not beyond the realm of possibility. To the extent that all accounting operations in these fields have something(s) in common it may be suggested that these things may be the consequences of some general statements concerning the accounting process. But other disciplines have not limited their research in formalization to the search for a unifying general theory. One might say that without the formalized

knowledge acquired in the special branches of each science, there is nothing to unify. For the most part, the theories in accounting are at a stage of development and formalization which strongly discriminates against the success of such a search. The axiomatic approach to the formulation of a general theory of accounting is an ambitious objective at the present time. The use of the axiomatic method in the presentation of some special area of accounting knowledge may be a more limited objective, but an admirable one, for it can contribute to the understanding of what is involved in that area, and in the use of the method, and can pave the way for research on a less limited scale.

Primitive Terms

Just as the scope of problems to be attacked is not limited by the use of the informal axiomatic method, the undefined terms in an informal axiomatic system are not subject to strict limitations. In the Peano axiomatization of the arithmetic of natural numbers there were three primitive notions. After the initial formulation (which was not intended primarily to exhibit frugality in the primitive base), successive, successful attempts to construct informal axiomatic systems of Euclidean geometry reduced the primitive terms from four to two.[1] Economy per se in the size of the primitive basis of a system is not a virtue,

[1]Pasch's system (1882) required four terms and the system of Pieri (1899) and Padoa (1900) required only two.

but it offers certain advantages.

For an informal axiomatic system to be of interest to anyone beyond its originator, the intended interpretation of the primitive notions must relate the system to some subject matter. For example, "N" or "*" may be manipulated within the framework of a system without any reference or perhaps even any interest in what one might mean by them. By interpreting "N" as "number" and "*" as "successor," the system becomes related to arithmetic. Most fields of inquiry contain more than a few words of especial interest to students of that field. If the number of primitive notions is limited, additional terms must be defined by means of those notions, and the problem of selecting such notions as will be appropriate and sufficient for defining the remaining terms is a major one. If the number of primitive notions is not kept small, the problem of definitions is alleviated to some degree but a new problem takes it place—an increase in the number of axioms. Axioms assert that certain relationships hold between the terms used in their statement and may be very simple or very complex. For example, one of the Peano axioms of arithmetic can be stated simply as "Every number has a successor," which states a relationship between the primitive notions "number" and "successor." Axioms are, so to speak, together with the definitions of a system, the only source of information in the system. If a primitive term is to be useful, it must appear in some axiom; a large number of primitive terms,

then, requires either axioms made complex by the inclusion of more terms, or a large number of axioms. In the presentation of the results of an axiomatization as support for one's argument, there is, at least initially, the question of the acceptability of axioms (which will be discussed later in more detail). If the number of axioms is large, the question claims more time for resolution. If, instead, axioms are made more complex, the deductive simplicity of the system is decreased. Thus, though logic does not require economy in the adoption of primitive notions, practicality would seem to dictate that such terms be kept to a minimum.

An additional advantage is to be gained from using few primitive terms. Again, remembering that the system may be used in conjunction with the presentation of some argument, even before the question of axioms' acceptability arises, the participants in the presentation must be aware of the intended interpretation of the terms used in the argument and its supporting proof within a system. The fewer terms involved, the fewer interpretations to be understood and agreed upon as suitable at the beginning of the argument. Finally, the ability to define a large number of terms of the subject matter by using combinations of only a few may in itself be of value in adding precision to the pre-systematic understandings of those defined terms.

An example of the problems produced by selection of primitive terms, and the degree to which precision might be required in formalization of a general statement of

accounting, may be helpful to illustrate how logical presentation can differ from ordinary careful writing. Consider Postulates A-1 and A-5 in Accounting Research Study No. 1.[1] A-1 states, in part, "most of the goods and services that are produced are distributed . . ." This statement may be understood to assert one of two different things.

1. All goods and services are produced, and most are distributed, or
2. Of the produced goods and services, most are distributed.

The difference between the two interpretations may appear slight when the postulate is considered in isolation. However, consider Postulate A-5, which states that money is the common denominator for the measurement of "goods and services, including labor, natural resources, and capital." Now, the first interpretation, above, of Postulate A-1 cannot be accepted; for, natural resources, which are part of "goods and services" according to A-5, are not produced, and the first interpretation of A-1 asserts that all "goods and services" are produced. Whether labor can be produced is questionable and may depend on the definition offered for the term "produced."

On the other hand, adoption of the second interpretation of A-1 may be more appropriate but brings up the question of what can be said about goods and services that are not the result of production. Do the same observations about

[1] For a complete statement of the postulates discussed here see Appendix A.

the distribution through exchange apply? If conclusions are drawn from the postulate as rephrased under the second interpretation (together with other statements, of course), it must be recognized that they can apply only to produced things.

The addition of the explanatory phrase "including labor, natural resources and capital" in A-5, though possibly intended by the author only as a matter of example (or even as an afterthought), causes further problems in the attempt to present a more formal and precise statement of the postulate. If these additional terms are to be retained in the more precise statement, the postulate may require restatement in a form something like the following:

Money is the common denominator in terms of which measurement is made of

1) things that are goods and labor, or
2) things that are services and labor, or
3) things that are goods and natural resources, or
4) things that are services and natural resources, or
5) things that are goods and capital, or
6) things that are services and capital, or
7) things that are goods, but neither labor, nor capital, nor natural resources, or
8) things that are services, but neither labor, nor capital, nor natural resources.

This example indicates that even the extreme care which Professor Moonitz must have taken in his writing does not produce the precision which may be required for logical analysis of the written words. The case for holding down the number of terms, and especially primitive terms, is very strong.

The historically earlier attempts at the axiomatizing of any specific field are less thrifty with primitive notions for at least two reasons. First, the initial formalization can be studied for the very purpose of accomplishing a reduction in primitive terms. This can be seen in the axiomatizations of plane geometry. Secondly, the initial formalization usually generates renewed interest in the pre-systematic, empirical definition of those terms taken as primitive. The interest draws attention to the details of such definitions, often suggesting new, so to speak, more primitive notions which may be fruitful and less complex. Geometry is a good example here, too, for an analysis of the early primitive notions such as "plane," and "segment" led to their discard in favor of, in one system "movement," and in another, "distance."

Attention to definition and interpretation as the result of a systematization of a theory has produced other effects. With the theory of relativity, the idea of simultaneity has undergone a change so that its complete explanation is deemed to require reference to an observer. In connection with the developments of mathematical systems, the older definitions of "number" have been reconsidered, and substantial work has been done to clarify this notion.[1]

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[1] Notably the words of Frege and Russell; Gottlob Frege, The Foundations of Arithmetic, translated by J. L. Austin (New York: Harper & Brothers, 1950) and Bertrand Russell, Introduction to Mathematical Philosophy, Second Edition, 1920.

Developments in the field of physics have renewed the interest in an adequately explicated concept of "probability."[1] While the actual use of the primitive notions within an informal axiomatic system does not require that the notions be precisely understood, the use of the system as an adjunct to the oral or written justification of a position held mediates in favor of such precision.

There is another problem which has confronted the users of the informal axiomatic method which should be briefly considered here.[2] Most of the physical sciences have now, in their vocabularies, both abstract and elementary terms (often called observation terms).[3] Which kinds of terms should be primitive has been something of a problem. There has been a trend toward choosing those at a high

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[1]One of the classic investigations of the concept is found in Rudolf Carnap, Logical Foundations of Probability (Chicago: The University of Chicago Press, 1950).

[2]The problem of abstract terms has an interesting sidelight unrelated to the present discussion. Such terms as molecule, rigid body, number and hydrogen ion have been used as the starting point of many theories, and the resulting formalized theories have been exceptionally valuable. Whether in fact there are such things as these, however, is a question which has not been answered. This writer adopts a kind of instrumentalist view that if such abstract, theoretical constructions yield beneficial results, the ontological questions will be left to the philosophers.

[3]A particularly helpful discussion on the use of abstract terms is to be found in Rudolf Carnap, Foundations of Logic and Mathematics (International Encyclopedia of Unified Science, Volume I, No. 3; Chicago: University of Chicago Press, 1939).

level of abstraction, but most of the sciences have not been able to adequately define the wealth of elementary terms by reference to these abstractions, and some of the former are still to be found as primitive.

For accountants who would utilize the axiomatic method, the problem of primitive notions may be a formidable one but not incapable of solution. In some of the studies more concerned with the nature of accounting, efforts have been made to determine what Professor Littleton called "the center of gravity,"[1] or the underlying concepts of the accounting process. In these works, though, there is not complete unanimity that, as Professor Littleton suggests, "income" is that "basic concept that makes accountancy different from all other methods of quantitative analysis."[2] Dr. Marple is more inclined to "capital" as the basic notion.[3] In the recent American Accounting Association monograph, Professor Goldberg proposes that characterization of accounting will include "basic premisses" or primitive notions relating to activity, outlook, measurement and record, and suggests that the notions selected might be

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[1] A. C. Littleton, Structure of Accounting Theory (American Accounting Association, 1953).

[2] Ibid., p. 18.

[3] Raymond P. Marple, Toward a Basic Accounting Philosophy (New York: National Association of Accountants, 1964).

"event," "commander," "resource" and "reddito" (the last being a word coined specifically for this purpose).[1] Throughout most of accounting literature, reference is made to such terms as "cost," "value," "economic benefits." Even less abstract terms such as "liability," "asset" and "equity" have received considerable attention, though the variety of interpretations of these terms and the problems which appear in practice relating to their application in a given situation challenge the designation of them as less abstract than the others mentioned. Collections of a number of these terms might form a primitive vocabulary for several axiomatic systems. As was noted above, pioneering works in axiomatization in most fields have not been particularly frugal in adopting primitive terms. That these accounting terms are not precisely defined or that there is no universal acceptance of a definition would not preclude their use for some particular problems. For example, it is possible to say several things about assets or recorded amounts without reference to cost. Or to make several comments about expenses without reference to liabilities or even equities. One might adopt the axiomatic method for an exploration of those possibilities.

At any rate, the use of the axiomatic method, with its need for undefined terms, to more rigorously approach

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[1]Louis Goldberg, An Inquiry into the Nature of Accounting (American Accounting Association, 1965).

problems in accounting, would undoubtedly generate the same intense interest in the adequate defining of basic concepts as has resulted in other fields of study. Following the analogy further, accountants may find that concepts more abstract than asset, income and equity will be necessary or more fruitful as more research is done with the use of this method.

Axioms

The selection of axioms poses at least as many problems as the choice of primitive terms. The problems divide into two basic categories, one related to the number of axioms and the other connected with their selection. As stated earlier, axioms can be said to "govern" the primitive terms; hence, the number of such terms has some effect on the number, or at least, the complexity of the axioms. In the Peano axiomatization of the arithmetic of natural numbers, for instance, the three primitive terms are governed by five axioms. Further, in the discussion of primitive terms it was noted that when the axiomatic system is used as an adjunct to the presentation of an argument or a position, the acceptability of axioms is subject to question. Hence, the number of axioms will affect the amount of time devoted to establishing a preliminary "meeting of the minds" on the subject in question.

The distinguishing characteristic of deductive arguments has been stated as the fact that no additional

premisses can render the conclusion invalid; that is, if a deductive argument is valid, then if all the premisses are true, the conclusion must be true. This characteristic is, of course, true of axiomatic systems. The truth insured by the use of the axiomatic method consists in the fact that if the axioms are granted as true, the theorems must also be granted as true. Thus, the famed incontrovertibility which some accountants have attributed to the conclusions derived within a given deductive system rests solely within that system--they are necessarily true and their contradiction false only if one adds the further qualification "within that system" or "if the axioms are true." If the rules of inference are not in question when an accounting argument is supported by an axiomatic presentation, the arguer's problem consists precisely in having his axioms granted as true. His first desire would be, of course, to find axioms which were obvious to everyone--the often made request of accountants to establish their arguments on "self-evident" truths.

The suggestion for self-evident axioms is generally made after reflection on Euclid's presentation of plane geometry which separates axioms and postulates. Those statements termed postulates were so-called because Euclid believed them not as self-evident as his axioms, though perhaps equally well accepted by fellow geometers. Despite the seeming difference, it is essential to understand that the status of those postulates in Euclid's system is exactly

the same as that of the axioms—statements in both groups are appealed to in proofs of theorems and all the proofs are considered to have equal validity. In the system, then, all must be accepted equally.

Looking at the experiences of others we find that the establishment of theories in the physical sciences would have been severely hampered by the requirement that all postulated relationships be self-evident. As the scientist has investigated matters more and more general in nature, the desire for self-evidence in working hypotheses has declined, and been supplanted in many cases by a desire for merely an understandable hypothesis. And, as the scientist has adopted methods of theory formalization even this criterion has met with only limited success.

> In consequence it became more and more possible to forego an "intuitive understanding" of the abstract terms and axioms and theorems accumulated with their help. . . . The demand for [even] an intuitive understanding of the axioms was less and less fulfilled when the development [of complex formalizations through the use of the axiomatic method] led to the general theory of relativity and then to quantum mechanics, involving the wave function.[1]

The axiomatic method has become a standard practice in the highly developed science of physics. That self-evidence or an "intuitive understanding" of axioms is not a formal requirement in the presentation of a system in physical theory should not preclude an interest in such a quality on

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[1]Carnap, Foundations of Logic, pp. 209-210.

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the part of scientists in fields only now adopting the axiomatic method. Such statements as "The assets of an accounting entity equal the equities in that accounting entity," or, as Professor Moonitz suggests, "Every accounting process is related to some entity or other," if not self-evident would at least gain universal acceptance. Nevertheless, the fact that such a requirement has, on the whole, proved to be forbiddingly restrictive in advanced sciences should be kept in mind. That Professor Moonitz's postulates have not gained universal acceptance should not discourage attempts to, for example, determine the logical consequences of accepting them.

The whole idea of self-evidence is, in fact, a relative one. Euclid, himself, was not wholly convinced of the self-evidence of his postulates, especially the parallel postulate, and strived to deduce it as a theorem of his system from the remaining axioms and postulates. The history of geometry shows that others were equally unconvinced, and the non-Euclidean geometries appeared with some form of denial or omission of this postulate as an axiom. For anyone not trained in mathematics or geometry, the axioms of Euclid cannot be said to be self-evident—familiar, perhaps, but not patently obvious. And history shows that what may at one time be termed self-evident can be, at a later time, considered false. That the sun revolved around the earth seemed a self-evident proposition to early astronomers.

Again, the use of an axiomatic system does not require that the axioms be self-evident or obvious but only that they be accepted for the purposes of the particular argument.

In accounting literature dealing with the use of methods of deductive logic to approach accounting problems, a desire for self-evident axioms is commonly expressed. In view of the vagueness of such a notion, it seems unwise, if not impossible to make such a stipulation.

If self-evident axioms are not required, it might be suggested that the accountant-arguer turn to statements the truth of which has been established in previous deductive argumentation. But as every other scientific investigator, the accountant should recognize that infinite regress will result, for the truth of those other statements likewise rests upon the truth of their premisses or axioms. Accepting the fact that any axiomatic presentation will bring, at some point, the question of acceptability of axioms, the advantage of initially attacking problems of smaller scope than the whole of accounting can be seen--the less sweeping the assumptions, the more likely initial agreement. Likewise, the fewer the assumptions, the less upon which to disagree.

Still, of what advantage to accountants is the use of the axiomatic method in argumentation, if, at the starting point of the argument the axioms must be tentatively accepted. One of the most important benefits of using the

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axiomatic method is that it enables the system-builder to explore the consequences of his assumptions regardless of their truth or their wisdom. The system-builder can find the answer to the question "What am I committed to if I accept this assumption?" And where are these accounting assumptions for exploration to be found? Professor Moonitz's postulates in Accounting Research Study No. 1, if they can be formulated in logical terms, offer some assumptions to be explored. The whole of accounting literature is filled with general statements about accounting which, if they could be presented in suitable logical form, could be used as the primitive basis of individual axiomatic systems. To what is the accountant committed if he assumes that his measuring unit is uniform? If it is not? To what is he committed if he equates acquisition cost with market value without reservation? The answers to questions such as these may enable the accountant to decide whether or not he wishes to make any such assumption regardless of its absolute truth.

Accepting statements regardless of their demonstrated truth is not nearly so heretical as it sounds at first. The geometer does not, after all, believe it true that the sum of the angles of all physical triangles is 180 degrees. He does not expect to find even one line between two points. He is not sure if any two lines are ever parallel. Nor does the physicist claim or observe the truth of statements about

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rigid bodies in free fall. Yet the axiom systems of these scientists rest on assumptions about such things as points and lines, parallels and rigid bodies. Returning to the very first comments on deduction, validity or correctness of deductive arguments can be determined by the rules of deductive logic. Whether the axioms of any system are true in the real world is simply not a matter of consideration within that system. It is a question outside the system entirely.

The writer has suggested only where the accountant-system-builder might get his axioms and why they might be selected. In the later chapter dealing with inductive logic, other considerations will be given with respect to the truth of any given statement.

Other Conditions of a System

In addition to completeness which was discussed in connection with the scope of the problem being investigated, it is generally required that axiomatic systems have independent and consistent axioms and rules of inference. Independence means, briefly, that no axioms be deducible from the others and that no rule of inference be included without which all theorems are still deducible. Independence serves the purpose of reducing the number of axioms to an irreducible minimum hence decreasing the number of assumptions which must be granted. It is likewise helpful

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when investigating the system apart from its contents in order to develop metatheorems, or theorems about the system. However, it is not an indispensable quality. For accountants who may wish to utilize the axiomatic method, the importance of the independence requirement should not be exaggerated or allowed to interfere with the construction of a system which for all other purposes appears adequate.

The central requirement of any axiomatic system is that it be consistent. This word is very familiar to accountants. It is even more important in logic than in accounting, for while accountants may now and then countenance inconsistency for good reason, the logician cannot do so. Since the rules of inference which would be preferred by accountants in any use of the axiomatic method would certainly be those accepted by logicians, the consistency of their systems will depend on the axioms alone. There are several descriptions given by logicians for the consistency of a system, but in general the system is consistent if it is not possible to prove as theorems both a statement and its negation.

Obviously, accountants would want to abide by this requirement. But it must be emphasized that consistency is a requirement of a given system, and that it is not synonymous with deducibility. We might consider here the suggestions of some writers that the acceptable accounting practices (presumably after accountants utilize logic) will be those practices which can be shown to logically follow

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from acceptable principles which were determined logically, and only those practices, since those will be the only ones consistent with the acceptable principles. Assuming for a moment that an axiomatic system is constructed for a general theory of accounting, this expectation is still in error. It is entirely possible, logically speaking, for a given statement--in this case, the statement of an accounting practice, if one could be given in an appropriate logical form--to be logically consistent with several others despite the fact that the statement in question cannot be shown to follow logically from the others. Consider, for example, the practice of carrying as an asset items of inventory that are damaged but salable, and a general statement (perhaps called a principle) that merchandise which is damanged and unsalable is not an asset. It is possible to utilize certain rather complex techniques to compare two or three (and perhaps a few more) simple statements to determine their logical consistency outside any particular system. But, the usefulness of these techniques is limited to relatively simple statements in small groups. In the example given, the two statements about merchandise are logically consistent, but the latter (Damaged, unsalable merchandise is not an asset) does not imply the former.[1] The area for exercise

[1]The statement regarding consistency and implication is supported by actual tests made by this writer which are somewhat complex to be presented here, but may be of interest to the reader relatively familiar with uniform quantification theory. The statements about accounting were first translated

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of a judgment factor by accountants would remain. For, if alternative practices are logically consistent with accepted principles, the individual accountant must select a practice—even after the logician had axiomatized a general theory of accounting.

On the other hand, the development of <u>one</u> consistent axiomatic system for a general theory of accounting <u>would</u> answer the need for consistency in the principles of accounting if the theorems of that system were given the name of "principles." For this development to be of value, however, it would still be necessary that only the one system be accepted; and the steps to its acceptance include the acceptance of its axioms. Again, then, it can be seen that the establishment of a complete set of consistent accounting principles on the basis of a deductive presentation of the

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into simple closed schemata and then tested for consistency and implication in accordance with the techniques suggested in <u>Methods of Logic, Revised</u>, by Quine (Sections 20 and 21). The translations used are given below, with the following dictionary:

"M" is intended to mean "merchandise"
"D" is intended to mean "damaged"
"S" is intended to mean "salable"
"A" is intended to mean "asset"
"&" is intended to mean "and"
"⊃" is intended to mean "only if"
"∃" is intended to mean "some"
"-" is intended to mean "not"

The general statement that damaged and unsalable merchandise is not an asset is then transcribed as follows:

$$(x)\,[(Mx\ \&\ Dx\ \&\ -Sx) \supset -Ax]$$

And, the statement describing the practice that damaged but salable merchandise is an asset has been transcribed as follows:

$$(\exists x)\ (Mx\ \&\ Dx\ \&\ Sx\ \&\ Ax)$$

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Symbolization

The construction of an axiomatic system, it was said earlier, requires the selection of certain primitive notions and an intended interpretation of them. Since the axioms postulate relationships between these notions, the axioms become interpreted as postulating relationships between interpreted terms; i.e., interpreted, they become sentences of the subject matter being axiomatized. For example, the following is a schema of uniform quantification theory:

$$(\exists x)\ (Mx\ \&\ Dx\ \&\ Sx\ \&\ Ax)$$

This schema postulates (asserts) a relationship (the relationship of being conjoined to, or in simpler terms, the "and" relation) between notions ("M," "D," "S," and "A," whatever they may be). When the notions are interpreted as "merchandise," "damaged," "salable" and "asset" ("M," "D," "S" and "A," respectively), the schema becomes a sentence of accounting which might be read: Some damaged, salable merchandise is an asset.

One of the most serious impediments to extended intelligent dialogue between accountants is the fact that most accountants have developed personal interpretations of the terms common in argumentation, and these personal interpretations interfere with the progress of the argumentation. But the deductive correctness of the argumentation is apart

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from the interpretations. And, the use of logic in argumentation has, as its primary purpose, the establishment of the correctness of argumentation.

> This is the advantage of formalization, i.e., of the separation of the calculus as a formal system from the interpretation. If some persons want to come to an agreement about the formal correctness of a given derivation, they may leave aside all differences of opinion on material questions or questions of interpretation.[1]

To accomplish this, scientists have turned to symbolization in the construction of axiomatic systems. By symbolization is meant generally the use of single letters or other shapes or groups of such in place of the ordinary words of the language and the introduction of variables. Woodger relates, in his exploratory work with axiomatics and biology:

> Symbolization is in no way theoretically essential, but its merits have long been recognized in mathematics and chemistry and it is all but indispensable in a theory in which calculation . . . is to be performed.[2]

Again,

> Practically it is impossible to make much progress in mathematics and logic without appropriate symbols, just as it is impossible to carry on modern trade without checks or book credit, or to build modern bridges without special tools. . . . Symbolic reasoning is essentially reasoning on a large scale with instruments appropriate to such wholesale undertakings.[3]

There is sometimes expressed a feeling that symboli-

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[1] Carnap, Foundations of Logic, p. 208.

[2] Woodger, op. cit., p. 67.

[3] Cohen, Preface, pp. 22-23.

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zation will destroy an unidentified "something" in the presentation of an accounting argument, that the utilization of logic in symbolic presentations will, in fact, diminish the value of the argumentation. Throughout this paper, however, it was stressed that the use of the axiomatic method by construction of a logical system was an adjunct, a sort of visual aid, to the presentation of a particular position on a controversial accounting question. As such it is not unlike the accountant's utilization of mathematical formulae or models in a discussion of some theory regarding proper balance sheet valuations. The additional tool enhances rather than interferes with the value of the discussion. Professor Cohen noted, "If logic were indeed only a manipulation of symbols it would be as devoid of scientific utility as chess or tick-tack-toe."[1] Certainly accountants are not unique in their initial reluctance to adopt symbolization in argumentation. Perhaps as Professor Cohen says,

> The opposition to symbolic reasoning, like the old opposition to the introduction of machinery, arises from the natural disinclination to change, to incur trouble or expense for a future gain. The prejudice against careful analytic procedure is part of the human. . . . Impatience with technique which arises from the fact that men are interested in results and would like to attain them without the painful toil which is the essence of our moral finitude.[2]

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[1] Cohen, Preface, p. 22.

[2] Ibid., p. 10.

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If accountants are to obtain the fullest benefits from the use of the powerful tools of modern logic, serious consideration should be given to accepting symbolization in argumentation.

The Logic of Functions Of Propositions

The system approach was said to apply to argumentation in which the smallest unanalyzed unit may be smaller than a complete proposition. It is sometimes desirable to reduce an argument only to sentences or propositions and functions or complexes of them. Deductive techniques are available for investigating such argumentation which is said to be in the form of functions of propositions. The system approach has also been used by logicians to investigate the logic of certain sets of such functions and these systems are generally called propositional calculi. But the construction of such systems is not necessary to utilize the deductive techniques for determining the validity (correctness) of argumentation which has been analyzed in this manner. It is sometimes possible, for example, to analyze a single sentence to be assumed and a single conclusion which is claimed to be implied by it. The logic applicable in such a case is called molecular logic or the logic of truth functions, and is the simplest of the deductive methods.

By the methods of truth-value analysis one can determine whether the assumption of one or a series of sentences

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truth-functionally implies another sentence. By implication is meant that there are no circumstances under which the conclusion can be false if the assumed proposition is true. At first glance it would seem that some aspect of truth-functional logic is what some accountants would wish to use, since most argumentation in accounting has been presented in prose or full-sentence form. But, a brief review of an application of the logic of truth functions should be sufficient to show that something more is needed for any intensive investigation of accounting problems and arguments.

Consider a discussion among three accountants on the problems of balance sheet classification. Each states his opinion on one simple problem as follows:

A: As far as I'm concerned, a bank account is not a current asset unless it is in the name of the company and is not pledged as security for some kind of debt.

