# EDITORIAL:
# ON THE SELECTION AND USE OF SOURCES IN THE HISTORY OF LOGIC

**1. The Problem.** "In writing a history of mathematics, the historian would be constantly faced with the question of *what sort of material to include*" [Wilder *1985*, 189]. This is a pertinent historiographical question for the historian of logic as well.

**1.1. Defining the scope of logic in the context of its history.** The first step in deciding what material to include is to define our subject. Edward Maziarz [*1987*, 50] stated that "the change and development of a variety of logics in the last hundred years or so necessitates that both 'logics' and the roles logicians enact in their regard be regarded as pluralities." This, he continues [*1987*, 50], means that "both in its historical development and its contemporary adventures, the expression 'logic' along with its cognates and variants ranges in meaning and reference from the extreme of being so broad as to appear trivial...to the other extreme of being so highly technical...as to be intelligible, perhaps, only to selected specialists... ." As Scholz [*1961*, vi] has made clear in his criticism of Carl Prantl's [*1855-70*] four-volume history of logic, our conception of what the history of logic contains and what a good history of logic may be is determined by our understanding of what logic is and what its nature may be.

Once we decide what we shall count as logic, we must decide what kind of historical data to accept as proper evidence for studying and understanding the history of our subject.

**1.2. History of logic is not logic.** The tasks of the historian of mathematics (the historian of logic included) are profoundly different from the tasks of mathematicians (including logicians). Whereas the mathematician is concerned with obtaining correct proofs of new theorems and extending or generalizing the results of his predecessors, the historian is interested in the genesis of theorems and in how they were proven, in failures as well as successes, and in how new results were received by contemporaries, as well as being concerned with the role the new results played within the context of the overall development of mathematics and how those results contributed to subsequent developments. This distinction has been most clearly formulated by Jean Paul Van Bendegem (see [*1989*, esp. 5-6]) within the context of a growing trend in philosophy of mathematics to reject a foundational approach in favor of a broader sociocultural and historical approach. Van Bendegem distinguishes the "artificial mathematician," who sees the development of mathematics as a linear progression which piles new theorems on old by application of logical rules (closely akin to Davis and Hersh's [*1981*, 366] "ideal mathematician" who is a theorem-prover *simpliciter* and whose publications "conceal any sign that the author or intended reader is a human being") from the "real mathematician," who struggles with ideas, proofs, and even with his peers, who frequently works by trial-and-error, and who only after successes can write a publishable proof-outline appealing to logical rules. "The

purpose of the history of science, broadly conceived, of which the history of mathematics and the history of mathematical logic form province and subprovince," Drucker [*1991*, xv] wrote, "is to understand the nature and development of the scientific enterprise."

The distinction between logic and history of logic raises a dilemma for the historian of logic. Historians of logic should remember that they will be judged not only by their abilities as logicians according to the standards and practices of research logicians but also for their adherence to the standards and practices of historical scholarship. The historian of logic therefore faces the difficult and unenviable task of finding common ground between loyalties to the community of logicians and the demands upon historians to reveal the historical "story" behind the logical research whose history is being studied. As Drucker [*1992a, 421*] writes, a "history of mathematics designed for mathematicians does not seek to recreate exactly what earlier generations did," adding that the best that a historian can do "is to take current scholarship and try to be faithful to the main currents detectable in the work of mathematical predecessors." This task will be doubly difficult when writing the history of recent logical research, where the historian must contend with living participants who would like the history to be written as they would like to have it remembered and as they remember it.