B: Let's be more positive about this. A bank account is a current asset if it's in the company's name or it is not pledged as security for a debt.

C: You fellows are much too complicated about these matters. A bank account is a current asset only if it's not pledged.

Do these three accountants agree with each other? Does each position actually imply the others? Truth-functional logic can help to answer these questions, and the results will be surprising to most accountants. The positions could be restated in the form of truth functions of the constituent propositions as follows:

A: -p v (q

B: p ⊃ (q

C: p ⊃ -r

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A: -p v (q & -r)
B: p ⊃ (q v -r)
C: p ⊃ -r

where the letters and signs are interpreted as follows:

"p" stands for "A bank account is a current asset"
"q" stands for "A bank account is in the name of the company"
"r" stands for "A bank account is pledged as security for some debt"
"v" stands for "or"
"⊃" stands for "only if"
"-" stands for "not"
"&" stands for "and"

As a result of truth-value analysis of these statements, it can be determined that the three accountants' positions are not equivalent. (By equivalence is meant that the positions will have the same truth value under all circumstances.) The position held by A implies (as defined above) those of B and C, and that of C implies the position of B. Logically, the similarities end right there. The position of B implies neither that of A nor that of C, and that of A is not implied by the position of C.

It is even more important to note that none of the positions considered express the position "A bank account is a current asset if and only if that account is in a solvent bank, is in the company's name, and is not pledged as security for a debt of some kind." Yet this statement is the one most accountants would say exactly expresses the actual requirements. Moreover, this statement, call it Position D, is not equivalent to any of the other three. Position D may be expressed logically as:

$$(x)\left[Bx \supset \{CAx \equiv [Sx \;\&\; CNx \;\&\; -(\exists y)(Dy \;\&\; PSxy)]\}\right]$$

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This expression may be translated by utilizing the following dictionary:

"B" stands for "is a bank account"
"CA" stands for "is a current asset"
"S" stands for "is in a solvent bank"
"CN" stands for "is in the company's name"
"D" stands for "is a debt"
"PS" stands for "is pledged as security for"
"$\supset$" stands for "only if"
"$\equiv$" stands for "if and only if"
"&" stands for "and"
"$\sim$" stands for "not"
"$\exists$" stands for "some"

Thus, the above string of symbols might be loosely translated into English as

> For everything you select, if it's a bank account, then it's a current asset if and only if it is in the company's name and the bank is solvent and it is not the case that it is pledged as security for some debt.

Little training in logic is required to see that this formulation is considerably more complex than those presented for Accountants A, B and C, earlier. This expression is beyond the scope of the logic of propositions alone. It involves what are known as quantification theory and the logic of relations, both of which are usually found in axiomatic systems. From this example, it should be clear that some of the simplest statements in accounting will require substantial analysis to bring out their logical form in order that they be dealt with logically.

Although the application of truth-value analysis to functions of propositions is, in one sense, the simplest form of deductive analysis, it is also the most basic of

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deductive analytical techniques. The molecular logic is usually assumed as part of the rules of inference in constructed systems such as those described earlier. It is rarely found used alone in analyses of argumentation since its use requires that full propositions remain unanalyzed and most arguments require a deeper analysis as indicated by the simple, single statement above.

The use of the logic of truth functions as related to functions of propositions is limited in another way. Referring again to the earlier example, the question was not asked, "What does each position imply?"but rather,"Does one position imply another?" To utilize truth functional logic with functions of propositions, the positions to be analyzed must be stated; for the propositional functions implied by any of the three original positions are, in fact, infinite. Thus, tests for implication can be made only on stated positions. Moreover, to determine that one statement implies another is not a proof of the latter from the former as premiss. It is logically possible to show that one statement implies another without ever being able to derive that latter with the former as the only premiss. This is true also in logic more complex than simple functions of propositions.

What do these limitations mean for accountants who would turn to logic in the analysis of argumentation? The application of the simplest logical techniques to accounting statements requires considerable precision in the formulation of those statements. The use of the logic of truth functions

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as applied to functions of propositions alone is extremely limited. Even the simplest statement concerning accounting seems to require considerable analysis of the individual parts of the propositions. For a few cases in which two or three accountants may express their positions on a single subject in only slightly different forms, a simple analysis using the proposition as the smallest unanalyzed unit of analysis may determine whether the positions are equivalent. However, most arguments occurring among accountants will involve something other than simple statements of position, and analysis limited to whole propositions is not likely to be of much value. Some use may be found when a debate arises between two accountants who have constructed informal axiomatic systems to support their theories on a particular matter. If the axioms of the systems exhibit apparent similarities such as those shown in the example presented earlier, mutual implication may be tested for. But in these situations there are more efficient methods for testing within the systems themselves; for if the axioms of one system are equivalent to the axioms of another, the latter will be theorems of the former and vice versa. The primary reason, then, for accountants to understand molecular logic is that it is usually incorporated into any axiomatic system.[1]

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[1] This fact was alluded to earlier when the comment was made that accountants might wish to accept certain tautologies in their use of deduction. Tautologies are, as can be seen from footnote 1, page 44, expressed as truth functions of propositions, in many cases.

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Conclusions

Certain conclusions can be drawn as to the usefulness of deductive methods in attacking accounting problems simply by examining the characteristics of deduction and its applications in areas other than accounting.

1. With the exception of simple truth functions of propositions, all the recognized deductive methods involve the construction of systems. The limitations imposed by adopting the proposition as the smallest unanalyzed unit are sufficient to preclude this practice as the sole deductive tool for analysis of argumentation. Of the system methods available, the informal axiomatic method seems the only one suited to the needs of the accountant since the requirements peculiar to the other methods relate to matters which do not affect the validity of the argumentation and are more important to the study of logic and higher mathematics. Moreover, practically, the informal axiomatic method is the most appropriate for initial attempts at formalization in a particular subject. The adoption of this method, with its explicit statement of allowable inferences, is the support needed for an accountant's claim that a conclusion which he advocates is "implied by" or "logically follows deductively" from an argument he has presented.

2. The informal axiomatic method may be used to investigate problems varying in scope. The experience of investigators in the sciences indicates that a general

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theory involving the whole of the particular discipline is a continuing ideal but not, by any means, a reality. On the contrary, the most progress has been made and the axiomatic method most useful when approaching problems with carefully defined boundaries. The accountants' desire for an axiomatization of the whole of accounting, or a general theory of accounting, seems likewise an ideal to be strived for but a monumentally ambitious single goal. Review of the requirements of an informal axiomatic system further substantiate this judgment. At this time, very few of the theories in accounting have been formalized in a manner which allows their examination from the point of view of deductive validity. The use of the axiomatic method to formalize theories in some particular area of accounting knowledge such as balance sheet classification or asset accounting seems a more attainable goal at this time and could prepare the way for research on more complex problems.

3. Consistency being a quality of a deductive system, the goal of consistent accounting principles deduced from basic accounting postulates can be attained only through the construction and adoption of a single axiomatic system for the whole of accounting. The same requirement holds for the attainment of the goal of consistent accounting practices deduced from accounting principles.

4. In no subject can the adoption of the axiomatic method guarantee the absolute truth of a given statement in

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5. The adoption of the axiomatic method will not once-and-for-all-time resolve disputes regarding definitions of basic concepts or assumptions in accounting, even in a particular small area. Its use in other subjects has generated interest in more adequate definitions of basic concepts, however, and this can be expected in accounting also. Similarly, its use in other subjects has facilitated the investigation of the deductive consequences of certain assumptions, and this, too, can be expected in accounting. Given the inability to determine absolute truth by resorting to the axiomatic method, this second advantage of the method may help accountants to decide which assumptions would be of value.

6. If the axiomatic method is utilized in an investigation of some particular area of accounting, the major problems will be adequately defining the boundaries of the area, finding primitive terms appropriate to that area and finding axioms to govern those terms which are sufficiently fruitful to produce the desired theorems. The various works concerning the underlying concepts of accounting offer a

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7. Accountants who would call on the tools of the logician to analyze and evaluate their argumentation should recognize that the fullest benefits cannot be derived from them without resort to symbolization to some extent. Even the simplest analysis into the truth functions of propositions is facilitated by the use of logical symbols.

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CHAPTER IV

INDUCTION

Inductive arguments have been characterized in this paper as those whose conclusions are not necessarily true; i.e., arguments such that there is at least one statement which, if added to the original premisses of the argument, can make the argument invalid. The premisses of an inductive argument are intended to offer good, but not conclusive grounds for asserting the conclusion of that argument. Hence, the strength of an inductive argument rests with its premisses. This, of course, can also be said, in a sense, about deductive arguments. The difference can be expressed in this manner: If one grants the premisses of a valid deductive argument, one is committed to acceptance of the conclusion with equal vigor; if one grants the premisses of an inductive argument one is still logically free to hold a position representing the exact opposite of that conclusion.

The status of an inductive generalization is shown clearly by the following example from chemistry. It is a well-known fact in chemistry that hydrochloric acid turns blue litmus solution red. If, however, a man were to say "I have seen the litmus solution turn red a hundred times after the acid is added, but the next time I believe that

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it will turn green," he is not contradicting himself--there is a logical possibility that he is right. As Professor Black has said, "The soundness of an inductive conclusion is a matter of fact, not merely a question of the logical relations between the premisses and the conclusion of the inductive argument."[1]

The very nature of inductive argumentation precludes a complete listing and description of the methods of such argumentation, since there are an infinite number of ways to build inconclusive arguments. Moreover, it is perhaps inappropriate to portray inductive arguments as valid or invalid, for it can always be said, then, if the conclusion of such an argument turns out, as a matter of fact, to be false, that the argument was invalid while appearing valid at one time. Deductive arguments, on the other hand, are either totally valid or totally invalid, there is no place for partial or temporary validity. Inductive arguments admit only of degrees of strength.

Nevertheless, some accountants have advised the adoption of inductive methods of investigation into accounting problems, or at least mentioned induction as part of a discussion of methodological possibilities. Professor Littleton refers to "Inductively Derived Principles."[2] Professor

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[1] Max Black, Critical Thinking (New York: Prentice-Hall, Inc., 1952), p. 304.

[2] Littleton, Structure, Chapter 11.

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Schrader, for example, presented a paper which, he said,

> . . . constitutes an exploratory study of the possibility that significant generalizations about accounting might be derived inductively.[1]

The comment seems to imply that this practice is not generally followed by accountants, and suggests further that it might be beneficial. With a clear understanding of the nature of induction, the accountant-researcher might now question the necessity and advisability of investigating inductive argument any further. No less a logic authority than Bertrand Russell is quoted regularly for his remark that "all inference is deductive" so that "what is called induction appears to me to be either disguised deduction or a mere method of making plausible guesses."[2] The writer suggests, at this point, that if what is desired in the current accounting quest for better theory is rigorous reasoning by accepted rules of logic which ensures unquestionable argumentation not open to criticism, then what is desired is not induction in any form. Inconclusiveness characterizes all such arguments.

But, to close the topic of induction at this point would be to do injustice to those accounting writers who have asked only for more thought, more careful consider-

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[1] Schrader, op. cit., p. 645.

[2] Ralph M. Eaton, General Logic (New York: Charles Scribner's Sons, 1931) p. 69, quoted in turn from p. 11 of Principles of Mathematics.

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> If we were to confine ourselves to the study of validity, we should be shirking the task of the "criticism of thought." For in real life we want our conclusions to be true as well as valid—irreproachable reasoning can be no substitute for well-grounded premisses. We are led, therefore, to consider the ways in which the truth (as distinct from the validity) of conclusions may be established.[1]

If, then, accountants are also interested in establishing the truth of their conclusions, there may still be a place for inductive argument in the study of accounting, though it would appear that such truth will be established only inconclusively.

As was stated above, a listing of the methods of induction is hardly feasible. Philosophers and logicians have, at times, however, suggested certain general grounds on which a person might hold a given proposition to be true, and have discussed the question of whether such grounds justify maintaining that given position. There are three general reasons one might give for holding a proposition to be true. One might say (1) I hold this proposition to be true because it is, or (2) I hold this proposition to be true because X said so[2], or perhaps, (3) I hold this proposition to be true because I know it to be so from

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[1] Black, op. cit., p. 249.

[2] Often, the appeal to authority is treated simply as a fallacy of informal argument rather than a valid ground for belief as will be noted later. Earlier in this paper,

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experience. The first two of these are not generally considered as premisses of inductive arguments having as their conclusion the proposition in question. But some such statements are often used in support of a stated position. If the concept of induction is expanded slightly, the fact that such support is used in inconclusive argumentation allows their discussion in this paper. Under the third ground, broadly interpreted as the appeal to experience, will be found those arguments generally categorized as inductive. In arguments of this type, the premisses relate to the specific subject matter with which the conclusion-proposition in question deals, while in arguments on the first two grounds, the evidence presented (premisses) is rather, in a sense, about the proposition taken as a whole. The remainder of this chapter will be devoted to a discussion of these three general grounds of belief, the ways in which they have been utilized by researchers in other fields of study, and their possible relevance to the study of accounting.

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mention was made of fallacies of informal argument which relate primarily to suppressed premisses. A listing of the common fallacies would serve no useful purpose in this paper and can be obtained from any standard introductory text in logic. The selection of the appeal to authority for inclusion in this paper in this particular section was based upon the realization that such an appeal can be reasonable grounds for belief in some cases, although sometimes it may be misused and hence lead to fallacious argument.

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Argument Based upon Self-evidence[1]

A position held and claimed self-evident or obvious has no actual stated premisses, for self-evident means that which does not need the evidence of any other proposition. At best, it could be called an inductive argument whose only premiss is "The following proposition is self-evident." Such an argument is found, for example, in the Declaration of Independence which states, in part:

> We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these rights are life, . . .

There is no doubt that certain propositions have been held to be true and even self-evidently so in the history of mankind. As was discussed in Chapter III in connection with the selection of axioms for a deductive system, appealing to self-evidence, or even looking for examples of such truths is fraught with difficulties. There have been times in the history of man when it was believed self-evidently true that the earth was flat and the sun rotated around the earth. Closer to modern times, we find that self-evidence is asserted for the proposition that two

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[1]From the following discussion have been excluded the two principles which are normally suggested by philosophers as self-evident: the principles of contradiction and excluded middle. It was noted earlier that some interest has already been expressed in not asserting the law of excluded middle in some special cases. The exclusion of these two principles from the discussion should not materially affect its completeness, for these principles are not those generally asserted by accountants as self-evident.

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straight lines cannot cross more than once or that space is finite. Yet modern scientists would not accept the unqualified truth of the latter two statements. In fact, much of what is now accepted belief in science stems from the refusal of some scientists in the past to accept what was proclaimed as self-evident.

It is equally important to note that true and self-evident are not synonymous. It may be true that the ocean tides are affected by the moon, but this fact is by no means self-evident. Similarly, it may be true that a check was written on the only bank account maintained by X Company or even that all X Company's checks are written on that bank account but certainly neither of these truths is self-evident.

A distinction should, likewise, be made between self-evident and universally accepted. Universal acceptance, if ever any such thing could be so and proved to be so, cannot be equated with self-evidence. The proposition that two plus two is four is certainly very close to being universally accepted; yet one might hesitate to suggest that it is self-evident. Similarly, although one might find universal acceptance of the truth of Dr. Moonitz's postulate that a report on economic activity must clearly identify the specific entity involved in that activity, it could hardly be called self-evident. The finding of a report on economic activity which does not do so is certainly not inconceivable. The farther one's statement

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Two lessons are to be learned from the experience in other disciplines and should not be ignored by accountants interested in furthering the knowledge of their subject. First, the prospect that propositions are equally self-evident to all concerned is very slight; and second, the advancement of knowledge which may come from the refusal to accept such propositions may be a high price to pay for universal acceptance and uniformity. The statement made by the University of Illinois Study Group that "postulates are self-evident propositions which underlie and are directly related to the accounting discipline, . . . generally recognized as valid,"[1] is very significant for the critical reader of the monograph. There is no point in discussing the results of that group's research since the authors have refused to accept discussion of the basic statements upon which the rest of the monograph is said to rest.

If propositions which have been proclaimed as self-evident are subsequently questioned and subjected to further investigation, their justification will involve some type of argumentation yet to be discussed. In any case, the argument involving simple claims of self-evidence

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[1] A Statement of Basic Accounting Postulates and Principles, p. 7.

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offers very little promise for the consolidation and expansion of accounting knowledge.[1]

Argument Based Upon the Testimony of Others

A great many of the beliefs we hold or propositions we assert are the result of simple inductive argument with the testimony of others as premisses or support. The value of such argumentation is undeniable. In the simple matters of life we accept, without personal experience, the testimony of doctors that an overdose of certain drugs is fatal—we would not want to learn this first hand, nor would we be able to establish the truth of more than one such statement in this manner. We accept the testimony of engineers that automobiles and airplanes do not run on water. We turn to the dictionary for word meanings without any thought that we are going to be deceived.

In matters more related to business, we accept the credit information about X Company supplied in a Dun & Bradstreet report without having ascertained the data directly from X Company's previous creditors. We accept

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[1] Certain propositions are said to be self-evident when "analysis" of the proposition alone enables one to ascertain its truth. A proposition such as "Balance sheets balance" or "Income is shown on the income statement" falls into this category. The truth of such propositions is guaranteed by what they say--they are true, so to speak, by definition. There can be no question as to the truth of such propositions, but as noted in Chapter III, what is, by definition, true, offers no information. And, moreover, these types of propositions are not those generally asserted by accountants as self-evident.

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as fact that income taxes will be levied upon our new organization without ever before having operated a profit-making company. We accept as fact that we will be sued if we don't pay our debt to creditor A, though we have never before neglected to pay our debts and subsequently been sued. We measure quantities of inventory by means of scales, rulers and yardsticks without having ascertained personally that these measuring devices measure in accordance with the standard by which we intend to abide. The acceptance of these facts and subsequent actions thereon represent reliance on testimony of others, often called an argument from "authority." Daily life would be intolerable, nay, impossible, without some reliance on the testimony of others.

The most highly developed of the physical sciences are not without reliance on the testimony of others. Without it,every chemist and physicist would have to perform every experiment which was made to establish every general statement of his science which was involved in his current experiment. Without it, each scientist would have to construct his own measurement tools. The basis of psychiatry would fall if the established general patterns of human behavior and reactions were ignored. In short, there would be little, if any, advancement in scientific knowledge without some acceptance of the reported findings and opinions of others. Yet these scientists recognize that reported experience is not conclusive proof. Even in the most advanced of

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The normal audit engagement is filled with examples of reliance on the testimony of others—letters of inquiry to legal counsel, stock transfer agent, banks, customers, etc. Without reliance on such testimony, the audit could not move to completion within a period of time which would allow the production of timely financial statements.

The wisdom of accepting the testimony of others in some instances is beyond question; the necessity of the qualification "in some instances" is equally undeniable. One who appeals to the testimony of another must always be prepared to answer a question as to why that testimony should be considered as adequate grounds for accepting the truth of the stated proposition. When listing fallacies of informal argument, philosophers recognize the possibility of an inappropriate appeal to authority, introducing the notion of differentiating between good and bad testimony, i.e., a need for evaluating a reference to authority. Consider the accountant who states that financial reporting has improved over the past twenty years on the ground that Andrew Barr said so. Such a remark could very well be made in connection with some premiss in any number of arguments dealing with, for example, the progress in accounting, the success of the AICPA or the SEC, or the growth of stock

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ownership. There is no logical necessity for accepting the arguer's position on the grounds he has suggested. If his opponent recognizes this appeal to authority as acceptable, all is well; if not, he may be required to offer further information such as that Mr. Barr is chief accountant with the Securities and Exchange Commission and has been with that organization since 1938, that the chief accountant of the SEC should be in a position to opine on reporting trends, etc. The example here represents an appeal to a recognized authority on the subject with which the argument deals. The type of fallacious appeal to authority envisioned by logicians is the use of the testimony of a recognized authority in one field to support a statement about something outside the field of that person's competence, such as an appealing to statements of Mr. Barr to support a civil-rights position.

The testimony of others as a grounds for accepting a certain position is particularly relevant to the history of accounting. Whatever it is that is considered "generally accepted" (theory, principles, practices, etc.) is the result of a build-up of authoritative statements accepting it. Individuals who are considering a particular accounting treatment normally search the literature for support of that treatment. It might be suggested that the multiplicity of accounting practices is at least partially the result of accountants' seeing that there is no logical necessity for

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accepting the testimony or experience of others, even that of recognized experts. Professor Paton, perhaps the most well-known authority in matters of accounting theory, states both that there are "postulates" in accounting (in the sense of important underlying assumptions) and what those postulates are. Yet with this testimony readily available, some members of the profession continue searching for postulates and others suggest that there are no postulates in the sense indicated. But, the history of science shows that even where most experts have agreed upon a particular matter, later evidence has been known to prove them wrong. In any case, simple appeal to Professor Paton's authority as an expert, and that of many other expert accountants who may agree with his position and his list of assumptions, will never logically necessitate the acceptance of these conclusions.

If a simple appeal to the testimony of experts, however many may be selected, is not completely satisfactory grounds for accepting a given statement, its supporters might present either the deductive argumentation used by those experts in arriving at their conclusions or the evidence from experience used by those experts in arriving at their conclusions inductively. The problems which will be encountered when deductive argumentation is presented for examination have been noted in Chapter III, mainly the problem of proper formulation of the argument and the selection of

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suitable axioms or starting points. The subject of inductive argumentation on the basis of experience will be discussed in the next section.

Argument Based upon Experience

Arguments based upon experience can range from positions supported by a single personal observation to a series of such observations or a group of complex descriptions of highly technical experiments. The popular notion that induction is that argumentation which moves from the particular instance to the general is most related to the argument based on experience since the general statements and laws of the sciences are thought to be conclusions based on a finite number of observations. The example from chemistry used earlier exhibits this situation: it is concluded that all cases of combining two specific liquids will produce a certain phenomenon on the basis of a series of experiments in which this phenomenon has occurred. The fact that such an argument, called an "inductive generalization" is not conclusive despite the general nature of its conclusion (and could be destroyed by a single negative instance) has been noted already. It has also been shown, by reference to an argument by "analogy," that induction based on experience is not limited to the notion of inductive generalization.

The common characteristic of arguments based upon experience is the use of data resulting from individual observations, whether accidental or intentional, simple or complex. Each argument includes, as premisses, evidence

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in support of the conclusion. Evidence is the key to induction. And, like the testimony of others, considered earlier, evidence may be either good or bad. There are no formulas for discriminating between the two kinds. While there have been suggestions through the history of logic and science as to how evidence might be gathered and analyzed, there are no rigorous rules or laws for distinguishing between good and bad evidence or for drawing conclusions on the basis of that evidence. There are, however, some general patterns of reasoning followed in arguments dealing with observations from experience known as inductive generalization, analogy and statistical generalization.[1] Each of these argument patterns will be discussed below together with brief comments on its major problem(s) and its past and possible future use in accounting. In addition, some brief comments will be made about the "hypothetical method" which has some characteristics in common with the three argument forms listed. No specific reference will be made to a special "scientific method" for there is no agreement amongst scientists or logicians that one method of argumentation occupies the central place in scientific

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[1]There is by no means complete agreement among logicians as to the types of inductive argument, so that any list suggested here will not coincide with all writings on the subject. Only in rare, and not unchallenged cases, has an author proposed that his listing is complete. See, for example, William Kneale, Probability and Induction (Oxford University Press, 1949). It is more common to suggest that the types of inductive arguments cannot be enumerated with accuracy.

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investigations.[1] The various argument forms proposed in the past as representing the "scientific method" are included in the four types selected for comment here, however.

Inductive Generalization

An argument involving an inductive generalization consists of premisses relating the evidence (that a certain fact was noted in some instances, which of necessity are only a sample of the total possible instances) and a conclusion which is of a universal form. Put in another way, from the premisses that the observed objects, events, situations, or whatever, in a group have a certain characteristic (be it a property or a relation), it is inferred that all items of that type have that characteristic.

The strongest argument is that which rests on the most complete or adequate evidence, with the latter phrase being

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[1]For example, Russell has described the method as consisting of "inventing hypotheses which fit the data, which are as simple as is compatible with this requirement, and which make it possible to draw inferences subsequently confirmed by observations." (Human Knowledge, Its Scope and Limits [New York: Simon M. Schuster, 1948], p. 311). When this description is coupled with his remarks about induction quoted earlier, the "method" of the scientists sounds rather unscientific. Karl Popper (The Logic of Scientific Discovery [London: Hutchinson of London, 1949]) maintains that the method of science is a form of the hypothetical method to be discussed later. Black (Critical Thinking), Robinson (The Principles of Reasoning, An Introduction to Logic and Scientific Method, Second Edition [New York: D. Appleton-Century Company Incorporated, 1930]), and Searles (Logic and Scientific Methods [New York: The Ronald Press Company, 1948]) all refer to several patterns of investigation as scientific methods.

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the crux of the problem and subject to some interpretation. Such an argument is that reported earlier about the combination of certain liquids in chemistry. Inductive generalization is the argument form which supports such scientific statements as "All magnets attract iron" or "Heat expands bodies." Most of the elementary and primarily descriptive statements of biology, chemistry and physics are the results of argumentation of this kind. In this group are also found some of the economists' generalizations, such as that held prior to the end of World War II that wars are followed by depressions and perhaps the profit motive assumption.

In the classificatory, defining stages of the physical sciences, collections of observations have been most valuable.[1] Thus, in the study of animal life, the classificatory schemes were established on the basis of innumerable observations, and categories such as fish, bird and man were suggested. As observations became more sophisticated, the characteristics of each category were carefully established and we find redefinition leading, for example, to the reclassification of bats and whales to the new category of mammals.

The most serious problem of which to be aware when statements are to be established by the "leap" from partic-

[1]For some interesting commentary on the role of induction in definition formulation see Georg Henrik Von Wright, A Treatise on Induction and Probability (London: Routledge and Kegan Paul, Ltd., 1951), Chapter 6.