**1.3. History of logic is not just chronology.** Our most fundamental claim is that the history of mathematical logic is more than a chronology of the accumulation of theorems or a record of increased abstraction and generalization from Aristotle to the present. The chronology forms the scaffolding of the history. It is essential that the historian understand the mathematics involved in technical detail and be able to carry out proofs of the theorems that belong to the history of his topic. The historian should know the context of those theorems at the time the new theorems were formulated and proven and should also understand how the new theorems affected the course of the development of his specific subject and of logic as a whole, and how those theorems relate to other areas of logic or mathematics. It is not enough that the historian should be able to repeat the proofs of the theorems that belong to the subject under discussion. He should also understand why the proofs were carried out the way they were and be able to judge both whether the theorems are true and whether the historically recorded proofs of those theorems are valid or not. As Hans Hahn (quoted by his student Gustav Bergmann [*1964*, 243]) used to say in his classes and seminars at the University of Vienna in the 1920's, "Just knowing how a proof goes, you know nothing. When you know why it goes this way rather than that or that other way, then you begin to know something." I therefore agree with Drucker when he writes [*1992a, 413*] that "the preparation appropriate for doing mathematics and expounding it does not bring historical sensitivity in its wake." (For a more detailed comparison of the differences between doing mathematical research and doing history of mathematics, and the related consideration of the twin problems of historians who are not research mathematicians attempting to do mathematics and of research mathematicians

without historical training attempting to write histories of mathematics, see [Fang *1972*, 60-63].)

The history of logic goes deeper than the chronology of theorems or knowing why the proof of a theorem goes "this way rather than some other way;" it is concerned with the men, methodologies, and ideas that went into the accumulation of theorems and with the perception of the role of the theorems, as well as the ideas and methodologies behind them, in the overall development of logic. The history of logic, Drucker [*1991*, xv] wrote, "seeks to replace the naive wonder at monuments with a sense for the tools and materials required for their creation." As Davis [*1985*, xii] wrote with respect to the history of mathematics:

> ...At a primitive level we can compile chronological lists of people who had mathematical thoughts..., putting in as many names as we find worthy and determining their dates as accurately as we can. ...
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> We want more than lists. And more is, in fact, available. In dealing with what is available, the historian of mathematics has several tasks. The first is that of interpretation and description, where the material is to be considered almost in the sense of static isolation. The historian of mathematics must identify material as mathematics and tell us what that mathematics purports to be; he must build a coherent and continuous historical structure of mathematical ideas. ...

But he goes on to say that another task "is to try to discover the genesis of mathematical ideas and to describe their interrelation one with the other and with the outside world." Drucker [*1991*, xviii] has stated that often "the besetting fault of the history of mathematics is to assume that there is only one path to a given result, and that it was pursued steadily and promptly once the result was in sight." Along similar lines, Anellis [*1988*] argued that there are external matters which affect in sometimes haphazard ways the development of mathematics. The development of a particular line of study can be determined by the social and cultural milieu in which a mathematician works and can be influenced by such matters of style, luck, or the times in which a line of research is carried out. Our understanding of the importance of a line of inquiry can be altered by the manipulation of the historical facts by those who seek to present a particular point of view. As O.A. Gabrielian [*1989*, 112] put it, the task is "to decide how to pass safely between the logical reconstruction of an image of mathematics and its coordination with the context of culture." This viewpoint had already been taken a step further by Maziarz [*1975*, 94], when he argued that "the realities of everyday life function both as a point of departure for human speculation and as their ultimate point of arrival and verification." For the historian of logic, this means that "while it is indeed the case historically that it took a great number of years to 'abstract' and to formulate a relational calculus or a logical system in terms of axioms and theorems, the bases for such calculi are indeed operative within the ambit of the realities of everyday life"

(Maziarz [*1975*, 97]). Elsewhere, in his study of the sociology of the logician, Maziarz [*1988*, 42] pointed out that the logician is as much a creature of his own time as a guardian and preceptor of eternal reason. Thus, the historian of logic who wishes to have a complete understanding of his subject is obliged to examine as well the "everyday life" of the logicians who contributed to the development of new logical results. A well-known example of this kind of study is Dauben's [*1979*] *Cantor*, which is both a biography and a technical history of Cantor's work in set theory and which devotes attention to the significance of Cantor's personality in the defense and reception of set theory.