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ular instances to a universal generalization is the incompleteness of the evidence. To be sure, the problem of incomplete evidence cannot be avoided since all instances--past, present and future--of a universal generalization cannot be examined. (If, in fact, all the evidence were available, the argument would not be induction at all but a case of that described earlier as perfect induction.) For this reason it is necessary to make every effort to accumulate evidence which, though incomplete, is without bias. A simple and commonly used example of biased evidence is the conclusion that all people are black based upon a multitude of observations by the members of a primitive African tribe. Here the evidence is biased by the geographic location of the observers. More basically, the evidence must not be biased by the exclusion of instances which contradict the general statement being made. The view, commonly attributed to Aristotle, that the evidence for inductive generalizations consists solely in the simple accumulation and enumeration of positive instances has long been considered erroneous, and the evaluation of evidence includes explanation of what might be called initially negative instances. Unlike the yet to be discussed statistical generalization, a single negative instance renders the inductive generalization false—hence the need for close scrutiny of apparently negative instances and the elimination of bias from the accumulation of favorable instances.

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theory which might be termed inductive generalizations based upon observations of business facts. It is possible that early accountants followed this line of reasoning when the idea of double-entry bookkeeping was originally conceived. Their observations that the business facts they had encountered had been analyzable into two parts, the accounting notion of duality, may have led to the conclusion that all matters to be accounted for could be analyzed in this manner. If so, the present controversies over the recording of pension liabilities and long-term leases, business facts, not observed, observable or even imaginable by the original proponents of the double-entry system, may be cases of negative instances which falsify the generalization regarding all business facts.[1] Mr. Dein, in fact, once observed that "the criteria for the admission of data into our accounting system has been whether we are ingenious enough to contrive an equality of debits and credits."[2] If, on the other hand, the owners' equity of the balance sheet

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[1] Professor Schrader ("An Inductive Approach") suggests that the balancing feature of an accounting system may be the necessary product not of the duality of business facts but of the fact that measurements are made. He suggests, on p. 647, that "if balancing is a condition required of every event admitted to the record, the aggregate must still have this characteristic." While his conclusion differs from the one expressed by this writer, he, too, notes that the evidence upon which the conclusion is based may be biased.

[2] Raymond C. Dein, "A Glance Backward at Research in Accounting," The Accounting Review, XXXVI (January, 1961), p. 7.

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Outside of the assumption of the double-entry system, there are few cases in the literature of accounting theory of the use of arguments leading from individual observations to universal generalizations. That, as Professor Moonitz says,[1] economic activity is carried on through specific units or entities, is the result of the definition of economic activity which requires that something be acting and not of some finite series of observations of economic activity being carried on. The usefulness of inductive generalization as an argument for establishing general statements of accounting theory which are normative, such as "All financial statements should identify the entity whose statements they are" appears severely limited. Observations that this, that or the other statement should identify the entity involved are biased by the observer's preconceptions of what ought and ought not to be done. A more general statement such as "All assets should be recorded" suffers the same difficulty. Moreover, it is unlikely that such a statement would even be argued inductively from the premisses that this, that and the other asset should be recorded, but rather from some more general state-

[1]Moonitz, Postulates, pp. 13ff.

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The University of Illinois Study Group suggests what appears to be a universal generalization relating the principal characteristics of assets. "They are measurable in monetary terms."[1] This conclusion is reached on the basis of evidence which seems to consist of noting the characteristics of those items which are listed in financial statements as assets. Here, too, there is bias inherent in the evidence, for the only assets which are included in the evidence are those which have been measured. There is no possibility of observing a negative instance in a set of instances which has, as a requirement for set membership, that the instance be a positive one.

One way in which observation, analysis and generalization about business or economic facts may be of use to accounting theorists is in the area of definition improvement. That the accountant deals with the same data as the economist does not automatically force the accountant to accept the economists' way of looking at things. Copi notes[2] that though the librarian, bookbinder and bibliophile all deal with the same basic material--books--each is interested in that material in a different way and will classify it according to his interest. Accounting and

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[1] A Statement, p. 16.

[2] Introduction, pp. 462ff.

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economics, while dealing with the same material, are not, after all, the same thing; and it is possible that the classification systems and definitions of the economist are not totally appropriate for the purposes and interests of the accountant. Professor Moonitz suggested something of this sort when he proposed that the term "income" be reserved for personal income and that "The terms 'earnings' or 'profit' are then available to describe the related concept when applied to accounting entities."[1] New classifications and/or definitions may meet with some resistance--as did Professor Moonitz's suggestion--but support can easily be found for the belief that some present definitions are not entirely adequate. While new classifications based on inductive generalization would be inductively argued, they might be supported at least as well as those presently in use.

Analogy

An argument involving analogy consists of premisses relating the evidence of noted similarities between two objects, events, situations or whatever, which are not known to be identical, a premiss that another characteristic is exhibited by one of these objects, etc., and a conclusion that the other object has that characteristic also. Stated another way, from the premisses that two things are alike

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[1] Postulates, p. 14.

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in some respects it is inferred that they are alike in another. Eaton distinguishes between argument by analogy and inductive generalization through enumeration by stating that inductive generalization

> . . . proceeds from statements about some particulars of a given class to a generalization about all particulars of that class; analogy proceeds from statements about some properties of given particulars to statements about other properties of those particulars.[1]

Analogical argumentation is common in both everyday life and scientific investigation. It forms the basis of medical research where experiments are performed with nonhuman animals who have some characteristics in common with the human animal. The conclusions of arguments stemming from successful experiment propose that successful treatment will be common to both the research animals and the human animals. Biologists have argued by analogy about the possibilities of life on other planets of the solar system. In the history of physics, analogical argument played a part in the development of a wave theory of light through an analogy with the organization and structure of the solar system.[2]

The problems encountered when conclusions are established by means of analogical argument center around the need for selecting relevant similarities and recognizing relevant dissimilarities. In medical research, different types of animals are used for different types of experiments

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[1] Eaton, op. cit., p. 555.

[2] From examples by Herbert L. Searles, op. cit.

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depending on the medical problem to be attacked. To an argument that the price of one stock will fall as the price of another did, the fact that the two stocks were obtained through the same broker is hardly as relevant as that the two companies are in the same industry or geographical location. Unfortunately, the notion of relevant similarity, like that of adequate evidence, is subject to interpretation; the decision as to what is relevant is a subjective one. The material composition or cleanliness of a measuring stick is not generally considered relevant to a measurement of length. Yet when dealing with measurements of extremely small dimensions, the absence of dirt particles on the measuring device becomes an important condition; and the possibility exists that in some cases the composition of the measuring stick may be a relevant factor in the experiment.[1] Thus, though the scientist may suggest those conditions which he considers to be relevant in his particular experiment, his report may still include comment on conditions he considers of doubtful relevance lest they subsequently be determined to be important.

The "as if" approach to the handling of some accounting transactions is an example of the analogical reasoning in accounting. This approach is seen, for example, in the recording of stock dividends and fixed asset acquisitions

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[1]This suggestion comes from a study of the concept of length of P. W. Bridgman in The Logic of Modern Physics (New York: The Macmillan Company, 1928).

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not involving cash. Similarities to cash transactions are noted, and the recording is effected based upon the characteristics of such transactions. Analogy is likewise used when accountants are confronted with a new situation or business fact and question whether it is to be recorded and if so, in what manner. An excellent example of the use of such argumentation is found in the discussion of the Arthur Andersen & Co. position on the accounting treatment of long-term lease obligations.[1] An analogy is drawn between such obligations and conventional types of debt. The argument states, in part, as follows:

> The similarities between leases and debt support the conclusion . . . that leases are frequently another form of financing under which the lessee acquires an important property right . . . concurrently with the creation of a fixed obligation.[2]

and concludes that such leases should, therefore, be recorded in the manner of other financing obligations. The same discussion offers an example of the importance of recognizing relevant dissimilarities in analogical argumentation and the subjectivity of the concept of relevance. Opponents of the recording of lease rights and obligations often draw an analogy between lease agreements and commitments for future operating expenses. The authors of the Arthur Andersen discussion attempt to falsify the conclusion of that analogy by pointing out what they consider to be

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[1] Accounting and Reporting Problems of the Accounting Profession, Second Edition (October, 1962), pp. 27ff.

[2] Ibid. p. 31.

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relevant dissimilarities between the two types of things being compared. That the firm's position is also based upon analogical argument renders it equally subject to question by those who disagree with its estimate of the relevance of the similarities contained therein.

Whether analogical argumentation offers any possibility for support of more general statements in accounting theory (such as the earlier example that activity reports should identify the acting entity) has not been explored. For example, no investigations have been made to detect possible similarities between the data of accounting and that of history, astronomy or biology. The writer does not wish to suggest that such similarities exist, but only that none have been looked for; and the search is made difficult by the absence of an authoritative collection of those general accounting statements in need of some support.

Statistical Generalization

An argument involving a statistical generalization consists of premisses relating the evidence that a characteristic is found to some extent in a sample or several samples of the total possible objects, events, etc., and a conclusion that this characteristic is to be found to some or perhaps the same extent in an examination of such objects or events. Closely akin to this argument form is the inference Carnap calls predictive or external,[1] which involves

[1]Carnap, Logical Foundations.

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the conclusion that a characteristic noted in one or several samples will also be found in another sample not overlapping the first.

Conclusions of arguments involving statistical generalization may, but need not, indicate the precision commonly associated with the word "statistical." Black forms the conclusion of such an argument as "Most (or, such and such a proportion of) cases of A are also cases of B."[1] In everyday life, statements of the form "This usually happens when . . ." or "Most of the time when . . ." represent conclusions from argumentation involving statistical generalization. In more precise terms, medical science has produced arguments leading to conclusions such as that pennicillin is sometimes but not always useful in treating numerous types of infections. Likewise, many of the laws of modern physics are statistical laws rather than universal statements.

Some distinction can be made between two uses of the qualifier "most." To conclude that most bank accounts are assets from the premisses that the several bank accounts examined were assets is not the same as from the premisses that a large percentage of those examined were assets. The latter is a statistical generalization. The former involves a kind of weak inductive generalization.

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[1]Black, op. cit., p. 327.

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a statistical generalization is the need for evidence which constitutes a representative sample of the objects to be generalized about. The problem of representativeness of the instances examined is shared, of course, by all the inductive arguments mentioned. In connection with the discussion of inductive generalization it was noted that the evidence must not be biased, which is equivalent to a question relating to the representativeness of the instances examined. In the discussion of analogical argument the need for relevant similarities was noted in order that accidental similarities be excluded as evidence to ensure the representativeness of the sample. But the representativeness of the sample is of particular importance to the statistical generalization. A single case which does not correspond to the conclusion of an argument by inductive generalization or analogy is sufficient to falsify that conclusion, but the conclusion of an argument by statistical generalization is, in a sense, harder to falsify. An example will make this point clear. Evidence may indicate that approximately eighty per cent of the machines of a certain type last between nine and ten years. Additional evidence that a randomly selected machine of that type lasted eight years is not sufficient to falsify the conclusion established by experience. If the original evidence was based on a random sample of machines of that type, another random sample which indicated that the machine life was between eight and nine years would not be sufficient to falsify the previously

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The notions of sampling and probability are inextricably associated with arguments by statistical generalization, however informal. Scientists who follow this method, whenever possible utilize the concepts of modern probability theory in appraising the acceptability of the evidence (the sample) in support of a conclusion stated as a statistical generalization. However, neither scientists nor logicians agree that the same concepts of probability are applicable to analogy, inductive generalization and statistical generalization, nor even which concepts apply to which arguments.[1] In the final analysis, the applicability of modern statis-

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[1]Carnap, for example, (Logical Foundations) proposes that one concept of probability relates to the probability of an hypothesis on a given evidence statement and another to the relative long-run frequency of "one property of events or things with respect to another." He suggests that no extensional concept of probability, dealing as it must with relative frequencies, will be appropriate for analogical argument since the strength of the analogy rests with the relevance of the similarities which is an intensional notion. Distinction is made elsewhere between the frequency and a priori theories of probability with the former more applicable to statistical generalization and the latter to other inductive conclusions. P. Coffey, in The Science of Logic, Vol. II: Method, Science and Certitude (London: Longmans, Green and Co., 1918), suggests that the probability to be attached to analogical argument is further complicated by the recognition that the relevant similarities used have only a probable connection with the similarity proposed in the conclusion. (pp. 154ff.)

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Though not related to accounting theory, in at least one activity performed by accountants the statistical generalization is commonplace, if perhaps not explicitly stated. An auditor's expressed opinion on financial statements is the conclusion of an inductive argument based upon experience (evidence). That evidence in turn is arrived at by similar argument. For example, in a normal audit engagement, the concluding work paper on inventory includes a statement of the auditor's position that the inventory is reasonable for inclusion in the financial statements. Such a comment is the conclusion of a long and detailed argument which rests on premisses relating the results of tests of physical counts, footings, extensions and pricing. The auditor's arguments are inductive and hence inconclusive. The notions of "materiality" and "fair presentation" can be interpreted as recognition of the inconclusive nature of the auditor's arguments.[1]

Statistical generalization as a form of argument to establish significant general statements in accounting theory offers only as much promise as those conclusions themselves offer. Generalizations such as that "Most assets

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[1] Present trends in the field of auditing to include testing procedures which embody the elements of modern statistical theory reflect further recognition of this fact.

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are recorded" or even that "Eighty per cent of all assets are recorded" (which might be supported by research and observation) are not generally found as premisses for further argumentation in questions of accounting theory. One might question the fruitfulness of such generalizations if they were used. Professor Moonitz proposes as a basic accounting postulate (which this writer would classify in the group of general statements of accounting) that "Most of the goods and services that are produced are distributed through exchange, and are not directly consumed by the producers." Presumably, he feels this generalization requires no report of the evidence which supports it though it appears to be in the form of the conclusion of an argument involving statistical generalization. Granting this conclusion for the moment, the important thing to note about statements such as this one is that the conclusion of any argument using them as premiss is subject to the same qualification; that is, it must take on the nature of a statistical generalization also. If, for example, Professor Moonitz wishes to further argue to some conclusion regarding the accounting for goods and services at exchange prices, he is subject to the limitation of the qualifier in his premiss unless further premisses are offered regarding the accounting for things not exchanged. Perhaps an additional analogical argument might be proposed to establish, albeit inconclusively, that things not distributed in exchange have exchange prices. Or it might be

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hypothesized that all goods and services are distributed through exchange and from this, coupled with some other assumptions, some conclusions may be deduced. But such an argument is not inductive but deductive as discussed in Chapter III. The truth of the conclusions rests with the truth of the premisses, one of which is the original generalization, and its truth still rests on the evidence for it.

Hypothetical Method

A method of scientific investigation often discussed in connection with inductive argumentation is that of suggesting an hypothesis, deducing some of its consequences and ascertaining whether the hypothesis and those consequences are in accordance with subsequent observations. Those statements which are implied by Newton's law of gravity are consequences of such a method. The law itself (stated as follows: Every body attracts every other body with a force which is proportional to its own mass but varying inversely as the square of its distance from that other) cannot have been established by observing instances of "forces," for "forces" are not the sort of things that can be observed. Movements of objects can be observed, but not forces. What Newton proposed were certain hypotheses about motion, and from these are deduced "the motion to be expected of bodies in various kinds of situations."[1]

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[1]William Kneale, op. cit., p. 100.

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When the postulates themselves are subject to test by observation, the evidential problem of inductive argumentation in general presents itself. Suppose, for example, that an hypothesis were suggested by means of analogical argument. To the extent that the hypothesis is general in scope, no finite amount of evidence can establish that hypothesis as true.

Often, the postulates themselves are not capable of test by direct observation (like those of Newton). Attempts are made to establish such postulates by testing the consequences derived from them or trying to arrive at these same consequences by inductive argument. If the consequences are tested and found to be in accordance with observations, there is said to be support for the hypothesis also. But in this situation, a peculiar characteristic of deduction becomes important. While a valid deductive argument guarantees that if the premisses are true the conclusion must be true also, there is no such guarantee that true conclusions cannot be deduced from false premisses. A well-known fallacy of deductive argument, usually called "affirming the consequent," involves essentially this same problem; affirming the consequent of a conditional argument does not imply the affirmation of the antecedent (hypothesis). Hence, to establish, however strongly, that the consequences of a particular hypothesis or set of hypotheses are true, or in accordance with some finite amount of observational

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evidence, does not necessarily provide equal evidence for the hypothesis. Nor does the ability to deduce conclusions which are in accordance with some observational evidence guarantee that the hypotheses used are the only hypotheses which would produce these conclusions. Whether the evidence supporting the consequences is of importance in establishing the hypothesis depends on facts outside the realm of logic; the judgment of the scientist is an important factor here. The relevance of the hypothesis to the conclusions must be judged. The availability of other hypotheses from which can be deduced the same consequences must be considered. The relationship of the hypothesis to other scientific statements previously investigated and tentatively established must be determined. All these considerations and many others have led the scientist to attribute the evidence for the consequences of an hypothesis to the hypothesis itself.

Thus, the hypothetical method, which, like the inductive arguments mentioned, involves eventually a reference to matters of observation and evidence, faces the same general difficulties as those arguments. The truth of the hypothesis, however tested, does not necessarily follow without fear of contradiction or qualification. In addition, the hypothetical method is troubled by the same difficulties involved in the use of the deductive methods as noted in Chapter III. Despite the multiplication of limitations, the method of

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hypothesis, deduction and test is considered extremely valuable in scientific investigation, with observations or creative imagination suggesting hypotheses whose logical implications can be explored and possibly tested.

Aspects of Induction Significant for Argumentation in Accounting Theory

This brief examination of the forms of individual inductive arguments suggests several comments relating to the usefulness of inductive argumentation in handling accounting problems or constructing accounting theories.

1. Modern scientists have refused to recognize self-evidence as adequate grounds for accepting a proposition as true. Though the postulates of the Illinois Study Group may be true, or accepted as true, the claim of that Group to the self-evidence of the postulates is neither justified nor appropriate. Rather, self-evidence has been determined a relative notion. Apparent self-evidence may be the result of pre-conditioning the mind through environment or experience. The lack of an abundance of self-evident truths in the more exact sciences should indicate to the accountant-theorist that the likelihood of finding general statements of accounting which could be said to be universally self-evident is very slight. And, this method of argument offers little hope for the accounting theorist attempting to expand or consolidate accounting knowledge. If there are postulates or principles which are inductively

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2. Scientists often rely on the testimony of others in the course of their work, but take into consideration the reputation and competence of the authority upon whom they are relying. Failure to rely to some extent on the testimony of other investigators could completely stifle the progress of science. Still, the scientist is aware that any appeal to authority is open to further question and the discussion may finally be reduced to an examination of the authority's basis for his conclusion. In an accounting argument, an appeal to the authority of accounting theorists or practitioners would be valuable only to the extent that the testimony is accepted as sufficient. To the present time, simple reference to accounting experts has not been sufficient to preclude differences of opinion in practice. Reference is made to Accounting Research Bulletin No. 43, Chapter 10b, in support of recording deferred federal income taxes. Undoubtedly, this Bulletin would be considered the testimony of highly respected accounting experts. Yet the controversy over the recording of deferred taxes still exists. This writer believes that future references to authority will produce the same results.

3. The most common misunderstanding of scientific statements, laws and theories is that they represent certainties. Professor Flanders, for example, notes "Science

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is also a certain body of knowledge, the knowns of science."[1] Mr. Alvin R. Jennings speaks of the principles of the physical sciences as "immutable laws."[2] Failure to understand the "laws" of science is also indicated by Professor Moonitz in Accounting Research Study No. 1 when he seeks to contrast supposedly unchanging facts and laws of astronomy with some "laws" of accounting, the latter being, for him, "merely an explanation of behavior at a particular time."[3] Of course, science would not progress very far if what was known at a given time was considered the last word on the subject. The story is told of Galileo having invited some of the learned men of his time to observe the moons of Jupiter through his telescope. Some refused his offer with the argument that if they did see anything, it must be an illusion (perhaps with the assistance of the devil), since the number of planets had already been determined with finality by astronomy.[4] The contention regarding the certainty attached to physical laws has been consistently and conclusively refuted by the number of such laws which have subsequently been discarded. In contrast to the status of

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[1] Dwight P. Flanders, "Accountancy, Systematized Learning, and Economics," The Accounting Review, XXXVI (July, 1961), p. 568.

[2] "Accounting Research," The Accounting Review, XXXIII (July, 1958), pp. 547-554.

[3] pp. 6 and 7.

[4] W. Ward Fearnside and William B. Holther, Fallacy (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959), p. 112.

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the laws of mathematics, Professor Einstein once wrote "those of all other sciences are to some extent debatable and in constant danger of being overthrown by newly discovered facts."[1]

Nor have scientists adopted a theory of probability such that it can be said that a specific probability is attached to the many scientific laws which have been established by inductive argument, such as many laws of chemistry. For the accountants to seek the certainty of the physical sciences, then, is perhaps an ill-conceived objective. The attribute of scientific investigations to be admired and imitated is not the infallibility of the conclusions so much as the meticulous accumulation and recording of evidence, the scientist's penchant for documentation.

4. Arguments based upon experience form the bulk of scientific history. In any situation where the evidence in support of the conclusion is not complete, the scientist has had to evaluate the evidence. The logician offers no inviolable rules for separating good evidence from bad. Such evaluation lies outside the realm of logic and within the province of the researcher in the particular discipline. And, it is a simple fact that no evaluation is possible without a presentation of the evidence to be evaluated.

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[1] "Geometry and Experience," from Sidelights of Relativity (New York: 1923), reprinted in Feigle and Brodbeck, op. cit., p. 189.

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Except in newspaper accounts, the reporting of conclusions in the physical and social sciences is seldom unaccompanied by the reporting of evidence upon which those conclusions were based. These reports include statistics, case studies, etc., and comments on control aspects of the observations as well as descriptions of efforts made to preclude prejudicial observation. Readers of these reports, colleagues of the researchers, are free to judge for themselves (by personal experiment, resort to documented sources, or whatever method) whether the evidence is adequate to warrant a position which cannot be, by the nature of its argument, conclusively demonstrated.

Care in the presentation of evidence is not common in accounting discussion, and its absence is a serious impediment to the acceptance of any given position. Dr. Moonitz's study has been criticized for its failure to specifically recognize accounting objectives and purposes.[1] This writer believes the criticism is the result of a failure to present the nature of the evidence on which Professor Moonitz bases many of his conclusions. While he claims clearly neither deductive nor inductive reasoning as the pattern for the study, the facts selected for examination and argument appear to have been governed by financial reporting considerations,

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[1] "Comments on 'The Basic Postulates of Accounting'," Journal of Accountancy, CXV (January, 1963), pp. 44-55.

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and, more specifically, public financial reporting considerations. To the extent that these criteria for data selection are not made clear, if necessary justified, and understood for their effect on the type of conclusions which will be reached, the argument is subject to methodological if not substantive criticism. If colleagues of the accountant-arguer are to be free to judge whether evidence is adequate support for a position, they must be aware of that evidence.

5. What constitutes evidence in an inductive argument are observations of data. In accounting, observable data are business facts. What can be argued inductively in accounting theory depends on what can be observed in business facts—what they have in common, what characteristics lead to distinctions between them, what rules they seem to follow. Moreover, the data must be selected without prejudice. Professor Schrader's experiment with inductive argument involved observations limited to exchange transactions,[1] and the bias in the evidence must be recognized. Perhaps a more subtle bias could exist in any accounting "principles" which Professor Littleton comments can originate in practical experience—"can be derived inductively out of accounting actions."[2] The results of such induction will be principles of accounting actions, which may or may

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[1] Schrader, op. cit.

[2] Littleton, Structure, p. 186.

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not be the equivalent of conclusions which could be reached upon observations of the data before accounting action. The use of data already subjected to accounting actions, presupposes, among other things, the defining characteristics abiding in the present accounting classificatory scheme. Hence, when it is suggested that "principles," "rules" and "conventions were generalized out of . . . experiences in meeting accounting needs," it is entirely possible that the data have been preconditioned to reflect only certain of their characteristics or relationships. And, what can be generalized about is what is built into the data by this preconditioning.

If what are desired are generalizations about an accounting system, such preconditioning is perhaps acceptable; if what are desired are conclusions about the data with which accountants are confronted, the situation is not acceptable. This writer suggests, for example, that argumentation involving some aspect of internal accounting reports (such as reports for capital budgeting purposes) may include generalizations about business facts including, but not restricted to, those facts relevant to some aspect of external reporting. Stated in a more general way, the total universe which might constitute evidence, the set of all business facts, though infinite, may be divided into an infinite number of nonexclusive subsets, the membership requirements for each depending on the purpose or objective of the

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6. The use of inductive argumentation alone will not produce a co-ordinated body of general statements which can serve as a general theory of accounting. Hence, it is hard to agree with Professor Littleton, who suggests, in Structure of Accounting Theory, that "Accounting principles (inductively derived) will necessarily be interrelated, because experience falls into patterns of related elements."[1] If the accountant attaches differential status to his inductively argued conclusions, such as, perhaps, a distinction between principles and postulates, the distinction must be an extralogical one. For, conclusions reached in separate inductive arguments are neither interrelated nor ranked automatically by the use of the same pattern of reasoning or the same basic data. In a sense, the conclusions hold equal rank, if the evidence is evaluated as equally adequate. No hierarchy of conclusions results. A distinction could be made, perhaps, based upon the scope of the statement (i.e., how general it is), but the distinction remains an extralogical one.

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[1] p. 231.