**1.4. Bowing to the spirit of the age.** Much of what follows is an examination of the question of the kinds of material that are appropriate to the study of the history of logic. First, however, I wish to examine why it is crucial that the historian go beyond chronology and the obvious published sources in order to gain a deeper insight into the history of logic. We want in our history of logic both what the late Marc Bloch [*1962*, 81], in his day the leading French expert on medieval feudalism, called a healthy "criticism of the documents of the archives," and what can be called a historical understanding of the past through reliving that past.

A duty of the historian is to describe, in the words of the influential nineteenth-century German historian and historiographer Leopold von Ranke ([*1956*], quoted by [Meyerhoff *1959*, 13]), "*wie es eigentlich gewesen*", which entails not only a description of attainable facts but a description of the *Zeitgeist*, what the twentieth-century Dutch historian Jan Romein called "bowing to the spirit of the age" (see [Geyl *1961*]), as well as all the circumstances and viewpoints relating to those facts. For contemporary historians, this means that "it is impossible to rid oneself of all the intellectual baggage of the present" [Drucker *1992*, 78]. It also means that "what the historical article will do...is reconstruct the past on its own terms and speculate on the relationship between people, institutions, and events, with echoes in later times" [Drucker *1992*, 78].

A "bow to the spirit of the age" one studies is more than mere antiquarianism and more than a corrective to anachronistic reading of current ideas and fashions into the mathematical past; it is a necessary and integral aspect of an understanding of the mathematical past. Such a strategy is crucial if we are to have any hope of understanding the mathematics of our ancestors as they understood it. The effort to place ourselves insofar as possible in the shoes of our ancestors becomes even more crucial if we agree with Lakatos [*1976*, 5] that an entire mathematical perspective can change over time, e.g., "whenever the mathematical dogmatism of the day got into a 'crisis', a new version once again provided genuine rigour and ultimate foundations, thereby restoring the image of authoritative, irrefutable mathematics."

That understanding the sociocultural aspects of the history of mathematics is a proper realm of inquiry for the historian has been pointed out by Kitcher and Aspray [*1988*, esp. 24-25], who emphasize that a more accurate understanding must include an attempt to understand how mathematicians of the past saw the mathematics of their own times.

Similarly, Karen Parshall [*1988*, 129] suggests that historians of mathematics take as their goal a reconstruction of the dynamics of mathematics at some particular time, with the aim of accounting for the failures as well as successes of the past, in terms of the processes that she calls "the natural selection of ideas" in mathematics, its history and philosophy. Historical sensitivity itself is not static, but has its own history. The history of the historiography of mathematics has been traced by Dirk Struik [*1980*]. A brief summary of the history of the history of logic is given by I.M. Bocheński [*1970*, 4-10].

**1.5. The use of texts and the relationship between historical "fact" and service to the "spirit of the age".** The problem of defining the task of the historian of logic raises the question of justifying the effort to determine *wie es eigentlich gewesen* and the possibility of doing so. Izabella G. Bashmakova and John M. Vandoulakis [*1992*] point to a distinction between "modernists" who translate older texts into the language of modern mathematics and "antiquarists" who argue that these translations are illegitimate because they distort the text and anachronistically read contemporary ideas and methods into those texts which did not originally belong to them. Bashmakova and Vandoulakis argue that the translation of older texts into modern mathematical terms is no different than translating a text from one natural language into another. It may cause some distortion of meanings or loss of nuance; but it makes intelligible the contents of the original text to those otherwise unable to read it. Since the mathematical "facts" that the older theorems expressed remain constant and have been absorbed into more recent results, the translation of those theorems into modern terms makes them readily available and applicable for the contemporary mathematician. Bashmakova and Vandoulakis argue that the interpretation of mathematics varies from one age to the next just because mathematics has a history and grows through time. Mathematical concepts and methods also vary from age to age, becoming increasingly complex. The first task of the historian, they argue, is to translate older mathematical texts into the prevailing contemporary mathematical language and current understanding. But translation by itself is not enough.