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narrow, specialized field of practice, the use of induction will not resolve, beyond question, disputes regarding central concepts and assumptions. The point has been emphasized repeatedly that what can result from inductive argumentation is not established but probable truth. Yet, to refuse to accept such conclusions until complete evidence is available would simply preclude investigations on any new subjects. This fact, among others, has encouraged scientists to accept some conclusions for the sake of progress. The probable conclusions serve as a basis for further investigation. Postulate A-5 of Accounting Research Study No. 1, which states that money is the common denominator for measuring purposes, has been attacked on the grounds that it is not entirely true.[1] Yet, to explore the implications of measurement made in money, or beans, or peanuts, it is necessary to assume that such measurement is made. Perhaps the attitude of the scientist is summed up in the following quotation about a social scientist who

> . . . reaches a state, finally, in which he has to face comprehensive sets of statements. All these sets may be composed of statements which seem to him plausible and acceptable. There is no place for an empiricist question: Which is the "true" set? but only whether the social scientist has sufficient time and energy to try more than one set.[2]

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[1] "Comments on 'The Basic Postulates of Accounting'," Journal of Accountancy, CXV (January, 1963), p. 49.

[2] Otto Nurath, Foundations of the Social Sciences (International Encyclopedia of Unified Science, Foundations of the Unity of Science, Volume II, No. 5; Chicago: The University of Chicago Press, 1944), p. 13.

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It can be seen, now, that the nature of these further investigations is not solely that of inductive argument, but rather partly that of deduction. For, at the outset at least, certain laws, statements or generalizations are simply accepted, and the scientist goes on from there. In this respect, the method of investigation resembles the form of the axiomatic method discussed in Chapter III more than any individual method of inductive argumentation.

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CHAPTER V

TERMINOLOGICAL DIFFICULTIES AND A "LOGICAL" SUGGESTION

A Terminology Problem

Consider the accountant, properly trained and proficient in the methods of logic, aware of their power and limitations, and desirous of approaching the subject matter of accounting with these tools. Mr. Paul Grady has concluded:

> Accounting principles [which, it appears, he uses here as synonymous with postulates and concepts] are not drawn from natural laws nor do they rest on inductive or deductive logic.[1]

Literally speaking, of course, nothing rests on inductive or deductive logic but more logic. Yet as noted in Chapter II, reasoning is what the logician subjects to scrutiny. And, Mr. Grady would certainly admit that if, as he says, "the foundation for their [principles, etc.] existence usually is based on business experience, contractual arrangements and legal requirements,"[2] the principles, or whatever, are nevertheless supported by reasoning whose substantive content consists of the matters he mentioned. If reasoning

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[1] Grady, op. cit., p. 55.

[2] Ibid.

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That there is nothing more to accounting than taking a particular action in a particular situation has not been seriously argued. Even the decision to follow a particular course of action in a situation must make use of something other than the exact circumstances of that situation or we would find no similarities in accounting records, reports and terminology. Absence of any reasoning would mean, simply, that there is only one level of accounting knowledge or one class of accounting statements, all of equal rank and importance.

Yet, accounting literature abounds with such terms as postulate, principle, concept, standard, and many more which purport to relate to general statements of accounting which vary in importance. Two difficulties have arisen with the use of these terms. First, the different terms have been used in connection with what appear to be the same things. Thus, for example, there is an exploration of many aspects of the entity "concept" by Dr. Li,[1] the entity "theory" of which Dr. Lorig writes,[2] and two entity "postulates" proposed by Professor Moonitz. In these writings it is not always

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[1]David H. Li, "The Nature and Treatment of Dividends Under the Entity Concept," The Accounting Review, XXXV (October, 1960), pp. 674-679, and others.

[2]Lorig, op. cit.

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possible to tell whether the difference in terminology is intended to deny that the other terms are applicable or simply that the subject is being treated at a different level of generalization or importance. Secondly, when proposals have been made as to the members of the set named by one of these terms--the set of postulates, principles, etc.--the sets are neither isomorphic nor do they have the same members. For example, Arthur Andersen & Co.[1] holds the position that there is only one postulate; Professor Moonitz, in Accounting Research Study No. 1, proposes that there are fourteen; and Professor Chambers[2] lists forty. Some authors are kind enough to tell the readers what terms are to be considered synonymous;[3] most are not. Such differences have caused Professor Storey to comment:

> Accountants have been extremely careless in this matter, and the situation has degenerated to such a state that it is doubtful whether the accountants really understand each other.[4]

And, Professor Gaa, in recognition of the situation, admonished the profession strongly.

> Since there is substantial disagreement on terminology, our starting point ought to be to

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[1]This position is explained substantially in The Postulate of Accounting-What It Is, How It Is Determined, How It Should Be Used (Arthur Andersen & Co., 1960).

[2]Chambers, Towards a General Theory.

[3]For example, E. A. Spiller, Jr. "Theory and Practice in the Development of Accounting," The Accounting Review, XXXIX (October, 1964), pp. 850-859.

[4]Storey, op. cit. p. 62.

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> reach agreement on the important terms we plan to use so frequently and so profoundly in our deliberations, literature, and reports. . . . How can we discuss efficiently and read intelligently about "postulates," "concepts," "principles," "practices," etc., when we are not all speaking the same language? We must waste time first to ascertain how a given term is being used by a particular speaker or writer.[1]

These inconsistencies in usage need not present serious problems in isolated cases when the point at issue is not the status or acceptability of the concept or whatever. That is, if passing reference is made, for example, to the entity "concept" in a discussion of long-term construction contracts or installment sales, it will normally be understood that what is meant is simply "something" of more general interest or applicability than specific statements about construction and installment contracts. But the terminological inconsistencies do present problems when the discussion is related to the organization of accounting knowledge and not the knowledge itself. That is, speaking of "postulates" is to be distinguished from speaking about "a particular postulate." Since what is at issue in this paper is the application of logic to something, the terminological inconsistencies do affect the discussion, and Professor Gaa's warning is to be heeded. Is logic to be used in studying and developing concepts, postulates, principles, practices, theories, conventions?

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[1] Charles J. Gaa, "Uniformity in Accounting 'Principles'," Journal of Accountancy, CXI (April, 1961), p. 49.

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Judging from the continual usage of the terms "concept," "postulate," "principle," "practice," "theory" and "convention," all appear to have become a permanent part of the accountant's vocabulary. It seems most unlikely that they will disappear now. This writer believes that the comments made about, and the distinctions made between, these terms in the past have been inadequate to permit a direct statement as to the applicability of specific methods of logic. The objectives of this chapter are, as follows:

1) To suggest what it is hoped will be a useful set of distinctions between these terms which will
   a) generally coincide with present usage, but which
   b) allows the identification of specific logical relationships.

2) To suggest those methods of logic, if any, which appear appropriate for investigations related to the accounting matters falling in each of the defined categories.

3) To indicate the advantages of the proposed interrelated structure, or set of distinctions, over those suggested by other writers.

Terms Distinguished-An Interrelated Structure

The Basic Approach

Few accountants, if any, would question the necessity of reasoning in some form in the presentation of accounting discussions. Undoubtedly, the most valuable attribute of reasoning, from the point of view of progress, is that

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attribute which characterizes deductive logic—the necessity to accept a conclusion if the premisses on which it is based are accepted. Whatever disagreement may exist concerning the truth or falsity of premisses may be discussed independently of the reasoning. But also, whatever disagreement may exist concerning the reasoning used may, likewise, be considered independently of the acceptability of the premisses. In disagreements of the latter type, a final answer can be found through the careful analysis of the specific inferences made, if the reasoning is expressed in a manner suitable for logical analysis. The problem of disagreement is thus reduced to the acceptability of premisses, and it is known, once the argument is in the proper form, just what the premisses are. If this type of problem is the most difficult to solve--and most assuredly it is in any discussion--it is to the benefit of accountants to isolate it from other problems. For this reason, the significant relationship in the current proposal is one involving deductive logic. The basic organization in the proposal is predicated on the use of deductive logic, specifically the informal axiomatic system as discussed in Chapter III (which is essentially the same as the hypothetical method briefly discussed in Chapter IV). It was shown in Chapter III that such systems can handle problems of different sizes and complexities, with varying degrees of rigor, and with or without the use of complex symbolization tech-

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The Proposal

On page 134 is a simplified graphic presentation of an interrelated structure of accounting terms consisting of theory, concepts, postulates and principles. An extension of this structure to include identification of practices and conventions is based upon this simplified structure. Given the position to be held by the accountant in the form of an informal axiomatic system (including the identification of allowable inferences in accordance with the degree of rigor desired), the structure allows for the distinction between concepts, postulates and principles, as follows:

1. concepts-the basic terms or primitive notions of the system;
2. postulates-the assumptions or axioms of the system; and
3. principles-any theorems of the system.

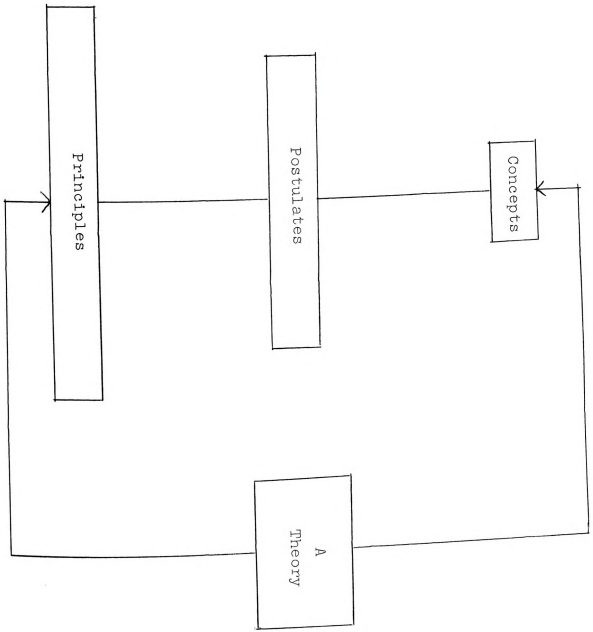
The whole system will be said to constitute a theory. Hence, a theory might be described as an argument or position on a specific subject, consisting of basic terminology, assumptions, and demonstrated (proved) conclusions.

It is then proposed that an accounting practice be

Principles

ILLUSTRATION 1

STRUCTURE OF A THEORY



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understood as an action in accordance with the principle of a theory by adoption of a specific definition of the basic terms in that theory, and that the term convention be used for a definition of some basic term which is common to many theories.

The following section is devoted to a comparison of the proposed definitions with current usage of these terms. The comparison is not one between definitions, but rather an attempt to relate the proposed definition to the use to which the terms are currently put. The advantages of the proposed distinctions are pointed out as well as the applicability or inapplicability of additional methods of logic.

Analysis of the Proposal

Theories

The proposed definition of the term "theory" is in keeping with current usage in many respects. That it is possible, under this definition, to have more than one theory concerning the same subject is consistent with present discussion of, for example, the entity theory and the proprietary theory. The subjects of different theories may range in importance, as from a theory of depreciation to a theory of balance sheet classification. Since different axiomatic systems may not be compatible because of different axioms, it would be possible for some theories to be incompatible, as are some present positions relating to deferred taxes and long-term leases.

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Providing a definition of theory which allowed for a theory of something less than the whole of accounting knowledge appeared to this writer to be not only in keeping with common usage, but also an absolute necessity. The construction of a general theory of accounting, advocated and even attempted by some, is an admirable project, but, as discussed in Chapter III, a tremendously ambitious one. And to delay the application of logical analysis to limited accounting arguments until a suitable general theory has been constructed, or to limit analysis to such a theory, seems in direct contradiction to the present interest in more rigorous examination of accounting problems and the desire for progress. One small problem carefully analyzed and brought to solution is more progress than no large or small problems analyzed or solved. Moreover, not all accounting problems deal with the whole of the subject matter of accounting. For example, there are problems of balance sheet classification which do not involve revenue considerations, and problems of cost accounting not involving disclosure questions. The question of continued adherence to historical cost does not rest on the recording and reporting of deferred income taxes. And, even more to the point, the question of how to record and report deferred federal income taxes should arise only after the question has been answered as to whether there are such things and whether they are to be reported. The present concern over a general theory may

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be an indication that something is amiss in accounting, and may be a reaction to the case-by-case approach used in the past, but there is certainly no proof that all the problems facing accountants are related to the absence of such a general theory.

In Chapter I it was noted that the justifications given for some accounting actions indicate the presence of a hierarchy of accounting statements by appealing to one statement to the exclusion of some others. For example, reporting inventory at the lower of cost or market departs from historical cost accounting but is considered appropriate since it provides for foreseeable losses. The careful construction of a theory regarding inventory reporting which includes a principle of lower of cost or market pricing may show that the theory simply did not include a postulate relating to adherence to historical cost. The apparent hierarchy may turn out to result from the omission of unnecessary postulates in individual theories.

Still, the proposal in this paper is in keeping with the present usage in the sense that <u>if</u> such a theory were constructed, its concepts, postulates, and principles would be, by definition, <u>the</u> basic concepts, postulates and principles of accounting which are now being sought. The application of the axiomatic method in several accounting arguments may, in fact, contribute to the development of a general theory by revealing that a particular series of

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Insofar as there is any reasoning to support any position on accounting matters, the minimum qualifications for membership in the proposed class of theories can be met by (1) carefully analyzing the reasoning to isolate its basic terminology and assumptions, and (2) outlining the rules followed in proving the position from those assumptions. The latter requirement is the most important if the accountant-arguer is ever to isolate the problem of premisses from the problem of reasoning. And therein lies one of the major advantages of the proposal. If the argument can be reduced to a form which allows review of its reasoning and tests of its validity, its premisses and conclusions are deserving of consideration. If the argument cannot be so reduced, it might better be called only the discussion of an opinion, whose weight rests solely on the persuasiveness (for whatever reason) or perhaps the reputation of the arguer; the discussion will be convincing to some and not to others. This description, to a great extent, approximates the situation in professional writing of the past and present.

There are no rules or regulations, no methods of logic, inductive or deductive, which the accountant can apply to produce for him a theory to express his ideas on a particular

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subject. He must have a working knowledge of the deductive rules of inference generally used. One of the most difficult tasks, the setting up of the boundaries of the subject, must be undertaken before the system is constructed. Before that, the system-builder must have an idea and an objective. And, unfortunately, for ideas as for systems, there are no algorithms. Given the construction of an appropriate system for an idea, and accepting the validity of its proofs, the question may be asked as to whether the theory can be said to be proved true? No! To the extent that it rests on the truth of its postulates, which may rest either on other postulates in another system or some method of inconclusive induction, the theory isn't true; it is merely useful.

Concepts

The proposed definition of concepts, like that of theory, is, in many ways, consistent with present usage. Though not generally thought of in relation to an axiomatic system, "concept" is often used synonymously with "basic term." Accountants speak of an entity concept, or a concept of income, of capital, or of cost. Though the proposed usage of the term as part of a definite system carries with it the obligation of the system-builder to explain what the concept is intended to mean, it also allows the meaning to vary from theory to theory. In this respect, the proposal coincides very closely with current usage, for discussions of income reporting and measurement often deal with different concepts

of income (e.g., the accretion concept, the purchasing power concept, etc.). Two arguers can both assert that all income should be reflected in a statement of the results of operations but mean entirely different things by their assertions.

In still another respect, the proposed definition seems in line with usage in accounting literature. In Accounting Research Study No. 1, each postulate is given a brief title which consists of some key word or phrase such as entity or continuity. Similarly, each of the postulates of the Illinois Study Group[1] relates to some basic idea such as, again, entity or continuity. For these and other such reports dealing with basic assumptions of accounting, the wording of the assumptions may differ, but the basic terms appear in many cases to be the same. Even in the Paton and Littleton monograph,[2] in which concepts are equated with assumptions, the discussion of each assumption is preceded by a title which relates to the very same basic notions noted in other studies, such as entity and continuity. It was noted in Chapter III, that the axioms of a system relate to the basic terms of the system and assert relationships between them. The differences in the wording of the actual statements given in the various studies about the underlying assumptions in accounting may, in fact, be different axioms involving

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[1] A Statement of Basic Accounting Postulates and Principles.

[2] W. A. Paton and A. C. Littleton, An Introduction to Corporate Accounting Standards (American Accounting Association, 1955).

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Under the proposed definition, concepts would not be, however, limited solely to basic terms of accounting such as those noted above. For example, common words or phrases with identification beyond the subject of accounting, such as "economic activity" or "time period," and perhaps "report" or even "fair," may be basic terms in some arguments.

The requirement that whatever basic terms there are be defined for the system could prove to be a major advantage of this proposal in the long run. It is true, of course, that in some cases this requirement has been ignored when the system-builder believed that the terms were sufficiently understood by themselves. For example, in the case of the Peano system relating to arithmetic, the author believed that the terms "number" and "successor" were generally understood and needed no further comment. Such might also be the case in an accounting argument in which one of the basic terms was "asset." If all that was needed was a general understanding of the term for that particular discussion, no detailed definition of the concept need be given. Nevertheless, it was also pointed out in Chapter III that the use of some very common terms as primitive in systems has stimulated interest in developing more adequate and useful definitions (as, for example, interest in determining what

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really is involved in the definition of "number"). Increased interest in definition improvement would not be an unwelcome or an unneeded development in accounting. Mr. David Anderson has remarked:

> Even in the narrow confines of our own territorial boundaries, we accountants are not in agreement as to the exact meaning of some of the more important and elementary terms which we employ.[1]

Much of the day to day work of recording involves the application of someone's definition of such words as asset or expense. This important fact is given explicit recognition in the proposed definition of a practice which specifically involves adopting a definition of the basic terms which appear in the statement of a principle.

Can other methods of logic help in the selection of appropriate basic terms for a theory or in the establishment of their definition? As discussed in Chapter III, the selection of terms is governed by considerations of simplicity and fruitfulness, and is generally the result of both careful study and a certain amount of trial and error. Nor are there methods of deductive logic to assist in selecting defining characteristics. If one wishes to argue, for example, in favor of a particular definition, another system might be constructed. But the basic terms of that system will, then, require an understanding in order for the new argument to be followed and finally accepted. Within the

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[1]David S. Anderson, "Communications Problems of Financial Reporting," Journal of Accountancy, CXV (April, 1963), p. 60.

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framework of the definitions proposed in this paper, the term in need of a definition would be a concept, say an income concept, and the new argument for a specific definition would be a theory, say a theory of income.

In Chapter IV it was pointed out that the method of argument from experience, specifically inductive generalization, has been helpful in the classificatory defining process. As a result of careful observations it may be possible for a theorist to make some generalizations as to what characteristics form part of the definition of, for example, an asset. He may suggest that the definition of asset include the characteristic of being capable of being converted into cash. In such a case, he must be prepared to reveal his argument which led to that conclusion, indicating the principle he followed in selecting business facts to observe and the various facts observed. His argument will be open to question, then, as to (1) the possible bias produced by his selection principle, and (2) the adequacy of his observations. Using an inductive argument he cannot hold it to be necessarily true-even if assets were the same sort of thing as, say, a species of animal, which they are not, there is the possibility that further observations might contradict his conclusion. In the use of man-made notions and classifications such as assets, the applicability of this method of logic seems particularly limited, but at least not impossible.

Argument by analogy may likewise be of some limited assistance in building a definition. For example, one might

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utilize premisses listing the characteristics which profit and nonprofit organizations have in common, and conclude that nonprofit organizations have, as a purpose, the most efficient management of economic resources under their control, since that characteristic is exhibited by profit-motivated organizations. On the other hand, analogical argument may, like all methods of inductive argumentation, lead to conclusions refutable with the addition of a single new premiss. For example, premisses listing the characteristics which profit and nonprofit organizations have in common might support the inference that nonprofit enterprises have the characteristic of a profit motive exhibited by profit-motivated enterprises. It was pointed out in Chapter IV that of major importance in arguments by analogy is the selection of relevant similarities and the consideration of all relevant dissimilarities. The evaluation of the argument rests with the individual's interpretation of what is relevant. Thus, though analogical argumentation may be useful, it is inherently limited by its nature as a method of induction.

To the important question of whether through the use of logic there will be true or right definitions or concepts, the answer must be the same as that with theories. No! The concept may be useful in a theory. The definition may be workable. But for truth, the question must remain open.

Postulates

The use of the term "postulate," as proposed here,

coincides in one major respect with the common, if not all the current accounting, usage of the word in that it refers essentially to an assumption. In the sense that an assumption is, by common understanding, something not proved, the proposed definition of postulate as part of an axiomatic system is particularly appropriate; for, the postulates of an axiomatic system are, in that system, simply true by definition.

The failure to confine the members of the set of postulates to the assumptions of a general theory of accounting is the major deviation from current accounting usage. But this failure is deliberate. It is the automatic result of the previously expressed opinion against directing all research efforts to the development of a general theory which would include the basic postulates of accounting. On the other hand, in view of the wide range exhibited by some of the so-called basic postulates suggested already (from specific and complex statements to such simple observations as fairness or integrity[1]), the proposed definition of postulates is not so unreasonable. Depending upon the argument being made, postulates could range from the very specific to the very general, and may differ from theory to theory.

Where would the postulates of a theory come from? Accounting literature in support of any accounting position

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[1] Gordon W. Stead, "Towards a Synthesis of Accounting Doctrine," The Accounting Review, XXIII (July, 1948), pp. 355-359.

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contains statements which, it must be supposed, are intended to in some way contribute to the argument. It remains for the writers to analyze their work to (1) find out what is logically a part of their arguments, i.e., to separate the statements with logical import from those with only psychological import, and (2) seek out those assumptions that, though left unsaid, are needed to support the conclusions drawn. Such analysis may, and probably will, be an extremely difficult task. The partial logical analysis of two of Professor Moonitz's postulates shown in Chapter III testifies to this fact. But, the ultimate rewards, the ability of being able to evaluate the reasoning on an objective basis and to narrow the areas of disagreement to specifiable assumptions, seem to warrant the undertaking.

Where do new postulates come from for new systems? There are no rules for their invention; though, since the postulates are only assumptions in a system, they can, indeed, be invented. Postulates of one system may be the principles of some other system. A slight alteration to assumptions used in other systems may offer possibilities. For example, the assumption that all assets have value in exchange might be altered to assume that some assets do not have a value in exchange. The implications of the latter assumption in place of the former in some theory may be very interesting.

What of the acceptability of postulates, one of the major questions of today? For apparently simple postulates such as, for example, Professor Mattessich's assumption

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"There exists a set of elementary additive time intervals,"[1] little criticism may be forthcoming (at least, until the reader is confronted with some of the conclusions which may rest partially upon this assumption). This fact does not change the nature of the postulate as an assumption in his theory and nothing more. And, a strange assumption to be accepted so freely by those accountants who try to avoid any deviation from reality and fact—for, the existence of a set of things called additive time intervals certainly is open to question.

To Professor Moonitz's more complex assumption regarding the time period, more criticism can be expected. Can logic help here? As pointed out in Chapter IV, the claim of self-evidence is seldom, if ever, justifiable. Even for Professor Mattessich's classic simple assumption quoted above, the claim is certainly not appropriate. Argument by analogy or inductive generalization, as discussed in Chapter IV, may be of use here. If a postulate of some system has been accepted (obviously not universally so, but rather accepted to some degree), the theorist may present an analogical argument whose conclusion is a postulate of his new theory. For example, suppose a theory were available regarding long-term debt, which theory included a postulate that such debt is to be recorded. An analogical argument detailing the similari-

[1]Mattessich, Accounting and Analytical Methods, p. 32.

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ties between debt obligations and long-term lease obligations, and leading to the conclusion that lease obligations are to be recorded may support a postulate in a theory about long-term lease obligations. Or, some extended observations of the business facts surrounding the operations of pension plans may lead to some new generalization regarding pension obligations. But both these types of argument are, of course, inductive in nature and subject to all the questions and problems explained in Chapter IV. The arguments will be inconclusive. Nor would turning to some method of deductive logic offer solution to the problem. For, any method of deductive logic requires premisses. And the criticism of the postulate at hand will simply be transferred to the premisses which support it, reducing the situation to one of justifying the new postulates. Can logic, then, prove the truth of the accounting assumptions in a system—the answer here, too, must be in the negative.

Principles

While the proposed definition of a principle does not agree with present definitions and usage in all respects, there are important similarities. Principles, as proposed, are definitely derived from postulates; the advantage of this proposal is that the phrase "derived from" is given a concrete meaning. This has not been the case in other proposals. For example, in the suggestions found in the writings of

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Leonard Spacek[1] it is held that there is one basic postulate which underlies principles, and the relationship between the postulate and the principles is that the "reasoning" in support of a principle is to be evaluated or rated to the extent that the results achieved by the principle's adoption are in accordance with the basic postulate. It may be seen from a review of Chapters III and IV, that the reasoning, if deductive, may be tested for validity, or if inductive, reviewed for adequacy and bias of evidence. But deductive reasoning is neither fair nor unfair, only valid or invalid. And the major problem in the evaluation of an inductive argument is fairness in the sense of possible prejudiced evidence. Adopting a position such as Mr. Spacek's, perhaps there is no method other than some type of court to evaluate whether the argument for some "principle" possesses the sought-after characteristic of fairness—there is no logical way to make such a determination.

The present proposal as related to principles offers a flexibility that seems particularly attractive and in line with current usage. Principles need not be consistent with each other if they are parts of different systems. For example, the construction of a theory of inventory pricing by an

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[1] "Need for an Accounting Court," The Accounting Review, XXXIII (July, 1958), pp. 368-379; "Solution to the Principles Dilemma," The Accounting Review, XXXIX (April, 1964), pp. 275-284; "Are Accounting Principles Generally Accepted," Journal of Accountancy, CXI (April, 1961), pp. 41-46, and several others.

accountant whose purpose related to intra-company transfers might reach different principles than one constructed by an accountant whose purpose related to sales to outside customers. Objectives of the theory can make a difference by influencing both the basic concepts (such as what is considered to be the meaning of "cost") and the postulates. The situation is not unlike the classification of some costs as part of manufacturing expense if incurred at a manufacturing plant but as general and administrative expense if incurred at the home office.

Principles, as proposed, need be of no specific degree of generality or applicability. This, too, is in keeping with current usage. In Accounting Research Study No. 7, some principles are very specific, such as A-8, relating to disclosure of rental charges on material lease contracts, or C-1, relating to valuation of current assets. On the other hand, principle A-10 speaks of disclosing the effect of inconsistency in the application of any other principle. Accounting and Reporting Problems of the Accounting Profession[1] refers to the principles of recording all assets and liabilities, providing for all costs, and matching costs and revenues. Mr. A. Carl Tietjen suggests a principle of fair presentation.[2]

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[1] Arthur Andersen & Co., 1962.

[2] A. Carl Tietjen, "Accounting Principles, Practices and Methods," Journal of Accountancy, CXV (April, 1963), pp. 66-68.

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Accounting Research Study No. 3 suggests principles ranging from "Profit is attributable to the whole of business activity" to "Stockholders' equity should be classified into invested capital and retained earnings." The proposed definition of what may be called a principle would not require that all statements with this label be of such sweeping scope as some of those suggested above. In fact, principles in one system might be postulates in another. For example, a theory about long-term leases may require a postulate such as one of those principles suggested above regarding the recording of all assets and liabilities and the matching of costs and revenues.

In any case, by virtue of the definition proposed, principles will be derived by logical means, in a specifiable sense of the term "logic," from postulates. To that extent, their truth would follow directly on the acceptance of the postulates and the prescribed rules of inference in the system. More than that cannot be claimed.

In only one major area does the present proposal require an actual change in the language of the accountant. The conformity of financial statements with "generally accepted accounting principles" has no real meaning under this proposal unless and until a general theory of accounting is forthcoming and pronounced accepted. Since such is not the situation at present, one might suggest that the phrase has no more meaning now than it would have under the proposal in this paper. Still, in case such a situation should arise,

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the principles of that general theory would become the basic principles of accounting. Though the phrase "generally accepted accounting principles" is almost unalterably etched into the history of accounting, the extent of present controversies over its meaning may be interpreted as a sign that its eventual elimination may not be entirely undesirable. There have been, in fact, some suggestions to that effect.[1]

Practices

The proposed definition of a practice, like the other definitions, conforms in many respects to present usage. Practices are definitely different from principles but are related to them. Practices are not statements about accounting but rather accounting actions--the accountant's actions with the facts of business. There is no difficulty in separating principles from practices—it is the separation of simple statements from accounting acts. It was noted in the discussion of concepts that much of the work of the practicing accountant involves the application of definitions. The proposed definition of a practice takes full cognizance of this fact.

Consider one of the suggested principles in the preceding section--that all assets and liabilities be recorded.

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[1] See, for example, Tietjen, op. cit., and Carman G. Blough, "Principles and Procedures," Journal of Accountancy, CXI (April, 1961), pp. 51-53.

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The practicing accountant has to adopt somebody's definition of an asset to be able to act upon this principle. Similarly, to provide for all costs it is necessary to decide what is to be considered a cost. To classify stockholders' equity into invested capital and retained earnings, it is necessary to adopt a definition of invested capital. Even principles involving such terms as disclosure and current assets cannot be acted upon without selecting some definitions of those concepts.

No method of logic seems appropriate for use with respect to accounting practices, which statement perhaps supports the comment sometimes made that accounting practices are illogical. An accountant may give reasons for selecting definitions for the basic terms in some principle or other; but, one should not confuse the phrase "reasons for" with "reasoning behind" or "reasoning" as used throughout this paper. An accountant may give, as the reason for selecting a definition, that he believes it is easier to apply, that he has adopted it on other occasions, that others have adopted it, etc. The selection process is not logical in any strict sense of the word logic. To the extent that practices, as defined in this paper, are not selected by logical methods, and require definitions which also cannot be developed entirely by logical means, there is some support for the opinion that methods of logic may be of little immediate,

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As with definitions, it would not be strictly appropriate to suggest that some practice is right or wrong. The practicing accountant adopts some definition of income in carrying out his functions. The present honest differences of opinion on the definition of the concept "income" suggest that there may be no right and wrong definition for a concept, but only definitions with varying degrees of usefulness for different purposes. Given these differences of opinion, it is difficult to support the position that there can be right and wrong practices; better to say that accounting practices, like concepts, have varying degrees of usefulness.

Conventions

The proposed definition of a convention is, of all the definitions proposed here, the least in conformity with current usage by accountants. The major problem here is not with the definition of the term, however, but with the inconsistency in current usage. Conventions are used synonymously with rules, concepts and standards, and sometimes even with principles, postulates and practices; yet, no single usage appears to predominate. In usage outside of accounting, however, a convention, or what is conventional, is associated generally with action. For example, the common phrase "It is conventional in the industry to do . . ." or "I did the conventional thing." In the proposed definition

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As noted in the discussion of practices, the essential element of an accounting practice, that which allows the accountant to act with a principle in hand, is the adoption of an adequate definition of the basic concepts in that principle. To be able to record an asset, the accountant has to be able to recognize one. But there are many accounting actions involving assets (their recording, valuing and classifying in financial statements, etc.) which might fit the definition of a practice. For the sake of order, and as a matter of common sense, it seems the accountant must utilize the same definition of the concept of assets. Hence, the proposal that a convention is the definition of a basic term common to many theories (and their principles).

Can logic assist in establishing conventions? No. Just as the selection of a definition in a particular case is not governed by methods of logic, so the decision to select the same definition in several cases. It may be common sense to have accountants utilize the same definitions; but, no method of logic will produce an ironclad convention just as no method of logic will produce an unchangeable definition.

Summary

The preceding sections have accomplished the first two objectives of this chapter, to establish useful distinctions between certain terms currently used by accountants which

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will allow identification of specific logical interrelationships, and to suggest the methods of logic appropriate for investigations of matters classified in the given categories. Concepts, postulates and principles have been characterized as constituting a theory in the form of an axiomatic system.

1) A theory, then, is a specific type of thing, and the axiomatic method of deductive logic is applicable.

2) Concepts are basic terms of a theory and require definitions. Terms are not selected by means of logic. In constructing definitions of the concepts, inductive generalization and analogy may be of some small help, but no other method of inductive or deductive logic appears appropriate. And, definitions cannot be considered true or false.

3) Postulates are the assumptions of a theory. Analogical argument and inductive generalization can be helpful in suggesting postulates, but cannot establish them as true. Likewise, another system constructed to argue to a conclusion which is a postulate in some system cannot establish the truth of the postulate.

4) Principles are theorems of a theory, and, as such, are the result of the application of the designated deductive rules of inference in a given axiomatic system. They will be true in a system.

5) Practices are actions in conformity with the principles of some theory by adopting a definition of the terms in those principles. No methods of logic relate to the selection of a practice. The accountant may put his argument for the adoption of a particular definition in the form of still another axiomatic system, but such a move will put him in a position of having to define his new concepts and justify his new assumptions. Judgment is still the primary factor in practice—judgment of what is to be accepted (what theories, what definitions), and what is suitable in the circum-

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6) Conventions, as definitions of basic terms common to many theories, are related to practical considerations, and like practices, are, in the final analysis, a matter of judgment.

Comparison with Other Proposals

There have been other proposals for organizing accounting terminology, to all of which this writer considers the present proposal superior. The major advantages of the present proposal lie (1) in the ability to isolate those areas in which specific methods of logic can be applied, by defining the areas in terms of logical relations, and (2) in the statement as to those areas to which some method of logic can be applied.

The proposal of Mr. Spacek was discussed briefly above in connection with principles. This writer agrees heartily with Mr. Spacek's warnings that "unless the arguments . . . are made available for study, we cannot hope to advance our profession,"[1] and,

> . . . without a clear statement of the reasoning on which the principles rest, no community of professional thought can exist.[2]

However, the proposal made by Mr. Spacek would seem to have several serious drawbacks if given consideration in practice. It appears that all statements on accounting matters save

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[1] Spacek, "Need for an Accounting Court," p. 375.

[2] Spacek, "Solution to the Principles Dilemma," p. 279.

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that accounting should be fair, would be relegated to the same general status. What is a principle is not easily seen, nor is it possible to distinguish between principles and practices. Such a distinction seems necessary unless one completely ignores the usage of these terms by accountants today. Further, there is no indication of what logical method, if any, could be used for ascertaining that principles are in accordance with the postulate. The accountant, or perhaps, the accounting court, is still left subject to psychological persuasion.

Like the Spacek proposal, the structure suggested by Mr. Stead[1] is based upon a single, undefined (and perhaps undefinable)notion, which is both ethical and subjective. For Mr. Stead, there is "one all-pervading principle of accounting," and that principle is Integrity. The structure or hierarchy proposed includes a principle, canons, standards and rules, the whole group together being called accounting doctrine. His principle is "an invariable cohesive force," his "canon" a "goal derived from the principle," his "standard" a "measure against which conduct must be squared," and his "rule" a "detailed mandate in a particular case." He supports and justified his proposal in the following words:

> The value of this approach is conceived to be the ability to derive the lower orders from those

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[1] Stead, op. cit.

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> immediately above and thus constantly check any formulation in any ethical framework against the dictates from which it is supposed to stem.[1]

Unfortunately, such phrases as "derived from," and "measured against," and "squared with," are not explained further. The question remains as to HOW one goes about this derivation and, in the absence of methods of doing so, how can one evaluate the path that a given "derivation" by another may take? Nor is there any way to determine what sorts of things fit into his categories, unless, of course, you are willing to simply accept his personal opinion as to their content. Moreover, his categories stray considerably far from present usage of most of those terms.

The Paton and Littleton monograph[2] offers a structure of concepts and standards, and also such things as principles, conventions, practices and procedures. Concepts are assumptions; standards rest on concepts. The distinctions between the remaining terms and their interrelationships are difficult to determine and appear to vary on occasion. However, the usage of most of these terms does not conform to most current usage. Nor does the study offer logical relationships between the groups, or methods of moving from one group to another. And, examination of the accounting matters discussed under the various headings does not give an answer as to the methods used by the authors. Further, there is no

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[1] Ibid.

[2] W. A. Paton and A. C. Littleton, Introduction.

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Professor Littleton's Structure of Accounting Theory offers a structure of definitions, reasons, principles and concepts, to which are added conventions, practices, standards, and a number of other levels. It is suggested that principles are inductively derived and somehow deductively tested for interrelationships. The types of induction to be used are not entirely explained, and the problems of induction in general (as noted in Chapter IV) are not fully reckoned with. The use of deduction is suggested as limited to traditional syllogistic organization, and where this very limited deductive method is to be considered useful is not clear. There appear to be no other discernable logical interrelationships between his categories. In particular, Professor Littleton suggests a category of concepts (which, to some extent, coincides with the present proposal in that it deals primarily with broad understandings of basic terminology), but there is no indication as to a single relationship between, for example, concepts and principles, which can be analyzed and examined by means of some method of logic. If for no other reason, the proposal is somewhat weakened by the very multitude of the terms used and considered significant.

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Professor Vatter has offered a "hierarchy of accounting ideas" which consists of objectives, conventions, doctrines, principles, procedures or methods, and postulates.[1] Principles are presented as distinctive in the hierarchy for "their logical significance." Conventions are said to have no logical reasons, but may be, in fact, arbitrary. But no suggestions are made for logically relating the various levels of the hierarchy in any strict sense, and it is difficult to understand where his principles, then, get the logical significance he asserts that they possess. Professor Vatter does remark, "Accounting is not a purely logical, deductive structure similar to Euclidean geometry."[2] This view is, to a great extent, in accordance with the comments made throughout this paper that the whole of accounting is not just one big logical system such that everything is bound by rigid rules of deduction. But Professor Vatter's statement refers to "accounting" and not a specific level or group of levels of his hierarchy. And, the role of methods of logic at any given level in his hierarchy is left generally unexplored.

The position expressed by groups of the American Institute of Certified Public Accountants is, perhaps, the most well-known at the present time. This proposal envisions a

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[1] William J. Vatter, "Postulates and Principles," Journal of Accounting Research, I (Autumn, 1963), pp. 179-197.

[2] Ibid., p. 186.

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structure of postulates, principles and rules or other guides for applying the principles. Postulates are assumptions upon which the principles rest, and are to provide some foundation for developing principles and rules. Unlike the Spacek proposal, it provides for the simple fact that accounting is not made up of simple statements relating particular actions in particular situations. Moreover, the terms used as names for the categories in the structure appear to correspond with present applications of those terms, though current usage has been, perhaps, influenced to a great extent by the position of the Institute. The proposal does present two difficulties. It lacks a suggestion as to how to go about deriving principles and rules from postulates (which admittedly is an extremely important missing link), and it fails to indicate a satisfactory explanation of what place "practices" or "procedures" hold in the structure and in accounting in general (are these coincident with rules?). Too, the position may be questioned for its immediate requirement (or supposition) that the set of postulates is small in members.[1] Still, "few" (like fair, adequate, sufficient, etc.) is, of course, a relative term, so presumably specific studies which purport to set out the basic postulates need only to reflect the individual's inter-

[1]That question is, in fact, raised by a correspondent to the Research Division of the Institute, and the comments are reprinted in "Comments on 'The Basic Postulates of Accounting,'" Journal of Accountancy, CXV (January, 1963) pp. 44-55.

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One of the major difficulties with most proposals has been that they were accompanied by extensive discussions and examples of things that fell into the various categories suggested in the structure. For example, the case for the possibility of a set of most basic assumptions in accounting may appear much stronger if it is unhampered by a statement that one of those assumptions is that accounting should be done in a stable unit of measure. Thus, the position expressed by the AICPA received little criticism until proposals were made regarding the statements which fell into the categories suggested. Similarly, the suggested one-postulate system of Mr. Spacek may appear particularly attractive because of the specific postulate offered rather than for its ability to add logic or reasonableness to the study of accounting problems. It should be noted that no controversial accounting terms or statements were used as examples in the discussion of the terminological proposal made in this chapter. This writer does not believe that the present state of accounting ideas generally corresponds to the proposal in this paper, and the proposal is not an attempt to justify that present state. The proposed definitions may be considered appropriate to the accounting theory of the future.

Nevertheless, there have been some particular research efforts which have either claimed an application of logic or

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been considered such by other members of the profession. As such these efforts are deserving of special consideration in relation to the present proposal and related suggestions. To a great extent, each study of the group accepts a basic structure consisting of postulates which "underly" principles. The proposal in this chapter accepts the same structure, and suggests the applicability and appropriateness of particular logical methods to specific areas of investigation (postulates, concepts, etc.). Having described in Chapters III and IV the logical methods available, it should be possible to determine if these studies do utilize some method of logic, and if so, to identify the method or methods used. The next chapter will be devoted to such a determination and identification, together with an indication of whether the methods used in the studies coincide with those proposed as most advantageous for the task undertaken.

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CHAPTER VI

CURRENT "LOGICAL" STUDIES EXAMINED

In very recent years, there have been some accounting investigations which Professor Storey calls "ample evidence that logical studies of accounting are not only possible but can be an important contribution."[1] He offers the opinion:

> The real breakthroughs in accounting theory are more likely to come from . . . individuals working more or less alone on what are now considered the fringes of accounting and uninhibited by consideration of accounting practice.[2]

Professor Storey refers specifically to the early Accounting Research Studies, the work of R. J. Chambers, generally summarized in his Towards a General Theory of Accounting, and the efforts of R. Mattessich, which culminated in the recent publication of his book, Accounting and Analytical Methods.

An investigation approximately equal in scope with these is The Statement of Accounting Postulates and Principles by a Study Group at the University of Illinois, which, its authors claim, is an attempt "to express and explain in concise terms the core of a general theory of accounting," and in which they are concerned with "the realism of our conclusions as

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[1] Storey, op. cit., p. 62.

[2] Ibid., (Footnote) p. 62.

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well as their internal consistency and logic."[1] It appears that this study should fit the qualifications set by Professor Storey, for the Group notes that its concern "was not an effort to make our conclusions palatable to any specific group."

An equally ambitious study was made by Dr. Marvin Carlson in an as yet unpublished doctoral dissertation entitled Accounting Theory as a Logical System. Dr. Carlson states that the study "is an experiment in constructing accounting theory with the aid of formal logic."[2]

Each of these five studies (Research Studies Numbers 1 and 3 have been considered as a unit) accepts the basic idea that there are, in accounting, some assumptions or postulates from which other accounting statements are derived, which organization is essentially the same as that proposed by this writer in Chapter V. The objective of this chapter is to analyze each of the studies in the following general pattern:

1) determine the components of the structure suggested;

2) ascertain what method or methods of logic the authors claimed were utilized;

3) identify the method or methods of logic which appear to have been used; and

4) compare the method used to that suggested as most appropriate for the type of problem being investigated.

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[1] Preface, page unnumbered.

[2] Marvin Lee Carlson, "Accounting Theory as a Logical System," Unpublished Ph.D. dissertation, (Commerce, University of Wisconsin), p. 4.

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In connection with the identification of the method of argumentation utilized, some preliminary comments are necessary. As noted in Chapter II, only arguments (premisses and conclusions) are the proper subject matter for logical methods; i.e., that the subject matter of logic is argumentation. If only conclusions are presented, there is no way to determine what method of logic, if any, was used to arrive at those conclusions. The writer does not wish to deny the possibility that extensive reorganization (and perhaps the addition of some unstated premisses) of the discussions in some of the studies would produce an identifiable logical argument. Nor is it suggested that the authors used no logical methods prior to the preparation of the studies for publication, and then presented only conclusions. But the writer is committed to examination of the selected studies as they are written. Current interest in the use of logic by accountants is at least partially prompted by a desire to be able to ascertain, in some objective manner, that reasoning behind a position is sound. And whatever methods of logic may have been used in argumentation taking place outside the final published study are not available for examination by this writer or any other reader.

When arguments are identified as inductive, there will not, generally, be a discussion of the strengths and weaknesses of the arguments. As noted in the discussion of induction (Chapter IV), evaluation of an inductive argument rests with evaluation of its premisses--its evidence. Such a

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task involves evaluation of its completeness, its freedom from prejudice, and its relevancy to the proposed conclusion. It is characteristic of induction that such argumentation is subject to individual evaluation with respect to such matters, and identification of argumentation and not its evaluation is the objective of this chapter.

When an author has claimed deductive methodology, the writer's first efforts were directed at locating some reference to a set of allowable inferences which guided the derivations developed by the author. These efforts, as will be seen in the discussion of the individual studies, were usually unsuccessful. The writer recognizes that there are some commonly used rules of inference, descriptions of which could be found somewhere outside these studies. It is possible that some authors did not desire to increase the length of their works by inclusion of a list of references. Yet, a simple reference to the location of such a list would certainly be sufficient for most readers; and, such reference might add considerably to the weight of whatever positions are expressed. For those readers who would not investigate the list of rules used, the very fact that such a list had been adopted by the author would give the reader confidence that the discussion was formally sound. The reader could concentrate his efforts on the substance of the argument. This advantage is exactly what characterizes deductive logic. For those readers who would question the validity of the argumentation, a list of rules or a reference to it is an

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absolute necessity. As was noted in Chapter III, the acceptance of all the premisses in an argument may be useless (except psychologically) if the argument is not valid, and many logic-minded readers of the study might wish to direct their attention initially to ensuring themselves of the validity of the argumentation. Perhaps, if the rules of deductive inference were as commonly known as the rules of mathematics, the failure to refer to them would seem appropriate. But it is unlikely that the accountants interested in reading the accounting studies examined here are familiar with commonly used deductive inferences.

Accounting Research Studies Numbers 1 and 3[1]

Structure Terminology

Since these studies were undertaken at the direct request of the AICPA Council, they understandably represent an attempt to follow the structural format envisioned in the report by the special committee on research programs. That structure consists of postulates, principles, and rules or other guides for the application of principles in specific situations. Postulates are said to be assumptions, and provide a foundation for principles.

In addition to the three basic levels mentioned above, the studies contain references to some things called

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[1]The two studies are here discussed together as they were intended to present the parts of an integrated whole. This position is made clear in the Preface to Accounting Research Study No. 3.

"concepts." Examples of things in this category according to Study No. 1 are fairness (p. 3),[1] going concern (p. 39), and materiality (p. 47). Study No. 3 mentions concepts of assets (p. 19), economic benefits (p. 21), accrual accounting (p. 48), and profit (p. 53). Though the authors of Study No. 3 indicate that "certain definitions are given to key terms and concepts" (p. 53) and then proceed to give a series of definitions, they do not state which of the things defined fit into which category. In any case, it appears that concepts are things to be defined. The only relationship indicated between concepts and postulates, principles and rules is that concepts are some of the words used in the statements which would fall into the latter three categories.

There is one serious matter of terminological conflict which significantly affects the examination in this paper. Not all the "principles" set forth in Study No. 3 will be discussed in this paper because the writer contends that on the basis of the authors' own usage of the terms identifying each category in the structure, those "principles" given which relate to pricing or valuation do not fall under the authors' heading of principles. Rather such comments or statements represent "rules or other guides for the application of principles to specific situations." The support for this contention follows.

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[1] Moonitz, The Basic Postulates. For the remainder of this chapter, the specific page references will be incorporated into the text which will make clear what source is being referred to.

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Principle A, Study No. 3, reads, in part, "any rule or procedure, therefore, which assigns profit to a portion of the whole . . ."[1] There is no indication in either study of a specific difference between rules and procedures, but even without such a differentiation the statement is significant. The statement indicates that the authors consider that rules and procedures are separate from and below the level of principles in the total structure. The usage of the terms "procedure" and "rule" in the studies indicates the type of things falling into those categories. In Study No. 3, the term "procedure" is used with respect to alternatives for pricing inventory--alternatives such as net realizable value (p. 27) and current replacement cost (pp. 29 and 34). In the discussion of the measurement of assets which are money or claims to money, the statement is made "as a general rule, the valuation of these assets should be based . . ." (p. 24, Underscore added.) Later, in the discussion of fixed assets, the authors call it a procedure to reflect the result of "buying cheap" and "using dear" assets through

> . . . the use of the current (replacement) costs of the services rendered . . . and the separate classification of the related gain or loss. (p. 34)

Reference to Study No. 1 reveals the same usage. Discussion of consistency (pp. 43-44) reveals that procedures are to be consistent, and the example given of a change in procedure is

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[1]The text of the postulates and principles examined is given in Appendix A for reference.

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a change in the basis of measuring revenue. The discussion of conservatism (pp. 47-48) speaks primarily of conservative procedures of asset valuation. That study also refers to a "set of pricing rules." (p. 55) Finally, in the statement of principle D in Study No. 3, the authors use the phrase "the proper pricing (valuation) of assets . . .," which evidences an intent to use the words "pricing" and "valuation" as synonyms.

The writer concludes that since the authors consider valuation and pricing synonymous, and since the examples of procedures and rules are ways of pricing, pricing and valuation must be a matter of procedures and rules. But those "principles" in Study No. 3 regarding measurement relate to pricing or valuation, and present specific suggestions for the application of a general statement (e.g., that all assets and liabilities should be recorded) to specific situations. As such, these comments, or "principles," meet the qualifications for membership in the structural category called, at the outset of the studies, "rules or other guides." Acceptance of this position has led the writer to limit the examination of principles in Study No. 3 to those which do not relate to specific suggestions as to how something "should be measured" or priced. On this basis, principles D and F in their entirety, and those portions of principles E and G which propose specific pricing suggestions have been omitted from consideration.

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Methodology Claimed

Professor Moonitz himself stated, in Study No. 1, that "heavy reliance must be placed on deductive reasoning in the development of accounting postulates and principles." (p. 6) Later he indicated[1] that both induction and deduction were used in the two studies, and that the postulates were "the inferences" drawn by means of induction from "the mass of data concerning the environment in which accounting functions."[2] Unfortunately, in the same article, Professor Moonitz repeatedly states that the postulates of Study No. 1 are self-evident, and then proceeds to discuss the search for them and the evidence reviewed. As already explained, self-evident propositions are those that require no support, those whose truth is apparent to anyone confronted with them. One must conclude that Dr. Moonitz meant, not self-evident assertions, but perhaps assertions to which no violent objections would be raised. In any case, given the claim of induction

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[1] Maurice Moonitz, "Why Do We Need 'Postulates' and 'Principles'?" Journal of Accountancy CXVI (December, 1963), pp. 42-46.

[2] Ibid., p. 44. This statement appears in contrast to the comments of some readers of the studies. Compare, for example, with the comments of Professor Metcalf who speaks of "the heavy reliance upon the deductive process evidenced by " Study No. 1.("The 'Basic Postulates' in Prospective," The Accounting Review, XXXIX [January, 1964], pp. 16-21.) Also compare with the editors of the Journal of Accountancy who applaud Professors Moonitz and Sprouse for having worked in "accordance with rigorous rules of logic" to "achieve a logically consistent set of principles." ("The Approach to Accounting Principles," CXIII [May, 1962], pp. 36-37.)

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in the investigation of postulates, deduction, then, is to be claimed in the development of principles.

No specific claims are made regarding methodology for arriving at definitions for concepts. Nor do the authors claim any use of logical methods in the development of rules and other guides, for it was not intended that the studies concern themselves with the things falling into that category. The only areas, then, where logical methods are claimed are in the development of the postulates and the principles.

Methodology Observed-Study No. 1

A reservation was made at the beginning of this chapter that the only basis on which one can identify the type of reasoning behind a conclusion is the information actually presented for examination. This reservation is especially applicable to the discussion of the two research studies. Much of the material in these studies is related to what "follows from" or is "involved in" or "implied by" the postulates and principles proposed rather than to the argument for the postulates or principles themselves.

Consistent with Dr. Moonitz's claim, the use of any deductive method is generally not in evidence in Study No. 1. Absent from the study is any formal argumentation which could be identified as deductive. However, special attention must be given to the second sentences of postulates A-3, A-4 and A-5, which Professor Moonitz claims are "implied" by the first sentences in each of these postulates. The author calls these implications "simple and direct, requiring nothing

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more than explicit statement by way of 'proof'."(p. 26) The claim in these cases, then, is to some method of deductive logic.