The next is what Bashmakova and Vandoulakis call "historico-mathematical interpretation," in which the historian fixes the text into the context of the mathematics of its own day. In other words, Bashmakova and Vandoulakis claim that the historico-mathematical interpretation of an earlier piece of mathematics should "embed" that mathematics into the context of its own time. Thus Bashmakova and Vandoulakis would appear to support the need for "bowing to the spirit of the age" as the second goal of the history of mathematics.

It is more difficult to gain empathy for the more distant than for the more recent past, because much of the *Zeitgeist* of the more distant past, disappeared with the deaths of those who lived it, along with their sensibilities, perceptions, attitudes, and private thoughts. The historian of logic who is studying that part of the history in which he has himself participated, or at least remembers first-hand, has a distinct advantage. It would be, I argue, a loss to later historians of logic to lose the privileged and private recollections of their

predecessors if those later historians are to gain anything at all like a full picture of the "spirit of the age" which he studies and of the logic of the past *wie es eigentlich gewesen* for those who were its participants.

The German historian August Ludwig von Schölzer (1735-1809) according to A.G. Mazour [*1975*, 30], argued that "the sole allegiance of the historian must be to truth;" and he was quoted by Mazour [*1975*, 41] as stating that "the first law of history is to state nothing false," adding that "it is better to remain ignorant than to be deceived." The addendum raises the question of whether the historian ought to report everything he knows. Schölzer's colleague Gerhard Friedrich Müller (1705-1783) was quoted by Mazour [*1975*, 35] as asserting that:

> I do not demand that the historian must narrate everything he knows, not even everything that is genuine, for there are things that could not be told or that are not interesting enough to be narrated to the public; but whatever the historian does state must be strictly true and never should he give any cause for suspicion to be directed toward himself.

Müller's diplomatic caution can be taken as discretion of the political historian writing, as Müller did, in a restricted political environment. But in any intellectual history, including the history of logic, such silence can be more harmful than helpful if it distorts or hides the accomplishments of bygone logicians, if it causes us to misunderstand their work or its true origins, or if it places credit for an important result with one researcher rather than with the one on whom credit ought to be bestowed. The kind of "discretion" which Müller favored, when applied to the history of logic or to the history of any science, can lead to the creation of a "standard" history which is misleading at best. An incorrect historical account in this sphere can degenerate into a kind of "idealization" of the past that falsifies or at least grossly over-simplifies the past (for an example from the history of logic, see, e.g. [Anellis & Houser *1991*]).

**2. The historian's sources – primary and secondary.** Historians commonly divide their literature into two categories – "primary" and "secondary" sources. Primary sources are the private and public documents of the past, ranging from such private materials as correspondence, diaries, and journals, to such public materials as annals, treaties, laws, charters, contracts, and similar documents. Secondary sources include such items as historical studies and book reviews of historical monographs. In such fields as philosophy, mathematics, logic, or science in general, it may not always be so easy to define a clear and sharp demarcation between "primary" and "secondary" sources. Original research publications and archival materials clearly belong to the realm of the "primary" source. Historical studies are clearly "secondary sources," and expository surveys most probably can be, in many circumstances, be identified as "secondary." But book reviews and critical expositions are as likely to serve as primary sources as not; consider the case of Frege's

review of Schröder's *Vorlesungen über die Algebra der Logik*, just one example of a review which, even in its own day, served as a primary source. It presented and helped to define a specific attitude concerning the nature and contents of logic and change the focus of mathematical logic away from the algebraic tradition of Boole, Schröder and Peirce towards the function-theoretic tradition which Frege advocated. The line between *primary* and *secondary sources* becomes even more blurred when one works with reprints of original works. (Thiel [*1983*, 176] talks about some reasons for suspicions raised by "unreliable editions or commentaries" that fall under the rubric of the "reprint.") In the attempt to document the pursuit of a result in logic, one may have to depend heavily, as Drucker [*1991*, xviii] has suggested, "on dating of letters, drafts, and even doodles."

In a discussion of scientific journals, Claude T. Bishop [*1984*, 4] defines *primary research journals* as those "that publish first reports of original research." In Bishop's [*1984*, 4] account,

> The key words in this definition are "first," which means that the work has not been published before, and "original," which means that the research reported is a new contribution to our knowledge.