The writer cannot identify what logical inferences led to the implications stated as being so simple and direct. Since the first parts of each of these postulates make no references whatever to "a clear identification" of anything, some intervening propositions must have contributed this term to the conclusions; and the method of logic capable of leading to such conclusions can have been neither simple nor direct. An example of a simple and direct deductive inference should illustrate this fact. From the postulate (A-3)

> Economic activity is carried on through specific units or entities.

the simplest and most direct inference is a proposition something like the following:

> If there is a report on some economic activity, there is an entity which carried on that activity.

Similarly, from postulate A-4, "Economic activity is carried on during specifiable periods of time," the simplest, most direct implication is

> If there is a report on some economic activity, there is some period of time during which that activity was carried on.

The implication claimed in postulate A-5 must be even less simple and direct. Though the postulate specifies money as the common denominator used to measure goods and services, the discussion of the postulate holds rather that it is "exchangeability" of goods and services which is measured

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in terms of money. Thus, if anything about reports in terms of money is implied by the postulate, it is about reports on exchangeability of goods and services and not about reports on goods and services per se. The writer cannot identify any method of deduction which would produce the claimed implication.

Identification of specific methods of induction that may have been used to arrive at individual postulates (other than the special cases just discussed) is further complicated by the fact that each postulate is not preceded by a discussion or argument especially intended to support it. What appears to be intended support of some individual postulate may be found in more than one place in the study, while for other postulates no support can be found at all.

Detailed search of the monograph itself reveals no listing of observations or report of such observations which would allow identification of the method of logic leading to postulates A-1, A-3, A-4, A-5, B-3 and C-3, as they are stated. Perhaps the author felt that no presentation of evidence (or the manner in which he collected it) was necessary in these cases. We might even suggest that these postulates are the ones Professor Moonitz considered self-evident. In any case, no evidence is presented. It is interesting to note that if one were to accept as evidence for postulate A-5 the author's statement "The point of agreement is that money is used almost universally as the common denominator in economic and business affairs" (p. 18), the inference to the postulate would be invalid. For, the statement quoted

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recognizes negative instances of the generalization made in the postulate, while the postulate asserts that there are no negative instances.

There are clear-cut cases of the use of argument based upon the testimony of others. That is, there are postulates for which that part of the discussion which at all relates to the final asserted conclusion in the postulate involves only quotations from other authors. In this group are postulates C-4 and C-5. To this list could be added postulate C-2 if it were stated in the declarative rather than a normative form. The postulate, as stated, is:

> Changes in assets and liabilities, and the related effects (if any) on revenues, expenses, retained earnings, and the like, should not be given formal recognition in the accounts earlier than the point of time at which they can be measured.

The question of what meaning to attach to "and the like" will be omitted here, though an interesting question indeed. In support of a postulate that formal recognition is not given, the author refers to an article in the Journal of Accountancy (p. 41). To the development of the postulate in its original form, however, the writer can attribute no method of induction.

Because of the absence of formal argumentation in the monograph, the idea of evidence and observation may be very broadly interpreted to include the giving of some examples, however few. On the basis of this broad understanding of evidence and argumentation, postulates B-1, B-2 and B-4 can be identified as the result of the method of inductive generalization. This list might be extended to include postulate

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C-1 if it were stated in declarative rather than normative form. The postulate, as stated, is as follows:

> In the absence of evidence to the contrary, the entity should be viewed as remaining in operation indefinitely. In the presence of evidence that the entity has a limited life, it should not be viewed as remaining in operation indefinitely.

Supporting a postulate that the entity <u>is</u> viewed in the manner suggested, the author offers several examples from present accounting practice. To the development of the postulate as stated above, however, the writer can attribute no method of logic.

The remaining postulate, A-2, is peculiar, both in its presentation and in the discussion connected with it. Professor Moonitz claims that it describes "the dominant method" of distribution (p. 22). This claim gives the impression that he has made observations of various methods of distribution. Earlier he states simply:

> Furthermore, the goods and services produced, are, for the most part, distributed through exchange of some sort, and not consumed by the producers themselves. (p. 8)

Two examples are offered of <u>goods</u> (but not services) which had been consumed directly in the past but are now being distributed through exchange. Under a broad interpretation of what constitutes evidence, the writer (with reservations) identifies the method of logic used in developing the postulate as statistical generalization. A less generous interpretation would attribute to the postulate the method of argument based upon the testimony of experts—in this case,

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Professor Moonitz. No other method is apparent from the monograph.

Methodology Observed-Study No. 3

Though the authors claim that deduction was used in developing the principles from the postulates, efforts to locate any reference to the rules of inference used were unsuccessful. The seriousness of this omission was noted earlier in this chapter. Despite the absence of a list of deductive inferences which the authors allowed themselves, the writer has attempted to identify the method of logic used in the development of the principles, as stated, by reference only to the study. The writer found no formal use of the postulates in the development of principles despite an explicit statement that "The 'basic postulates of accounting' developed in Accounting Research Study No. 1 are an integral part of this statement of principles." (p. 55)

As stated earlier, discussion of Study No. 3 is limited to those principles which are not measurement rules or pricing suggestions. The remainder of the principles are A, B, C, the first sentence in E, the first two sentences in H, and that portion of G not dealing with pricing. Principle A stands out from the rest for two reasons. Unlike all the others, it is expressed in the declarative form. And, the manner in which it is supported in the monograph is unusual. The method of logic which appears to have been used in the development of this principle is argument based upon the

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The monograph contains no information which would allow any method of deductive logic to be attributed to the development of the remaining principles, either individually, in groups or in totals. Some single sentences appeared to be intended by the authors as support for some specific principles, but the relationship of these statements to the stated principles must be an indirect one demanding considerable additional argument and premisses to establish any logical connection. Summarizing, then, with the exception of principle A, the monograph holds no evidence of the use of any logical methods. Regarding the exception, the method of logic used was inductive, and one which was noted in Chapter IV as often weak.

Comparison of Observed and Proposed Methodology

The use of inductive methods was suggested in Chapter V as appropriate for the investigation of postulates of a theory; specifically recommended were analogy and inductive and statistical generalization. To some extent, the methods observed in Study No. 1 (if any method could be identified) correspond to those suggested. But the discussion in the monograph allowed identification of some postulates as resulting from arguments based upon self-evidence or the

testimony of experts. The writer considers it unfortunate that the use of induction was extended to include these methods, which, as noted in Chapter IV, are very often without merit. Though it was suggested that deduction (specifically axiomatic method) was appropriate in the development of principles, the use of deductive methods of any kind was not observed in reaching the principles of Study No. 3 from the postulates of Study No. 1. While it is conceivable that both the principles and postulates could be formulated in some logical manner and proved consistent with each other, that exercise would not be evidence of any implications of the postulates or that the statements were on two different levels such as the postulate-principle scheme would claim.

Postulates and Principles of the Illinois Study Group

Structure Terminology

The Study Group has stated that their work follows from

> . . . the current interest in "basic postulates" and "broad principles" and because these terms necessarily occupy a central position in accounting theory. (Unnumbered page of Preface.)

The study envisions a structured whole, called a "general theory of accounting," consisting of postulates, principles and concepts. Postulates are underlying assumptions (p. 6); principles are "basic propositions which express significant relationships in accounting." (p. 23) Concepts, though not defined in the monograph, appear to be important basic terms in accounting.

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The study presents another category called "environmental conditions," which are much like postulates in influencing theory but are "impressed upon accounting by its environment." (p. 6) A fifth category, consisting of "rules and procedures," is necessary to cover the actual actions which accountants take in given situations.

Methodology Claimed

The Study Group makes several specific statements regarding the methodology used. Postulates are claimed as "'discovered' by inductive observations" (p. 7), "inductive in nature" (p. 23), and, even more specifically, "self-evident propositions." (p. 7) They are "not formulated through deductive reasoning." (p. 6) Principles are "universal," "directive in nature," and "more deductive in nature than postulates." (p. 23) Concepts are said to be "formulated" by "a combination of observation and the application of deductive logic." (p. 12) Observation is involved in their original development, and the concepts are then tested by the use of deductive logic to determine if they can be "derived properly" from postulates and matched against other concepts for contradiction and inconsistencies (p. 12). The authors note that

> . . . individual accounting principles are not necessarily derived from the accounting postulates . . . [for] while accounting postulates do have considerable influence on principles, much of this is exerted indirectly through the influence of postulates on concepts, the latter often influencing principles directly. (p. 23)

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The authors adopted a distinctive consistent form for the statement of their accounting principles, which form, they note, follows Professor Littleton's notion of principles as " a statement linking a goal with the means of achieving that goal." (p. 24)

The writer understands these comments to claim that postulates were developed by the use of inductive logic (that they are self-evident), that principles were deduced from postulates and/or concepts, and that concept formulation involved both inductive and deductive methods. The methods used or to be used in arriving at those things which are environmental conditions or accounting practices are not explained. The authors note only that the environmental assumptions must be accepted by accountants in their development of accounting practices (p. 4), and that principles "provide guidance" for the actual carrying out of the accounting functions of analyzing, recording and reporting (p. 32).

Methodology Observed-
Postulates and Concepts

The Illinois monograph is like the AICPA studies in that much of the discussion is devoted to the "significance" or "implications" of the proposed postulates, concepts and principles rather than to their development. And, as with those studies, the reservations made at the beginning of the chapter regarding the limitation of the examination to the published study itself apply to the Illinois monograph.

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The authors' claim of induction in connection with the postulates cannot be denied outright. The impossibility of observing all accounting and all accountants, coupled with the authors' assertion (without reservations) that the postulates are "the assumptions which are made in accounting" (p. 6), describes a situation in which conclusions have been drawn from necessarily incomplete evidence. Presentation of that evidence in support of the conclusions would constitute inductive argumentation. It seems at least possible to accumulate evidence in this case since the authors claim to limit themselves to what is being assumed rather than what should be assumed. The evidence might have consisted of some type of survey of accountants to determine what they were assuming. However, the monograph gives no details of such a survey; and the writer doubts that the authors really meant to give the impression that one was taken (except, perhaps, among the authors themselves).

Still, the impression of some type of survey or a series of observations persists. In support of postulate 1 (Accounting data and reports have validity and usefulness for widely differing purposes.),[1] the authors state:

> A considerable variety of interests finds accounting data helpful, some of them using such data for one purpose, some for another, . . . [and, the data] are used by interested parties . . . for many decision-making purposes. (p. 8)

These comments do not, however, indicate a survey of

[1]The text of the postulates and principles is given in Appendix B for reference.

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accountants as to their assumptions. Rather they appear to result from a survey of the users of accounting data, and hence, could only have led to an assumption which the data-users make. Only if the supplementary claim regarding its being an accountant's assumption is ignored can the development of postulate 1 be attributed to the method of inductive generalization; and, even then, the monograph contains no premisses beyond the statement quoted above.

Postulate 2 (Economic activity is engaged in by identifiable enterprises and these enterprises constitute units of accountability and centers of interest for accounting analysis and reports.) is said to follow directly from the fact that

> . . . individuals and other interests for various reasons find themselves interested in the status and progress of given enterprises. (pp. 8-9)

Here again, only by ignoring the assertion that the postulates are accountants' assumptions can this sentence be considered related to the development of the postulate as stated. But the relationship cannot be identified as one of premiss and conclusion; and, there are no additional statements presented which allow identification of any method of inductive logic as having been used to arrive at the postulate as it is stated.

For postulates 3, 4, 5 and 6, the reader is presented with only argument on the basis of testimony--to be specific, the testimony of the authors. For example, in support of postulate 5 (An enterprise will continue without significant change of environment and activities unless there is per-

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suasive evidence to the contrary.) the authors offer:

> A continuance of approximately the present conditions and trends has generally proved to be the most reasonable assumption. (p. 10)

And, for postulate 6 (The flow of economic activity in which an enterprise engages can be related to specified time periods within its life on a meaningful basis.), the authors simply state the assumption is "implicit in present practice." (p. 11)

In summary, the discussion in the monograph presents no evidence which would allow any method of inductive logic to be attributed to the development of the postulates save, perhaps, self-evidence or argument based upon the testimony of experts, and in the latter case, the experts are no other than the arguers.

That section of the study dealing with concepts is generally devoted to giving and explaining the definitions of those concepts selected as important rather than argument in support of the proposed definitions or evidence regarding how the definitions were developed. Though some definitions at first appear to be the result of extensive observations of the items now considered instances of the concepts defined, the definitions given are discussed as though they had been developed from some argument as to what the concepts <u>should</u> include. For example, the authors report:

> In accounting, the term asset has a special meaning. . . . It appears that assets are simply all those items which are listed on the left side of the balance sheet. (p. 16)

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This definition appears to result from observations of processed accounting data, though no indication is given as to the extent of such observations. Later, it is noted that another definition given in the study would "furnish a basis for reappraising those items we now include as assets to determine if any should be excluded." (p. 17) Since the definitions are not the same, the authors must be taking the position that their definition is not the result of the same observations which led to the "special meaning" quoted above. But, the new definition offered follows a discussion of "three principal characteristics of assets." And the authors give no indication that the things whose characteristics were investigated for the formulation of the second definition were any other than those things which are, by the present definition, assets. It is certainly not clear how observation or induction could have led the authors to decide that these three characteristics were common to all assets since they would have had to know the characteristics or have a definition of assets in order to select the things to observe.

The characteristics, definitions, or descriptions (the authors do not always give definitions as such) of the concepts of transaction, liability, ownership equity, revenue, revenue charge, enterprise status and enterprise progress, are simply presented by the authors for acceptance with some accompanying recommending comment such as, "We find it more useful." The discussion of realization (called sometimes a concept, sometimes a test), like that for the individual

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Methodology Observed-Principles

For that part of the monograph which deals with principles, some of the comments pertaining to the AICPA principles study are equally appropriate. For reasons noted in the introductory section of this chapter, the absence of any rules or references to rules which the authors allowed themselves to use to reach their conclusions is a serious omission. The authors do not actually present support for the principles in the form of formal argumentation which would allow identification of any method of deductive logic as having been used. Rather, they direct themselves to discussion of some of the "implications" of the principles. Moreover, the principles are like Dr. Moonitz's "imperatives," stating what should be done. Neither the postulates nor the definitions contain the relationships needed to allow conclusions to be deduced in this form. As noted in Chapter II, it is not possible to deduce statements of what ought to be from statements of what is. If one concludes that something "should be found," it must be concluded by means of inductive argument of some sort. The monograph offers no evidence to this effect either.

If the principles are restated in the more familiar if-then form, the normative aspect of each is eliminated. Thus, for example, principle 1 might be restated as follows:

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> If accounting develops and maintains a complete record of all events and actions which result in changes in enterprise assets and equities, then reliable information concerning enterprise activities is provided.

In this form, the course of action recommended is recognized as a sufficient, but not a necessary condition for the goal to be achieved.[1] As an experiment, the writer attempted to envision what might have been the deductive argumentation leading to this principle from the postulates and definitions in the monograph.[2] To achieve the principle as restated above, the derivation required several nonsubstantive

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[1] As restated, the principle asserts that if a course of action (the developing and maintaining of a certain kind of record) is followed, the goal (provision of some reliable information about something) will be achieved; or, where such a record is found, reliable information will be found also. It does not deny that in some enterprises some reliable information may be available in the absence of the kind of record described, nor that some enterprises may have neither such a record nor some reliable information. The restatement takes into consideration the logical interpretation of the if-then relationship. The principle should not be stated in the form of a necessary condition, which would be written:

> If reliable information concerning enterprise activities is provided, a complete record of all events and actions which result in changes in enterprise assets and equities is developed and maintained.

Such a proposition, under the normal interpretation of the if-then relationship, denies the availability of reliable information in the absence of a complete record. But the writer did not believe that the authors of the study intended to suggest or would hold the position that reliable information cannot exist in a situation where a complete record of the matters listed is not kept.

[2] A very limited informal axiomatic system was used. The rules of inference used were those proposed by Quine in Methods of Logic, Revised. The rules of the system include no controversial inferences and are common to most natural deduction systems.

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assumptions, additional definitions, and at least one substantive (and perhaps unacceptable) assumption regarding the relationship of validity or completeness to reliability, and depended also on the writer's interpretation of what the authors intended to say in the postulates and principles.[1] The writer emphasizes that the derivation (or any other) is not reported in the monograph, and that it requires information, assumptions and rules which are not reported in the monograph. As such, it represents only one of an infinite number of possibilities, any one or none of which may have been considered by the authors. From the monograph there is no way to determine what has been considered by the authors.

Principles 1b, 2a, 2b, 7 and 8, and, with the addition of a stated goal to be achieved, principles 1a, 2, 3, 4, 7a, 8a, and 8b are of the same general form as principle 1, and can be restated to eliminate their normative aspect. The possibility exists that the experiment noted above might be expanded to allow the derivations of these principles; but such derivations appear to be possible only with a multitude of additional substantive and nonsubstantive assumptions and definitions and considerable personal interpretation of the

[1] In addition to the matters mentioned already, the writer noted that the principle as stated presents a minor accounting but a major logical problem which involves the logic of dealing with the null set. From a strictly logical standpoint, the principle would have to be restated to include the assumption that the complete record does have at least one transaction in it. Obviously, this assumption is not one that would annoy the accountant, but without it, the derivation is impossible from the point of view of the logician.

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words used in the monograph. By combining principles 5 and 6, and principles 7 and 8c into a form like principle 1, these principles may be added to the list given above. Summarizing, then, the claim to development of principles through the use of deductive logic is not supported by the form of the principles or by the discussions in the monograph. In fact, the form of the principles as stated is more in keeping with some type of observation and inductive argument.

Comparison of Observed and Proposed Methodology

The inductive methods apparent in the monograph for the development of postulates are limited to the generally unreliable arguments of self-evidence, or, by broad interpretation, the testimony of experts (the authors themselves). With respect to the methods used in developing concepts or principles, there can be no comparison made, since the monograph offers no indication of what methods these were.

The structure envisioned by the Study Group corresponds in some other important respects with that proposed in Chapter V. The importance placed by the authors on formulating adequate concept definitions coincides with the suggestions of this writer. Moreover, it is interesting to note that while the Study Group claims to have a general theory of accounting, its authors recognize that their theory may not be adequate for all areas of accounting. They believe that some specialized areas of accounting can be covered only by developing additional postulates and prin-

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Towards a General Theory

Structure Terminology

Professor Chambers states that he is pursuing "a body of general ideas on which the practice of accounting is or may be based" (p. 3), "a network of ideas which can represent the source of all specific prescriptions for accounting practices." (p. 4) The network consists of postulates or assumptions, and principles. Postulates are "the characteristics of the world of action," which "represent the way in which the environment of accounting is visualized." (p. 29) Principles are "statements relating to the general nature of accounting." (p. 44)

In view of the author's description of his goal, to the two categories specified above must be added another for accounting practices. Professor Chambers notes that "a general theory or framework of concepts is sought" (p. 46), indicating that for him, concepts are not a separate category of simple terms but rather propositions, and specifically, the propositions of the category he calls principles.

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Methodology Claimed and Observed

In a sense, Professor Chambers is very modest in his claims to the use of logic. Of his postulates he states only that he believes them "realistic and verifiable by observation or introspection." (p. 39) But, he makes no claim to have used any logical method in their development or to have exhibited such argument in his monograph; nor does he actually claim that his postulates are self-evident. It is left to the reader, then, to make his own observations or to examine his own thought processes and sensory experience,[1] for support of the postulates. That the author makes no attempt to justify these assumptions in the monograph is in keeping with his claim. He simply states them for what they are--assumptions.

The principles are said to "have emerged from" the foundation of postulates (p. 44), and are "deduced" (p. 3) or "derived" therefrom (p. 43). The method of deduction is left unspecified, however. With respect to this claim, the writer can only repeat those comments made concerning the studies discussed earlier in the chapter. Like Accounting Research Study No. 3 and the Illinois Study, the Chambers monograph provides no list of rules of inference which allow the reader to move from postulates to principles. With each principle, Professor Chambers offers references to one or

[1] This second alternative is based upon the definition of "introspection" given in Webster's Seventh New Collegiate Dictionary (Springfield, Massachusetts: G. & C. Merriam Company, 1965).

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more postulates and one or more paragraphs of discussion, which references, he says, "are rough indication of the grounds on which the statements depend and the place in which they are discussed." (p. 44) The writer and other readers might speculate on how the author might have moved from the postulates to the principles, but cannot be certain that those inferences used in the speculation (or any other logical inferences) were actually used by the author. Nor does the intended support pointed out by the author give an indication of the author's line of argument or rules of inference. An example of one principle and its support will serve to illustrate this situation. In support of principle D, which states:

> The relevance of accounting information varies directly with its correspondence with realities (i.e., market conditions, contractual relations, etc.) at the time of actions. (p. 44)

Professor Chambers offers only the following postulate:

> For a given role choice depends on the intensity of wants, on present knowledge and on expectations of the outcomes of available courses of actions. (p. 40)

The author also refers the reader to one paragraph in the monograph for discussion of his principle.

> Formal or processed information is conveyed by signals which differ from the original observable events and things. Signals are necessarily abstractions. The probability of optimal adaptation varies with the correspondence of the signals to the observable real events and things; they may be so conventionalized that they represent in one dimension what may only be described adequately in more than one dimension. Correspondence is critical where the actor has no possibility of confirming or testing the quality of the signals. (p. 17)

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nor the realities, nor the direct proportional relationship found in the principle it is said to imply. And the discussion paragraph neither relates to the postulate, quotes it, nor presents even the outline of an argument leading to the principle in question.

The example given is typical and was selected primarily because it did not require extensive quotations.[1] In summary, on the basis of the information contained in the monograph, the writer cannot attribute any method of deductive logic to the development of the principles listed by Professor Chambers.

Professor Chambers claims that the principles provide a framework of concepts "by means of which accounting of various kinds and of various entities may be explained or described." (p. 46) No suggestions are given regarding how to develop practices from these principles, or how to decide what falls into the category of practices. Since Professor Chambers is not concerned with accounting practices in the monograph, there is no way of knowing what methodology he would use.

Comparison of Observed and Proposed Methodology

As noted in Chapters III and V, it is often informative

[1] A complete listing of postulates and principles from the study has not been included in this paper. Altogether, Professor Chambers proposes forty postulates and twenty-one principles. The one principle discussed at length in this paper is a typical example of the group. The inclusion of a listing was deemed, by this writer, as not necessary.

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to propose assumptions for the specific purpose of exploring their consequences and without attempting to justify the assumptions prior to this exploration. The writer might attribute this motive to Professor Chambers though he has not exactly claimed it. That he leaves the evaluation of his assumptions to the reader's personal experience (observation and retrospection) suggests that he believes they can be supported by some method of inductive argument. This methodology, as well as simple hypothesis invention, is consistent with the suggestions in Chapters IV and V as to the methodology for the development of postulates. There can be no comparisons of observed and proposed methodology with respect to the development of principles inasmuch as there do not appear to have been any methods of logic used.

In all fairness to Professor Chambers, it should be emphasized that he made only limited claims for the completeness and applicability of his study. The title itself, Towards a General Theory, indicates that the author did not intend that the study be final; and, in the Introduction, he predicts that the study "will have some defects and some limitations." (p. 3) But the limitations pointed out by the author (applicability to only natural persons or simple trading enterprises) give the impression that the author intended the theory to be sufficient for those two cases. The writer suggests that as Professor Chambers seeks to complete his theory the utilization of the informal axiomatic method for the development of principles (as proposed

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Accounting and Analytical Methods

Structure Terminology

The work of Professor Mattessich indicates an entirely different interpretation of what other authors call "the basic assumptions of accounting." For Professor Mattessich, the basic assumptions of accounting are those conditions which must be present for any accounting system--in effect, the definition of an accounting system (p. 26 and p. 30). Thus, when he suggests that there are eighteen assumptions, he is observing that an accounting system, to be within his definition of an accounting system, must have been preceded by some assumptions dealing with these eighteen matters in some way. He does not always suggest, however, in his list of these assumptions, how all these matters are to be dealt with.

His list[1] consists of ten specifically stated assumptions, and eight, what he calls "surrogate" or "place-holding" assumptions in which no specific statement is given but rather it is assumed that there are statements which could be given. In a sense, then, his assumptions are not so much a general theory of accounting as a general outline for a system of accounting. In this way, his work differs sub-

[1]The text of his assumptions is given in Appendix C.

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stantially from, for example, the AICPA postulate study, examined earlier. For example, Professor Mattessich states that a basic assumption (one of his surrogate assumptions) is:

> There exists a set of hypotheses determining the value assigned to an accounting transaction.

His position is that it must be assumed that there is some set of rules (the terminology here is the writer's) which determine the value to be used in a transaction, or accounting wouldn't be able to take place. He does not believe, however, that any particular set of valuation hypotheses fits the category of "a basic assumption." On the other hand, Dr. Moonitz suggests one of the basic assumptions of accounting to be that accounting data are based on exchange prices. At the risk of oversimplification, it might be said that Professor Mattessich suggests the subject matter of the assumption or what accountants make assumptions about, while Professor Moonitz (and others) are suggesting specific assumptions about those subjects.

Again unlike the other authors, Dr. Mattessich does not specify what form the basic assumptions must take—whether they be incorporated in definitions or propositions or undefined terms. His own attempt at formulating a system (given in Appendix A of his book) shows that he does not equate his assumptions with axioms; for, he uses all three of the above-mentioned forms to meet the conditions he maintains are necessary. For example, the matters of economic object and entities are incorporated into his system in the form of an

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undefined term and definitions, respectively, while for the matter of time, the author utilizes both definitions and propositions. On the other hand, the other studies examined have generally limited themselves to propositions only.

For Professor Mattessich, the "assumptions" are also "principles" (p. 30), and the term "postulate" is not used at all. "Theorem" is used to refer to anything which can be deduced in any system which incorporates the eighteen basic assumptions. The term "concept" is given no specific and consistent meaning through the study. The author does not offer a definition of accounting practices, but in view of the nature of his assumptions, one might consider the selection of the empirical hypotheses to replace his surrogate assumptions as accounting practices, or accounting practices may be the actual working with a given accounting system.

Methodology Claimed and Observed

Technically, Professor Mattessich does not claim that his "basic assumptions" are the basic assumptions of accounting at this time in the sense in which this phrase is used by most authors. For, he holds that he will call something an accounting system only in cases where assumptions on these eighteen matters appear to be operative. Thus, he states that the eighteen assumptions are the "necessary and (hopefully) sufficient conditions for an accounting model" (p. 31), i.e., for an accounting system to exist. If one is missing, an accounting system simply does not, by definition,

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A less technical interpretation of the author's intention would suggest that he believes his list to be appropriately called the basic assumptions at the present time. The author makes no specific claim as to the methods he used to arrive at those ten assumptions which he states specifically. Nor does he claim some particular method in arriving at the conclusion that there must be some assumptions regarding the eight other matters on his list. He states only that the assumptions deal with both a priori and empirical notions (p. 41), and he does not specify which assumptions fall into which category. He does not, however, consider his assumptions unsupported. An entire chapter of the book (Chapter 4) is devoted to what Professor Mattessich calls "The Evolution of the Accounting Model," in which he presents considerable discussion and examples of various accounting systems of the past and present. He observes that "from a broad point of view or by careful reflection . . . all of these basic assumptions are prevalent in each of the accounting systems discussed." (p. 138) Despite the absence of any claim by the author, the writer would willingly attribute the method of inductive generalization to the development of the author's list of assumptions. The evidence provided--examples, and discussions of them--did not consist of written historical statements of the exact assumptions in each accounting system discussed; but the author pointed out those attributes of the systems which

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have led him to believe that such assumptions were operative. Whether the individual reader will consider the evidence sufficient to warrant the conclusions drawn is a question arising with all inductive inferences; but whatever the individual's answer may be, evidence is presented which is intended to support the listed assumptions.

The author does not claim to have deduced anything from the list of assumptions as such. When other authors have referred to the work of Professor Mattessich as providing evidence of the contribution of logic,[1] it has been primarily in connection with the specific axiomatic formulation noted earlier as appearing in Appendix A of his book. There, the author has attempted to formulate a general system which incorporates the basic assumptions presented in his outline for a system. It is a "general" system only insofar as there is a limited attempt to supply specific hypotheses in place of the surrogate assumptions in his list (only one is suggested). It is an attempt insofar as the formulation is not the only possible way of incorporating the conditions presented in his outline.

For his general system (the author, however, calls it a general theory), the author claims, and the writer and any reader can observe and identify, the use of an axiomatic system. The axioms and primitive terms are explicitly

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[1] See, for example, the comments of Professor Storey quoted in this chapter, and Moonitz, The Basic Postulates, p. 3.

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stated and the derivations of theorems are given. The allowable rules of inference are incorporated by explicit statement of the author so that any reader can, by referring to his rules, examine the derivation of any theorem.[1]

Comparison of Observed and Proposed Methodology

The author's use of inductive methods to arrive at his assumptions is in keeping with the methodology proposed by the writer in Chapter V. Likewise, the use of the axiomatic method to deduce further propositions from some specific assumptions coincides with the methodology proposed. However, it should be remembered that what Professor Mattessich has constructed in his Appendix is not a theory in the sense in which that term is used by this writer, but rather the beginnings of a specific accounting system. And, Professor Mattessich's outline of assumptions is not a theory of accounting or an attempt to structure accounting knowledge but, as he says, a meta-theory (p. 426)—not a theory of general accounting, but a theory about accounting

[1]As a matter of minor interest, insofar as Professor Mattessich's system incorporates the matters of elementary arithmetic, in accordance with the well-known work of Godel, it cannot be both consistent and complete with respect to the class of true sentences which can be written in the language of his system. This fact will perhaps bother accountants who are striving for the goal of a complete and consistent theory of accounting; but if this were the only drawback to Professor Mattessich's system, it would be a minor problem since all other systems which utilize basic arithmetic contain the same limitation.

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in general. In fact, given that his outline demands that some set of hypotheses fill the conditions of his surrogate assumptions, a general theory of accounting seems impossible, for any set of hypotheses which is proposed will be related to some specific accounting objective. Hence, a general theory of the type being called for in the literature of the day will be, for Professor Mattessich, a specific theory; and the specific system he has constructed is not the general theory for which accountants are asking.

It is interesting to note that Professor Mattessich's studies have led him to place all of his assumptions on an equal level. As noted in Chapter IV, there is nothing in the nature of inductive argument which will produce a coordinated body of general accounting propositions or automatically create a hierarchy among these statements. Professor Mattessich's observations led him to the conclusion that each accounting system embodies some assumptions about eighteen matters, and he puts all on an equal basis--a position radically different from that of others who accept a postulate-principle scheme. Thus, he does not envision the identification, valuation and classification of economic transactions as following from the nature of the transaction or the entity or any other general matter; rather he proposes that one must postulate identification, valuation and classification criteria at the same time as one postulates transactions and entities. Again, though his assumptions may be

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normative in the sense of postulating what "should be," they are the "should be" for a specific accounting system, can vary from system to system, and are not dictated by his other assumptions. This, too, is a very real departure from the positions expressed by most other writers.

Accounting Theory as a Logical System

Structure Terminology and Methodology Claimed

The terminology used by Professor Carlson corresponds, in many respects, with that used by the writer in Chapter V though he proposes no specific meanings for the often-used terms of accounting. "Concept" is the term he applies most often to the primitive terms of an axiomatic system, though he does sometimes use the word in connection with some basic term outside any system (p. 49). Postulates are any relationship asserted to hold in an axiomatic system (p. 17 and p. 81). While the author uses the word "theorem" to describe the propositions deduced in an axiomatic system (p. 9), he apparently would allow the use of the title "principles" (p. 17) for the same propositions. However, he does not confine the title "principle" to such theorems, and it appears that he would class those general statements in Accounting Research Study No. 7 and any like them as principles also.

Professor Carlson's meaning of the term "theory" is not quite clear. The term is often used to describe an

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axiomatic system (e.g., pp. 17-18). But he also notes that "a single theory may have any number of axiomatic systems which formalize it entirely or in part" (p. 8), which seems to indicate that a deductive axiomatic system is only a formulation or formalization of a theory (p. 4), and the theory is something more or less intangible. Accounting practices are not defined at all, though the author must have believed that there was a category of such things, since theorems of deductive systems can hardly be acts of accountants fulfilling their functions as accountants.

In his study, Professor Carlson constructs an axiomatic system which he calls TS, modifies this system into another, called TS', and outlines still another which he calls MS. The first is intended to deal with "traditional accounting," the second incorporates the possibility of purchasing-power changes. The last deals with current-value accounting, and is based upon Professor Carlson's interpretation of the Moonitz-Sprouse (hence, MS) principles study. No theorems (principles) are presented for the last two systems.

Professor Carlson makes no suggestions regarding how postulates and definitions of concepts are to be developed. Nor does he make any claims to the use of logical methods in the development of his own definitions or postulates, though one postulate is said to be "obvious" (p. 94), and two others "intuitively obvious." (p. 158 and p. 212) The theorems are, by definition, claimed as de-

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Methodology Observed

Though as stated above, no claims are made to the use of logic in arriving at the postulates, Professor Carlson does argue that his system TS does formalize a significant part of traditional accounting (pp. 216-220). However, the argument does not support the contention that the postulates of his system are therefore the assumptions of accounting or the assumptions of accountants. For, the argument rests on showing that the theorems of his system are essentially the same as some AICPA pronouncements on several matters. And, logically, the postulates or assumptions of his system need not be the assumptions made or even considered by those persons handing down the AICPA pronouncements. As Professor Carlson himself noted, there may be many systems to express the same general position.

Of the twenty-three postulates in system TS,[1] six (Q-2, and Q-6 through Q-10) deal with simple mathematical concepts and may be considered as needing no support. (Yet, oddly enough, Professor Carlson chooses to present algebraic proofs for some.) Twelve of the postulates of TS (C-1, C-2, C-3, C-5, C-6, M-2, M-4, Q-1, Q-3, Q-4, Q-5 and Q-11) are offered as obvious or without supporting argument,

[1] A list of the postulates used by Professor Carlson is given in Appendix D.

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which appears in keeping with the author's expressed interest in the theorems rather than the postulates of the system. Four of the postulates (M-1, M-3, M-5 and M-6) are accompanied by references to somewhat similar statements made by other accounting writers of pronouncements of the AICPA. Consistent with the treatment of other studies, the writer has considered these as inductive arguments based upon the testimony of experts. The argument for the remaining postulate (C-4) can be identified as a simple deductive argument of the traditional logic. The postulates of systems TS' and MS, insofar as they differ from those of TS, are Professor Carlson's interpretation of statements made in the Moonitz-Sprouse monograph, and no method of logic was claimed or observed for their formulation.

The method of logic claimed and observed for the actual development of the principles presented as deduced from the postulates in System TS was the axiomatic method of deductive logic. Primitive terms and axioms were explicitly stated, together with a complete list of the rules of inference adopted. Proofs (arguments in support) of principles were stated in full. That there were errors in some proofs[1] does not affect the ability to identify the method of logic used.

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[1]These errors have been discussed with the author and acknowledged. At the present time, the writer is not aware of the methods of their subsequent correction, if any. The errors affected the proofs of almost all of the theorems of system TS; and for this reason, a list of Professor Carlson's principles has not been included in this paper since they have not been proved.

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Comparison of Observed and Proposed Methodology

Since Professor Carlson was not primarily interested in supporting his postulates but rather in deriving his principles, the fact that the methodology attributed to most postulate development was either inductive (argument based on the testimony of others) or nonexistent is neither surprising nor a criticism. The author himself suggests (pp. 248-250) that it was his intention to find or invent postulates from which he could deduce the desired theorems. Yet, inductive methods and hypothesis invention were both suggested by the writer as legitimate for the development of postulates. The use of the axiomatic method to investigate principles is, of course, in keeping with the suggestion made by the writer in Chapter V.

In some important ways, however, the proposals of Professor Carlson differ from those made by this writer. Professor Carlson does not envision the use of axiomatic method in the presentation of a simple argument for any specific position, but rather for problems of such scope as all of traditional financial accounting theory, cost accounting, etc. Making no claims to the completeness of his theory (in a logical or a nonlogical sense), he nevertheless maintains that it contains a "substantial part of currently accepted accounting theory" (p. 248); thus he holds to the idea that a general theory of accounting should be the goal of present research efforts employing the axiomatic method.

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The system he has constructed provides some evidence that perhaps his claims and such goals are premature. For, the system does not allow the proof of such simple matters as that accounts receivable and inventory are current assets, or even assets, while it attempts to provide a proof for the necessity of inter-period income tax allocation and the lower of cost or market valuation of inventory. And while the system allows a proof for the possibility that assets can be used to provide other assets (the costs attach idea), it does not provide for the replacement of liabilities by some other liabilities. Moreover, while seventeen substantive (i.e., nonmathematical) postulates have been offered, only eight are operative in his system as presented. Nor was the system established as consistent. The major emphasis in the derivations is upon definitions, but the author does not point out that his definitions for nonprimitive terms are as much assumptions, subject to acceptance or rejection, as are his postulates. And it is the formulation, in logical terms, of the definitions, that led to the errors mentioned earlier. This fact is further evidence that the scope of the project is perhaps beyond reasonable expectations at this early stage (or perhaps even any stage) in the formalization of accounting ideas.

General Conclusions

The terminology used in the five studies examined does

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not completely coincide with that proposed in Chapter V, and in each study some very common structural term of present accounting vocabularies was unexplained or ignored. For example, in the Accounting Research Studies, and the works of Professors Carlson, Chambers and Mattessich, the term "concept" and how it relates to the other terms used (postulate, principle, practice) are not explained. More important, in none of the studies examined is there a workable definition of an accounting theory or any suggestion as to what constitutes an accounting practice, or how such are related to the other terms which are discussed. In this respect, the proposed interrelated structure of terminology in Chapter V differs from all the studies and appears to offer an advantage.

In general, the methodology used (when it was at all possible to identify it) in the development of postulates or assumptions was inductive, though the range of accounting statements covered by the title of "postulate" was amazingly wide. Inductive argumentation was suggested in Chapter V as appropriate for developing assumptions for a theory. But, the specific methods recommended (viz., inductive and statistical generalizations and analogy) and the methods found in the studies (with the exception of Professor Mattessich's work) were basically not the same. The major arguments found were the much less acceptable methods of arguments claiming self-evidence or arguments based upon the

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testimony of others. And, the identification of even those methods rested heavily either on the writer's broad interpretation of what constituted the presentation of evidence, or on the adjustment of the proposed terminology to correspond with that used in the study under examination.

With the exception of the works of Professors Carlson and Mattessich, the methods used to develop further statements from the assumptions or postulates were not in accordance with the recommendation in Chapter V, since no logical methods could be attributed to their development in the rest of the studies. In both exceptional cases, the method used, the construction of an axiomatic system, corresponds with the writer's recommendation. Yet, there is considerable difference in the intentions of the two authors, their terminology and the results of their work. Professor Mattessich has constructed, by his own definition, a specific accounting system, while Professor Carlson attempted to axiomatize the whole of "traditional financial accounting."

Throughout this chapter, the writer has adopted a relatively broad interpretation of the notions of evidence and even argument. Nevertheless, the writer found it extremely difficult to find evidence of and to identify any method of logic as having been used in many areas of the studies examined. That all the works examined here have been considered by their authors and/or others as log-

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ical studies provides grounds for suggesting that clarification of the nature of logic and its methods would be a desirable addition to current accounting literature. Of the studies examined, only two exhibited the use of the more rigorous area of logic--some method of deduction. It is interesting to note that neither of those studies was available to Professor Storey at the time of his comment quoted at the beginning of the chapter. That some logical studies can be carried on relating to some aspects of accounting ought not to be disputed in view of the type of work done by Professors Carlson and Mattessich. Reference to these same two works does not, however, support a contention that logical studies have, or even can, produce a general theory at this stage in the development of formalization in accounting theory.

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CHAPTER VII

RÉSUMÉ

This study was undertaken because of the present intense interest in investigation and research into the very foundations of the accounting process. That there is something in accounting which transcends the individual practice adopted by a particular enterprise in a specific situation is seldom, if ever, disputed. But whatever the name or names given to that elusive something said to be prior to, and to provide the foundation for, accounting practices, different practices are continually being adopted--practices which, when followed in apparently similar situations, produce substantially different results on financial statements.

That what purport to be justifications for these practices appearing in professional journals are not convincing to all accountants raises the question of whether a method of justification or position presentation can be found which would be accepted by all as convincing. The search for such a method most often produces suggestions for an application of the methods of logic.

The use of "logic" is suggested for investigations of all kinds of things in accounting--principles, postu-

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lates, concepts, etc.--predicting that, with the help of logical techniques, a general theory of accounting will be constructed which would present an interrelated combination of these categories in its structure so as to produce a hierarchy of accounting statements. Such a theory would presumably show what should be done and bring an end to the many current disputes, while at the same time providing a basis for resolving future problems as they arise. The current work of several researchers has been heralded as evidence that logical studies have been made and can produce such a general theory. The overall purpose of this study has been to critically examine these suggestions, predictions and presumptions regarding the utilization of logical methods in the light of the nature of logic and logical methods and the state of accounting argumentation.

"Logic" Clarified

It should be recognized that a simple suggestion that "logic" be applied to "accounting" is, if not meaningless, at least far from precise. There are several methods of logic and there are many aspects to consider in accounting. To clarify the first of the vague terms in the suggestion, an examination of the nature of logic and its several methods was undertaken in Chapters II, III and IV. In these chapters, the attributes or characteristics of logical methods were presented. Though limited comments were made relating to possible utilization in accounting, for

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the most part the discussion was organized so that the limitations or problematic aspects of each method could be recognized apart from any specific application.

Methods of argumentation (which is the subject matter for logical analysis) were effectively segregated into those which involved conclusive reasoning (properly labeled deductive) and those which did not (inductive). The distinction was shown to be extremely important, for the connotation of certainty, which, for some, may be associated with the word "logic," was shown to arise not from the nature of logic itself, but rather from some of its methods. Attributing certainty or irrefutability to scientific propositions (which are commonly understood to have been developed through the use of inductive methods) was shown to be unjustified. What certainty is to be found through the use of logical methods is attached to deductively derived conclusions, and even this certainty is subject to reservations.

Of the deductive(conclusive) methods, only two could possibly be of interest to the accountant wishing to organize the body of accounting knowledge in some systematic manner: truth functions of propositions and informal axiomatics. The former, dealing as it does, only with whole propositions, can be of no benefit in the study of individual terms, and its usefulness is limited primarily to comparisons of relatively simple and clearly stated argu-

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ments. The latter method has proved useful for problems of varying scope and complexity, allows of varying degrees of rigor, and has been found appropriate for initial attempts at formalization in a particular subject. Its use has often generated much-needed interest in more adequate definitions of basic terms of a discipline, and has encouraged increased precision in the formulation of basic assumptions and complete arguments. Most importantly, its proper use allows specific and understandable meaning to be placed on such claims as "this logically follows."

In Chapter IV it was shown that any discussion of the methods of reasoning inconclusively (induction) is necessarily limited by the fact that there are perhaps as many ways to do so as there are people to reason and matters for them to reason about. Such ways of reasoning may be more accurately described or classified as general grounds for believing or holding a given proposition to be true, those grounds being self-evidence, testimony and experience. Despite the suggestions of many, accountants should dismiss the first of these grounds, self-evidence, as a means to support their beliefs. Self-evidence was shown to be a relative notion. It is a method of justification continually rejected in scientific investigations, and at least as inconclusive a ground for belief as any of those examined.

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the testimony of others, was shown to be a valuable part of scientific investigations, though the present state of accounting practices indicate it to be generally rejected by accountants. If and when expert accounting testimony is related to conclusions based upon specific, well-documented, and possibly quantitative experiments, as is that of relied-upon experts in the physical and social sciences, arguments in this form may also play an important part in accounting investigations. But it was pointed out that no rules or methods of logic can be utilized in a determination of the acceptability of the testimony of an expert. There is no logical necessity for its acceptance.

Those ways of reasoning popularly called inductive were shown to be essentially the variations of the experiential ground for belief. The methods available, inductive and statistical generalization, and analogy, have all proved valuable to researchers in other disciplines at one time. The characteristic common to these methods is the use of statements of evidence as the premisses of argumentation. Evidence is the key to induction, and evaluation of evidence is what allows the determination of the strength of an argument. But here it was emphasized that the logician does not offer inviolable rules for gathering or evaluating evidence, for separating the good evidence from the bad, or for drawing conclusions on the basis of evidence. Evaluation of the evidence is not, in fact, the logician's

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interest at all, but rather that of the researcher in the particular discipline to which the evidence relates. But the absence of rules for evaluating evidence does not excuse a researcher from its presentation, for there can be no evaluation by other than the original researcher unless the evidence is available for review. Failure to report the evidence supporting what appear to be conclusions based upon induction was shown to be not uncommon in accounting literature.

"Accounting" Clarified, A Proposal

The simple suggestion made above is in need of further clarification for the second of its vague terms, "accounting." What is there to be investigated? Continued usage of the terms "concept," "postulate," "principle," "practice," "theory," and "convention," indicate that all have probably become a permanent part of the accountant's vocabulary. In Chapter V it was shown that serious inconsistencies exist in the use of these terms, and that the several attempts made to explain the meanings of some of these terms have failed to consider the others or to identify relationships between them which would give some substance to the suggestions for the use of logic. Yet, without some clear understanding of at least what an "accounting theory" is supposed to be, it is quite impossible to intelligently evaluate or make any predictions about what the discovery of a "general theory of account-

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The selection of a logical tool to apply in a particular investigation should be dictated by the nature of the thing being investigated; and these terminological inconsistencies, together with the absence of adequately defined interrelationships, seriously hamper the selection process. Consequently, a terminology proposal was made in Chapter V which allowed for a distinction between the above-listed terms in such a way that, though all retained applicability generally coincident with present usage, specific logical interrelationships were established. Given these distinctions, those methods of logic were suggested which appeared appropriate for investigations related to matters falling in each of the categories defined. The basic unit of the proposed interrelated structure was a theory, which was defined as any axiomatic system for the presentation of a position or argument. Concepts, postulates and principles, then, were equated with the system's basic terms, axioms and theorems, respectively. Practices were defined simply as actions in conformity with the principle of some theory by adopting some set of definitions for the terms in the principle; the word "convention" was suggested to apply to some definition common to many theories.

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appropriate in the investigations of postulates and the definitions of concepts; hypothesis invention was considered as appropriate also for suggesting postulates. Thus a premium is still placed on creativity, ingenuity and inspiration, and the accountant continues to be confronted with matters requiring exercise of the judgment factor. Principles would be the result of the application of the deductive rules of inference designated in a given theory (axiomatic system). And, practices and conventions, though clearly and understandably related, by definition, to the other structural categories, would, nevertheless, generally not be subject to investigation by methods of logic.

A General Theory

A "general theory," using the above definitions and distinctions, has some meaning. Whether such a theory could ever be constructed and whether it would satisfy the hopes and claims of those who urge its construction are entirely different matters. And the advisability of devoting the bulk of our research efforts at the present time to the construction of such a theory is surely open to question.

An Ambitious Objective

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efforts to the pursuit of the elusive general theory seems almost a contradiction. A problem of secondary importance rigorously analyzed and brought to solution represents more progress than the failure to resolve any problems, large or small. Furthermore, no proof has been offered that all the currently controversial issues in accounting can be attributed to the absence of a general theory.

Though there have always been hopes among the theoreticians of the more advanced physical sciences that some basis might be found for unifying the several branches of study within a given science, there is, as yet, no general theory in any of them. Thus, while accountants may not be alone in envisioning and pursuing such an ideal, researchers in other disciplines have not limited their efforts in formalization of their theories to the search for this underlying, unifying general theory. Without the formalized knowledge in the specific branches of each discipline, it seems appropriate to suggest that there would be little to unify, and the theories in accounting are at a stage of development and formalization which strongly discriminates against the success of a search for a general theory. On the other hand, the development of formalized theories on a somewhat less grand scale may, in fact, contribute to the eventual construction of a general theory by revealing that a particular series of axioms appears in each case. Such a result would be evidence that those assumptions

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Analysis was undertaken, in Chapter VI, of the several studies pointed to as evidence that a general theory with the help of logic is a reality or near reality. Critical examination of these studies fails to support a contention that the use of logical methods has, or even can, produce a general theory at this point in the development of formalization in accounting theory.

Generally, no use of logical methods was discerned in the selected works of Professors Moonitz, Sprouse and Chambers and the staff of the University of Illinois, though with the broadest interpretation of what constitutes the presentation of evidence it was possible to identify some limited use of arguments claiming self-evidence or the testimony of experts. The fact that such broad interpretation was necessary underscores again the need,in accounting discussion, for more care in the presentation of whatever evidence is intended to support reported conclusions. The Mattessich study was revealed to be not a general theory of accounting at all but rather a theory about accounting in general, or a definition of an accounting system. Following his outline for a system, a general theory of the type being discussed at the present time seems impossible; for, any hypotheses proposed to fill the place of his surrogate assumptions must be related to some specific accounting objective and hence the system becomes

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specific. The Carlson study serves to provide evidence of the difficulty of adequately defining the boundaries of the subject matter for a theory. It also seems to support the possibility that even a theory encompassing only traditional financial accounting is probably beyond reasonable expectations at the present stage in the organization of accounting ideas in a formal manner.

Some Unfulfilled Predictions

It is possible to make some observations about the conditions that will exist if such a general theory should be constructed. Its basic terms, axioms and theorems could, indeed, be called the basic concepts, postulates and principles of accounting. And, it would present an interrelated structure of these categories which would produce a hierarchy of a sort. But much more can be said about the circumstances which would surround the construction of such a theory and the problems it would produce.

The claim that a general theory will in some way show what should be done is without support. No amount or method of examination and observation of what is (induction) will enable a determination of what should be. And no finite number of applications of presently known deductive rules of inference will result in a conclusion involving an "ought to" without an assumption of the same nature.

The theory could not be said to be right or wrong, to be true or false. Resting on the truth of its postulates

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(axioms), which, in turn, rests on either the truth of the postulates of other theories or some method of inconclusive reasoning (induction), the theory isn't true; it is merely useful.

Nor, if more than one general theory were proposed, would any rules of logic demand that one theory be accepted as opposed to another. That is, "a" general theory need not automatically become "the" general theory, or, more importantly, a generally accepted theory of accounting. Its postulates, and the definitions of its nonbasic terms are subject to acceptance and logically open to question. Its rules of inference may be challenged. To be of any practical value, its basic terms require interpretation. Even if the interpretation utilizes seemingly simple words, these words will undoubtedly require clear definitions in order that the principles of the theory may be translated into practices. Thus, while the principles will be consistent with each other if the system is proved to exhibit this quality, practices could be, in a manner of speaking, inconsistent by virtue of the adoption of different definitions by different practitioners. Hence, a single set of definitions also will have to be generally accepted, else alternative practices will exist. And accountants must not expect to settle such problems by searching for the right or true definitions, for definitions are neither true nor false, but only useful and workable.

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The very question which appears in some form or another in most current accounting discussions, that of acceptance, cannot, then, be expected to disappear with the advent of any general theory of accounting. An increased use of formalization in the method of presenting the various sides of issues in dispute may draw attention to those areas which represent the center of the controversy. But a once-and-for-all-time end to differences of opinion is highly improbable in that most deal with either some important general or specific assumption or the more difficult area of definitions.

The availability of a general theory would not destroy the usefulness, or even the need for, what might be called special theories, or theories designed to cover special problems, such as, for example, cost accounting, or even the more limited problem of deferred income taxes. The general theory may provide some assistance in the resolution of as yet unborn problems, but reference to those other, necessarily less abstract theories, would doubtless be of more value in connection with any specific future disputes. And the possibility will always exist that new business facts may exhibit characteristics not observed in those used in the formulation of currently workable definitions, so that re-examination of these definitions becomes necessary, bringing with it new conflicts regarding definition selection. It can be seen, then, that if

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and when any general theory of accounting is proposed, the accountant's problems will hardly be over.