We can extend Bishop's conception of "first reports of original research" to include all *primary literature*, so that such material as Frege's review presenting a critical exposition of Schröder's work is within the realm of the logic historian's primary sources. For the purposes of historians of science, including historians of mathematics and historians of logic, we can legitimately define *primary sources* to be the contents of the union of the historian's primary sources – the public and private record of the past – and *primary literature* conceived as the extension of Bishop's definition of primary research journals.

**2.1. The need for inedita.** A complete history requires in addition to the published material – which for the historian of logic include such items as textbooks, journal articles, and research monographs – that form the tip of the logical iceberg, the use of correspondence, notes, and similar material of an archival nature. Historians have long known the value of archival materials, of primary sources, the personal and public correspondence, journals and diaries, birth and baptismal records and death certificates, annals, charters, contracts, treaties, law codes, and various assorted documents of this nature for writing histories based upon contemporary documentation. Leibniz helped pioneer the use of this tool when, as librarian to the Hannoverian court, he wrote the history of that German land (see, e.g., [Bloch, *1962*, 8]). For an intellectual history, such as the history of mathematics or the history of logic, which deals with the development of ideas rather than with observable events, the use of such materials as correspondence, research scribblings and early drafts, lecture notes, or recollections of discussions must play a crucial role if we are to understand logic's past and obtain a comprehensive view, because it is in the correspondence, research scribblings and early drafts, lecture notes, or

discussions that ideas are first aired, tested, and discarded or developed. Kloesel [*1986*, xiii] wrote that the aims of the editorial decisions made by the Peirce Edition Project in selecting material for publication were to assist in answering such questions as the following:

> Who were the thinkers whose writings Peirce studied most intensively, in what order, and at what stages of the development of his own thought? What were the questions with which he began, and what others did he take up and when? To what questions did his answers change, and what was the sequence of changes? When and to what extent were his...views modified by his own original researches in mathematics..., and by the major...discoveries of his time?

These kinds of questions form an important aspect of understanding the intellectual milieu in which logicians of the past worked. The goals which were enunciated by Kloesel for understanding the work of Peirce can be applied not only to other logicians but, *mutatis mutandis*, to various topics within the history of logic as well.

**2.2. Chronological studies based on published primary sources can be incomplete.** A serious obstacle to the writing of the history of logic is absence of complete documentation. Heinrich Scholz wrote ([*1961*, v-vi], in Leidecker's unfelicitous translation): "it is impossible to summarize knowledge which does not even exist..., and which cannot be created by a *tour de force* in mere sampling of what can only be actually gotten hold of by most thorough and painstaking research, and even at that not so without reliance on one's intuition and an eye sharpened by long experience." How are the historical gaps to be filled? This is a problem for both the historian writing about a previous age and for the historian writing current or recent history. Thiel [*1983*] spoke of the difficulties and disappointments facing a historian writing a history of logic when archival materials have been lost. (An account by [Hermes, Kambartel and Kaulbach *1979*] of the fate of Frege's *Nachlaß* describes but one example of many of important archival losses to the historian of logic.)

**2.2.1. The problem of lost or altered primary sources.** The historian can be seriously handicapped in presenting an account of his subject when primary materials are either not extant or have become distorted. Bocheński [*1970*, 9] informs us that the researches of "historians of philosophy and philologists in the 19th century" made the modern history of logic possible. As a result of the work of these nineteenth-century scholars, we have, Bocheński [*1970*, 9] tells us, "published for the first time a series of correct texts edited with reference to their their context in the history of literature." The scientific history of logic requires proper documentation. But what precisely does this mean? Texts alone present only *finished products*; they are a mere fragment of the work that goes into logic, and we seldom learn from them anything about the origin and development of a

result or about the research and study that went into the finished text. To obtain this kind of information, additional documentation is required. The chronological approach, based upon finished products, has both strengths and weaknesses. Its major strength is to give us the "scaffolding" required in order to trace the outline of the development of a subject, place it in the context of the development of related areas, and locates the development of our subject as part of the chronological development of logic as a whole. Davis [*1985*, xiii] analyzed the principal weakness of the chronological approach as one which "distorts the past by not describing the past in its own complex nature," and which "omits from its description a great deal of connecting tissue that is not formalized, written-down mathematics." Thus, to ignore the unwritten materials creates omissions that, in Davis's words [*1985*, xiii] "are absolutely scandalous in that they lead to an inadequate account of the sources of mathematical inspiration."