The Beginning

There is no need for the profession to abandon the hope of finding a general theory of accounting. The search need not be discontinued. Nevertheless, it should be immediately recognized that most accountants are completely unfamiliar with many of the most fundamental matters relating to logical inference. This fact is evidenced by the several misunderstandings and misconceptions pointed out in this paper. There is considerable practical advantage to be gained by introducing the use of any logical method in rather simple and limited problem areas, perhaps even in connection with positions about which there is no apparent disagreement at present.

A theory is not necessarily a complex thing. The construction, within the confines of a known natural deduction system, of a proof of a single proposition meets most of the qualifications for membership in the set of theories. The experiment mentioned in Chapter VI, to derive one of the principles suggested by the Illinois Study Group from selected postulates and definitions, would constitute a somewhat elementary theory as that term is used in this paper. That the principle was uninteresting and would probably be accepted by most accountants without any proof at all does not negate the value of

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its demonstration. On the contrary, the postulates which appeared to be necessary in the proof (e.g., assuming a directly proportionate relationship between the completeness of accounting records and their reliability) might not so easily be accepted. A more interesting theory might be proposed after a careful analysis of a well-written professional article in opposition to the recording of deferred federal income taxes. Undoubtedly one of the major problems in any such analysis would involve segregating the reasoning for the position being held from the reasoning for or evidence in support of some of the premisses used in the main argument. For example, if one of the assumptions necessary for the argument is that taxes are not an expense, the article may also include considerable space devoted to an analogical argument in support of this assumption. Even in this theory, a single proof would probably suffice to express the reasoning followed in support of the final position.

Beginning the utilization of appropriate logical methods with such modest objectives corresponds with the suggestion made in this paper that attempts at theory construction on a small scale would be appropriate at the present time, as well as more likely to succeed. A certain amount of resistance has confronted those writers who have utilized complex mathematics as part

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of the presentations of their ideas. Since logic is not as widely known as mathematics, it is reasonable to expect that the use of logical methods to assist in position presentation will meet the same type of resistance. As a practical matter, then, during this time of experimentation with simpler theories, the members of the profession could take steps to convince themselves of the acceptability of the methodology. This preparation will enable the accountant to more intelligently analyze and more readily accept whatever results might be produced by the future use of some method of logic in connection with more controversial and basic issues.

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APPENDIX A

POSTULATES AND PRINCIPLES OF THE

ACCOUNTING RESEARCH STUDIES

Postulates

A-1 Quantification Quantitative data are helpful in making rational economic decisions, i.e., in making choices among alternatives so that actions are correctly related to consequences.

A-2 Exchange Most of the goods and services that are produced are distributed through exchange, and are not directly consumed by the producers.

A-3 Entities (including identification of the entity) Economic activity is carried on through specific units or entities. Any report on the activity must identify clearly the particular unit or entity involved.

A-4 Time period (including specification of the time period) Economic activity is carried on during specifiable periods of time. Any report on that activity must identify clearly the period of time involved.

A-5 Unit of measure (including identification of the monetary unit) Money is the common denominator in terms of which goods and services, including labor, natural resources, and capital are measured. Any report must clearly indicate which money (e.g., dollars, francs, pounds) is being used.

B-1 Financial statements The results of the accounting process are expressed in a set of fundamentally related financial statements which articulate with each other and rest upon the same underlying data.

B-2 Market prices Accounting data are based on prices generated by past, present or future exchanges which have actually taken place or are expected to.

B-3 Entities The results of the accounting process are expressed in terms of specific units or entities.

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B-4 Tentativeness The results of operations for relatively short periods of time are tentative whenever allocations between past, present, and future periods are required.

C-1 Continuity (including the correlative concept of limited life) In the absence of evidence to the contrary, the entity should be viewed as remaining in operation indefinitely. In the presence of evidence that the entity has a limited life, it should not be viewed as remaining in operation indefinitely.

C-2 Objectivity Changes in assets and liabilities, and the related effects (if any) on revenues, expenses, retained earnings, and the like, should not be given formal recognition in the accounts earlier than the point of time at which they can be measured in objective terms.

C-3 Consistency The procedures used in accounting for a given entity should be appropriate for the measurement of its position and its activities and should be followed consistently from period to period.

C-4 Stable unit Accounting reports should be based on a stable measuring unit.

C-5 Disclosure Accounting reports should disclose that which is necessary to make them not misleading.

Principles

In accordance with the writer's limitation noted in Chapter VI, the list of principles which follows includes only those not related to specific suggestions for pricing or valuations.

A) Profit is attributable to the whole process of business activity. Any rule or procedure, therefore, which assigns profit to a portion of the whole process should be continuously re-examined to determine the extent to which it introduces bias into the reporting of the amount of profit assigned to specific periods of time.

B) Changes in resources should be classified among the amounts attributable to

1) Changes in the dollar (price-level changes) which lead to restatements of capital but not to revenues or expenses.

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2) Changes in replacement costs (above or below the effect of price-level changes) which lead to elements of gain or of loss.
3) Sale or other transfer, or recognition of net realizable value, all of which lead to revenue or gain.
4) Other cases, such as accretion or the discovery of previously unknown natural resources.

C) All assets of the enterprise, whether obtained by investments of owners or of creditors, or by other means, should be recorded in the accounts and reported in the financial statements. The existence of an asset is independent of the means by which it was acquired.

E) All liabilities of the enterprise should be recorded in the accounts and reported in the financial statements.

G) In a corporation, stockholders' equity should be classified into invested capital and retained earnings (earned surplus). Invested capital should, in turn, be classified according to source, that is, according to the underlying nature of the transactions giving rise to invested capital.

H) A statement of the results of operations should reveal the components of profit in sufficient detail to permit comparisons and interpretations to be made. To this end, the data should be classified at least into revenues, expenses, gains, and losses.

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APPENDIX B

POSTULATES AND PRINCIPLES OF THE

ILLINOIS STUDY GROUP

Postulates

1) Accounting data and reports have validity and usefulness for widely differing purposes.

2) Economic activity is engaged in by identifiable enterprises, and these enterprises constitute units of accountability and centers of interest for accounting analysis and reports.

3) Accounting is primarily concerned with the effect on an enterprise of its exchange transactions with other enterprises or individuals and with events which produce results essentially the same as exchange transactions.

4) Transactions in which an enterprise engages are consummated in terms of a stated or implied money price, and this money price provides an appropriate basis for accounting measurement and analysis.

5) An enterprise will continue without significant change of environment and activities unless there is persuasive evidence to the contrary.

6) The flow of economic activity in which an enterprise engages can be related to specified time periods within its life on a meaningful basis.

Principles

1) To provide reliable information concerning enterprise economic activities, accounting should develop and maintain a complete record of all events which result in changes in enterprise assets and equities.

a) All enterprise transactions (exchange transactions and equivalent events) should be recorded in terms of their effect on enterprise progress and status.

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b) To avoid erroneous conclusions based on premature analysis, recognition of the ultimate effect of some enterprise transactions on enterprise progress and status may be postponed until, but only until, the series of transactions of which they are integral parts have been completed.

2) Enterprise data should be expressed in such monetary terms as will facilitate their use by the various interests in an enterprise.

a) Enterprise transactions should be recorded at their money price in order that these data may be recorded in a reasonably homogeneous and objective manner.

b) To achieve reasonable comparability and completeness, enterprise transactions in which necessary quantification is not apparent should be recorded by means of reasonable approximation of exchange prices.

3) The accounting records should accumulate and classify the financial data in such a manner as will facilitate their use for analysis, interpretation, and reporting.

4) Classifications should be used which will permit proper identification of assets and equities of the enterprise, and which will recognize significant similarities, dissimilarities, and interrelationships relevant to enterprise progress and status.

5) To reflect enterprise progress and changes in enterprise status, modification of enterprise transaction data may be required.

6) The nature, extent, and effect of any recorded modifications of enterprise transaction data should be clearly evident in the accounting records.

7) To provide enterprise interests with information appropriate to their needs, reports reflecting enterprise progress and status should be prepared and made available periodically.

a) All enterprise transactions should be reported to reflect their effect on enterprise progress and status.

b) Information reflecting events and developments other than enterprise transactions may be required to supplement or complement reports of basic transaction data.

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a form appropriate to their needs, reports should be so arrayed as to reflect managerial success or failure in guidance of the enterprise economic endeavors.

a) Significant similarities, dissimilarities, and interrelationships in the reported data should be clearly indicated in the report.
b) Reporting practices should be followed which facilitate comparisons over time and among enterprises.
c) A clear distinction should be maintained in accounting reports between basic enterprise transaction data and supplementary or complementary information.

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APPENDIX C

THE BASIC ASSUMPTIONS OF

PROFESSOR MATTESSICH

1) Monetary Values There exists a set of additive values, expressed in a monetary unit; this set is isomorphic to the system of integers plus the number zero.

2) Time Intervals There exists a set of elementary (or minimal), additive time intervals.

3) Structure There exists a structured set of classes reflecting significant categories of an entity.

4) Duality For all accounting transactions, it is true that a value is assigned to a three-dimensional concept consisting of two accounts and a time instance.

5) Aggregation Every balance assigns a value to an ordered pair; the latter consists of the pertinent account and the above stated period which starts with the accounting period.

6) Economic Objects There exists a set of economic objects, whose values and physical properties are subject to change.

7) Inequity of Monetary Claims There exists a custom to enter debts with the understanding to redeem them in legal tender at face value--whether meanwhile price-level changes vis-a-vis this legal tender have occurred or not.

8) Economic Agents There exists a set of economic agents who set specific goals to an accounting system, command resources, and make plans and decisions with regard to economic actions.

9) Entities There exists a set of entities setting the frame for economic actions.

10) Economic Transactions There exists a set of empirical phenomena, called economic transactions. Each of these transactions assigns, by means of empirical hypotheses, a value to an ordered pair of transactors (categories) and a time instance.

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11) Valuation There exists a set of hypotheses determining the value assigned to an accounting transaction.

12) Realization There exists a set of hypotheses, specifying which of the following mutually exclusive effects are exercised by a change of an entity's economic object(s). Such a change either: (1) affects the value assigned to the current income of the entity; or (2) does not affect the owners' equity of this entity (within the specified period); or (3) affects the owners' equity without affecting the current income of the entity.

13) Classification There exists a set of hypotheses required to establish a chart of accounts.

14) Data Input There exists a set of hypotheses required to determine the form of data input and the level of aggregation for which accounting transactions are to be formulated.

15) Duration There exists a set of hypotheses about the expected life of the entity (or entities) under consideration, and the duration of individual accounting periods or sub-periods.

16) Extension There exists a set of hypotheses specifying the empirical conditions under which two or more accounting systems can be consolidated and extended to a more comprehensive system.

17) Materiality There exists a set of hypotheses (criteria) determining if and when an economic transaction or related event is to be reflected by an accounting transaction.

18) Allocation There exists a set of hypotheses determining the allocation of an entity's economic objects or flows of services to subentities and similar categories.

NOTE: The emphasis in the above assumptions originated with Professor Mattessich.

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APPENDIX D

THE BASIC ASSUMPTIONS OF PROFESSOR CARLSON

Professor Carlson formulates his assumptions in logical notations. In most cases, he provides a loose translation of the assumption, but on occasion, the assumption is not easily translated into good English, and the author offers either no translation at all, or a very literal one. Whenever a loose translation has been given by the author it is included in the listing below; otherwise, the literal translation will be given. For Q-8 and Q-10, for which the author gives no English equivalent, the writer has attempted to provide one.

C-1 Every Economic Service Inflow has a Source.

C-2 A thing sold expires because of the Source generated by the sale.

C-3 The Source generated by the sale of an item is received because that item was foregone.

C-4 For all x, and for all y, if x is received as a result of foregoing y, then y expired in the current fiscal period.

C-5 The Economic Service Inflow itself can always be distinguished from the Source by which it was provided.

C-6 If a thing obligates assets, then it expired for the same reason that it obligated assets.

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M-1 All expired costs are matched with some Source.

M-2 If an Economic Service Inflow is Part of another and neither has expired, then the one is matched with the other.

M-3 Anything which obligates Assets because of Revenue or Non-operating Revenues is an Expired Cost.

M-4 If one thing expires because of another, and one is a Source and the other is an Economic Service Inflow, then the one is matched with the other.

M-5 Net Non-operating Revenues and Non-operating Losses are matched with Net Income.

M-6 Net Income to Retained Earnings is matched with Net Worth Before Transfer of Current Income to Retained Earnings.

Q-1 For all x and for all y, if x is the Gain on y, then there exists a z such that z is the Source from the sale of y.

Q-2 For all x and for all y, if x is Greater than y or if y is Greater than x, then there exists a z such that z is the Difference between x and y.

Q-3 At acquisition both an Economic Service Inflow and its Source are quantified at the Implied Cash Cost of the Economic Service Inflow.

Q-4 If the Net Book Value of an Asset is Greater than the Expected Net Benefits to be obtained from it, than the Difference between the Net Book Value and the Expected Net Benefits expired during the current fiscal period.

Q-5 If the Potential Margin is less than the Conservative Estimate of Next Period's Margin, then the Difference between the two expired during the current fiscal period.

Q-6 For all x, y, and z, if x is Greater than y, and y is Greater than z, then x is Greater than z.

Q-7 For all x, y, z, w, and v, if x is Greater than y and z is Greater than y and either x is Greater than z or z is Greater than x and w is the Difference between x and y and v is the Difference between x and z, then w is Greater than v.

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Q-8 Given x=y-z and w=y-r and p=x-w, then p=r-z.

Q-9 Two numbers which are both the difference between the same two things are identical.

Q-10 Given x=z-w, and y=z-x, then w=y.

Q-11 The Source of anything which obligated Assets but for which no assets were foregone is a liability.

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SOURCES CITED

Books

Arthur Andersen & Co. Accounting and Reporting Problems of the Accounting Profession. Second Edition. October, 1962.

_____. The Postulate of Accounting-What It Is, How It Is Determined, How It Should Be Used. 1960.

Black, Max. Critical Thinking. New York: Prentice-Hall, Inc., 1952.

Blanché, Robert. Axiomatics. Translated by G. B. Keene. New York: The Free Press of Glencoe, 1962.

Bridgman, P. W. The Logic of Modern Physics. New York: The Macmillan Company, 1928.

Carnap, Rudolf. Foundations of Logic and Mathematics. (International Encyclopedia of Unified Science, Volume I, Number 3.) Chicago: University of Chicago Press, 1939.

_____. Logical Foundations of Probability. Chicago: University of Chicago Press, 1950.

Chambers, R. J. Towards a General Theory of Accounting. Melbourne, Australia: The Australian Society of Accountants, 1962.

Church, Alonzo. Introduction to Mathmatical Logic, Volume I. Princeton, New Jersey: Princeton University Press, 1956.

Coffey, P. The Science of Logic, Volume II: Method, Science and Certitude. London: Longmans, Green and Co., 1918.

Cohen, Morris R. A Preface to Logic. Cleveland: The World Publishing Company, 1944.

Copi, Irving M. Introduction to Logic. New York: The Macmillan Company, 1961.

_____. Symbolic Logic. New York: The Macmillan Company, 1965.

Eaton, Ralph M. G
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Eaton, Ralph M. General Logic. New York: Charles Scribner's Sons, 1931.

Fearnside W. Ward and Holther, William B. Fallacy. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959.

Fiegl, Herbert and Brodbeck, May, editors. The Philosophy of Science. New York: Appleton-Century-Crofts, Inc., 1953.

Frege, Gottlob. The Foundations of Arithmetic. Translated by J. L. Austin. New York: Harper & Brothers, 1950.

Goldberg, Louis. An Inquiry into the Nature of Accounting. American Accounting Association, 1965.

Grady, Paul. Inventory of Generally Accepted Accounting Principles for Business Enterprises. Accounting Research Study Number 7. New York: American Institute of Certified Public Accountants, 1965.

Kneale, William. Probability and Induction. Oxford University Press, 1949.

Leonard, Henry S. Principles of Right Reason. New York: Henry Holt and Company, 1957.

Lewis, Clarence Irving and Langford, Cooper Harold. Symbolic Logic. New York: Dover Publications, Inc., 1932.

Littleton, A. C. Essays on Accountancy. Urbana, Illinois: University of Illinois Press, 1961.

_____. Structure of Accounting Theory. American Accounting Association, 1953.

Madden, Edward H., editor. The Structure of Scientific Thought. Boston: Houghton Mifflin Company, 1960.

Marple, Raymond P. Toward a Basic Accounting Philosophy. New York: National Association of Accountants, 1964.

Mattessich, Richard. Accounting and Analytical Methods. Homewood, Illinois: Richard D. Irwin, Inc., 1964.

Moonitz, Maurice. The Basic Postulates of Accounting. Accounting Research Study Number 1. New York: American Institute of Certified Public Accountants, 1961.

Neurath, Otto. Fo
national Enc
of the Unity
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Paton, William A
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_____ and Li
Accounting
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Popper, Karl.
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Nurath, Otto. Foundations of the Social Sciences. (International Encyclopedia of Unified Science, Foundation of the Unity of Science, Volume II, Number 5.) Chicago: University of Chicago Press, 1944.

Paton, William A. Accounting Theory. Ann Arbor, Michigan: 1922.

_____ and Littleton, A. C. An Introduction to Corporate Accounting Standards. American Accounting Association, 1940.

Popper, Karl. The Logic of Scientific Discovery. London: Hutchinson of London, 1959.

Quine, Willard Van Orman. Methods of Logic, Revised. New York: Holt, Rinehart and Winston, 1959.

Russell, Bertrand. Human Knowledge, Its Scope and Limits. New York: Simon M. Schuster, 1948.

Robinson, Daniel Sommer. The Principles of Reasoning, An Introduction to Logic and Scientific Method. Second Edition. New York: D. Appleton-Century Company Incorporated, 1930.

Salmon, Wesley C. Logic. (Foundations of Philosophy Series) Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963.

Searles, Herbert L. Logic and Scientific Methods. New York: The Ronald Press Company, 1948.

Sprouse, Robert T. and Moonitz, Maurice. A Tentative Set of Broad Accounting Principles for Business Enterprises. Accounting Research Study Number 3. New York: American Institute of Certified Public Accountants, 1962.

Storey, Reed K. The Search for Accounting Principles-Today's Problems in Perspective. New York: American Institute of Certified Public Accountants, 1964.

Study Group at the University of Illinois. A Statement of Basic Accounting Postulates and Principles. Urbana, Illinois: Center for International Education and Research in Accounting, 1964.

Suppes, Patrick. Introduction to Logic. (The University Series in Undergraduate Mathematics) Princeton, New Jersey: D. Van Nostrand, Inc., 1957.

Vshenko, A. P. T
Brothers, Pu

Von Wright, Geor
Probability
1951.

Woodger, J. J.
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Ushenko, A. P. The Theory of Logic. New York: Harper & Brothers, Publishers, 1936.

Von Wright, Georg Henrik. A Treatise on Induction and Probability. London: Routledge and Kegan Paul, Ltd., 1951.

Woodger, J. J. The Technique of Theory Construction. (International Encyclopedia of Unified Science, Volume II, Number 5.) Chicago: University of Chicago Press, 1939.

Articles, Periodicals, Reports and Other

American Institute of Certified Public Accountants. "Report of the Special Committee on Research Programs," Journal of Accountancy, CVI (December, 1958).

Anderson, David S. "Communication Problems of Financial Reporting," Journal of Accountancy, CXV (April, 1963).

Bedford, Norton M. and Dopuch, Nicholas. "Research Methodology and Accounting Theory-Another Perspective," The Accounting Review, XXXVI (April, 1961).

Blough, Carman. "Principles and Procedures," Journal of Accountancy, CXI (April, 1961).

Carlson, Marvin Lee. "Accounting Theory as a Logical System," Unpublished Ph.D. dissertation, Commerce, The University of Wisconsin, 1964.

Chambers, R. J. "Blueprint for a Theory of Accounting," Accounting Research, VI (January, 1955).

Dein, Raymond D. "A Glance Backward at Research in Accounting," The Accounting Review, XXXVI (January, 1961).

Devine, Carl Thomas. "Research Methodology and Accounting Theory Formation," The Accounting Review, XXXV (July, 1960).

Editorial. "The Approach to Accounting Principles," Journal of Accountancy, CXIII (May, 1962).

Flanders, Dwight P. "Accountancy, Systematized Learning, and Economics," The Accounting Review, XXXVI (July, 1961).

Gaa, Charles J. "
Journal of Ac

Gordon, Myron J.
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ing Review,

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Gaa, Charles J. "Uniformity of Accounting 'Principles'," Journal of Accountancy, CXI (April, 1961).

Gordon, Myron J. "Scope and Method of Theory and Research in the Measurement of Income and Wealth," The Accounting Review, XXXV (October, 1960).

Hempel, Carl G. "Geometry and Empirical Science," The American Mathematical Monthly, LII (January, 1945).

_____. "On the Nature of Mathematical Truth," The American Mathematical Monthly, LII (December, 1945).

Jennings, Alvin R. "Accounting Research," The Accounting Review, XXXIII (July, 1958).

Journal of Accountancy, "Comments on 'The Basic Postulates of Accounting'," CXV (January, 1963).

Kleerekoper, I. "The Economic Approach to Accounting," Journal of Accountancy, CXV (March, 1963).

LaSalle, Brother. "Basic Research in Accounting," The Accounting Review, XXXIV (October, 1959).

Li, David H. "Alternative Accounting Procedures and the Entity Concept," The Accounting Review, XXXVIII (January, 1963).

_____. "The Funds Statement Under the Entity Concept," The Accounting Review, XXXVIII (October, 1963).

_____. "The Nature and Treatment of Dividends Under the Entity Concept," The Accounting Review, XXXV (October, 1960).

Lorig, Arthur N. "Some Basic Concepts of Accounting and Their Implications," The Accounting Review, XXXIX (July, 1964).

Mattessich, Richard. "Towards a General and Axiomatic Foundation of Accountancy," Accounting Research, VIII (October, 1957).

Metcalf, Richard W. "The 'Basic Postulates' in Prospective," The Accounting Review, XXXIX (January, 1964).

Moonitz, Maurice. "Why Do We Need 'Postulates' and 'Principles'?" Journal of Accountancy, CXVI (December, 1963).

Park, Olin. "Thought Processes In Creative Writing," The Accounting Review, XXXIII (July, 1958).

Pye, Malcolm, "F
ciples," Th

Queenan, John W.
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Schmidt, Leo A.
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Pye, Malcoln. "Reasons, Probabilities, and Accounting Principles," The Accounting Review, XXXV (July, 1960).

Queenan, John W. "Postulates: Their Place in Accounting Research," Journal of Accountancy, CXIV (August, 1962).

Schmidt, Leo A. "Practical Uses of the Device of Formal Logic in Accountants' Daily Work," Journal of Accountancy, LXXXVIII (November, 1949).

Schrader, William J. "An Inductive Approach to Accounting Theory," The Accounting Review, XXXVII (October, 1962).

Scott, DR. "The Influence of Statistics upon Accounting Technique and Theory," The Accounting Review, XXIV (January, 1949).

Spacek, Leonard. "Are Accounting Principles Really Generally Accepted?" Journal of Accountancy, CXI (April, 1961).

_____. "Need for an Accounting Court," The Accounting Review, XXXIII (July, 1958).

_____. "Solution to the Principles Dilemma," The Accounting Review, XXXIX (April, 1964).

Spencer, Milton H. "Axiomatic Method and Accounting Science," The Accounting Review, XXXVIII (April, 1963).

Spiller, E. A., Jr. "Theory and Practice in the Development of Accounting," The Accounting Review, XXXIX (October, 1964).

Stead, Gordon W. "Towards a Synthesis of Accounting Doctrine," The Accounting Review, XXIII (April, 1948).

Tietjen A. Carl. "Accounting Principles, Practices and Methods," Journal of Accountancy, CXV (April, 1963).

Vatter, William J. "Postulates and Principles," Journal of Accounting Research, I (Autumn, 1963).

Windal, Floyd. "Legal Background of the Accounting Concept of Realization," The Accounting Review, XXXVIII (January, 1963).

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Pye, Malcoln. "Reasons, Probabilities, and Accounting Principles," The Accounting Review, XXXV (July, 1960).

Queenan, John W. "Postulates: Their Place in Accounting Research," Journal of Accountancy, CXIV (August, 1962).

Schmidt, Leo A. "Practical Uses of the Device of Formal Logic in Accountants' Daily Work," Journal of Accountancy, LXXXVIII (November, 1949).

Schrader, William J. "An Inductive Approach to Accounting Theory," The Accounting Review, XXXVII (October, 1962).

Scott, DR. "The Influence of Statistics upon Accounting Technique and Theory," The Accounting Review, XXIV (January, 1949).

Spacek, Leonard. "Are Accounting Principles Really Generally Accepted?" Journal of Accountancy, CXI (April, 1961).

_____. "Need for an Accounting Court," The Accounting Review, XXXIII (July, 1958).

_____. "Solution to the Principles Dilemma," The Accounting Review, XXXIX (April, 1964).

Spencer, Milton H. "Axiomatic Method and Accounting Science," The Accounting Review, XXXVIII (April, 1963).

Spiller, E. A., Jr. "Theory and Practice in the Development of Accounting," The Accounting Review, XXXIX (October, 1964).

Stead, Gordon W. "Towards a Synthesis of Accounting Doctrine," The Accounting Review, XXIII (April, 1948).

Tietjen A. Carl. "Accounting Principles, Practices and Methods," Journal of Accountancy, CXV (April, 1963).

Vatter, William J. "Postulates and Principles," Journal of Accounting Research, I (Autumn, 1963).

Windal, Floyd. "Legal Background of the Accounting Concept of Realization," The Accounting Review, XXXVIII (January, 1963).

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