**2.2.2. The need to "fill in" lost data.** A historical study limited to exegesis of published writings alone, to the consideration only of journal articles, textbooks, or research monographs, will not easily recover answers to the kinds of important historical questions that Kloesel enumerated. Wilhelm von Humboldt's [*1971*, 5] remark, in describing the historian's task, that "an event is only partially visible in the world of senses; the rest has to be added by intuition, inference, and guesswork," applies in the case of the history of thought. The use of these primary sources has become an indispensable tool for, *inter alia*, the Bertrand Russell Editorial Project and the Peirce Edition Project in producing their scholarly critical editions. "Criticism of the documents of the archives" entails more than the hermeneutical exegesis or evaluation of the documents themselves, but includes an evaluation of their place within the general development of the subject, their contribution to the development and presentation of ideas and their reflection of the ideas and intentions of their authors, and finally, the reactions and evaluations by contemporaries to the documents and the ideas which those documents promote, as well as the veracity of the depictions which authors seek to retroactively impose on their work. Therefore, the historian must not only provide an exposition and evaluation of the work studied, but must interpret that work and provide judgments of its significance and standing within its context and against the background of the history being considered.

The historian writing contemporary history can also suffer from incomplete source materials when a participant is unable or unwilling to assist the historian by providing his version of the history or does not make available to the researcher the primary sources that are required for the accurate presentation of the facts. In the absence of the required archival documentation, it is not only legitimate, but necessary, for the historian to make an educated guess about what happened and why on the basis of the resources that are available and his own knowledge of the subject. In this case, it is legitimate for the historian of logic to use such materials as are readily available, in particular unpublished but publicly available data and documents (such as class lecture notes or lecture transcripts, classroom hand-outs, the recollections of others, including even rumors), but it may also be

necessary to use this material to provide a reconstruction of the episodes that the remainder of the record available to him to not fill. Thiel [*1983*, 182] emphasizes the loss to history when personal sources of information remain unused, either through neglect, ignorance, or physical loss of documentation. Because of the belief that Löwenheim died in 1953 rather than 1957, no one thought during the interim to seek him out to ask for his experiences and knowledge; consequently, Thiel [*1983*, 182] notes that "much about the motivation and development of the Boole-Schröder tradition in mathematical logic would be clearer to us today, had somebody known about Löwenheim's survival and taken the opportunity to talk to him and ask him questions." To Thiel's list we may also add information lost because those directly involved in, or having direct first-hand knowledge of, an event prefer, for whatever reasons, not to divulge that information. In some cases, this first-person information is precisely what is needed to fill a crucial gap in the history, to supply an explanation for certain occurrences (about which must otherwise guess), or to dispel rumors and hearsay arising because the first-person information has been deliberately withheld. In the absence of personal recollections of direct participants, one must rely upon the recollections of, and sometimes rumors propagated by, those who were present, even if only on the periphery of events and knew, if not the actual events themselves, the milieu in which the events took place and the folklore of the day. Thiel [*1983*, 182] concludes that "it seems necessary to intensify the exchange of experience in biographical and bibliographical work...," while warning quite plainly of "'the current history of logic' being a notoriously delicate field" ([Thiel *1983*, 175]). "There is a difficulty," Thiel [*1983* 184] tells us, that we may "no longer *understand* former problems; and there is the still weightier difficulty that we might fail even to *perceive* a problem, e.g. with respect to the question of how to conceive a concept." This is precisely why, in order to try to understand history, we ought to take advantage of all available remaining resources. We can grasp the milieu, impressions, experiences, and insights of the past, even the most recent past, through its folklore, its contemporary accounts, even its rumors insofar as these elucidate the way logicians of the past viewed events in the history of logic in which they had actively contributed or watched their colleagues working on.

**2.3. Using inedita.** It is historiographically legitimate to employ relevant unpublished publicly available material to describe views prevalent at the time under consideration in the effort to present a full and accurate picture of the subject as it was viewed by contemporaries. This presents a difficulty, since the historian may be obliged to consider conflicting views as presented by participants in the events being described. In the case of recent history, the historian may be obliged to consider also conflicting facts or attitudes of participants who are still living. When it is necessary to utilize hearsay, undocumented and unverifiably reliable sources because more direct and fully substantiated information from the parties involved or published documentation is not available, readers must be made fully aware of the nature of the material used and must be warned against uncritically accepting the validity of the statements made in such sources, in particular when all parties

directly involved were unable to state their own cases. It is obvious but important for both the historian and the reader to be reminded that information presented in second-hand sources is less easily substantiated or corroborated than material available in print. The "second-hand" data are much more likely to reflect the wishes and desires and afterthoughts of those who relay them than will a published first-hand account that has withstood the critical inspection and assessment of others as well as having been carefully documented by the author.

What can be the possible justification for including rumors in a historical account intending to capture the "spirit of the age"? Rumors can be notoriously unreliable, but there is the opposing view that "where there is smoke, there is fire." Bloch remarked [*1962*, 108] that "rumors did not originate on the firing line;" rather, they originate through intermediaries who pass information on to the "common soldier" from the "notable personages" who barely associate with their troops. Thus, when reliable and verifiable written documentation is unavailable, indirect evidence, including second-hand evidence, even rumor, may be necessary to fill in the blanks of a picture. At the same time, however, the historian will also have the obligation to point out the nature of his sources, adding a proviso to his account that such recollections and rumors may not be altogether reliable or accurately reflect the versions of events portrayed of all principals or parties to the events.

When Romein advocated "bowing to the spirit of the age," he declared that there are two spirits of any age, the *true spirit* and the *false spirit* (the latter encompassing all manifestations that are not true). The proper aim of the historian is to depict the former, "the certainty as I understand it" (see [Geyl *1961*, 325]). A similar sentiment was expressed by Romein's and Geyl's colleague, the Dutch social historian of the early modern period Johan Huizinga [*1960*, 60] in his essay on "The Task of Cultural History." It should therefore be understood that the viewpoints, rumors, and opinions surrounding corroborated documentary evidence are themselves part of the historical reality being studied, as much as the are "facts themselves" that underlie those opinions, rumors, and viewpoints, and it is historiographically legitimate to include the record of these in an account of the overall events being described.

**2.4. Assessing the inedita.** Rejection of the validity of an account by someone who may be named in, or even the subject of, the account does not alter the historiographic legitimacy of describing views directly bearing on the central issues and for which a public record is available, whether those views are corroborated or not. The views of others, speculations or rumors, whether correct or not, are a crucial link in understanding the history of mathematics because, as McCleary [*1989*, 9] wrote, "the receiver of a work of mathematics...is generally a fellow mathematician, a fellow producer, with criteria that are very different from the casual reader of literature. This active role played by the reader speeds the reception process on the appearance of a work...," or, if the audience for whom it was intended has a negative reaction, can slow down or even halt, the reception of the new work. We must then know something of "the author's intentions for his or her

audience, and the audience's ability, inclination, and intentions toward the work" [McCleary *1989*, 4].

Certainly both the original and retrospective viewpoints, opinions, or attitudes of first-hand participants towards their work are a legitimate and essential part of the history being considered. This does not, however, entail that either the past or present demands of participants towards their past work constitutes the whole history of their work, or that these demands can or should dictate the historian's account of that work.

**2.4.1. Getting 'up close' and personal.** There is an important distinction to be made between presenting rumors, speculations, or opinions that affect our understanding of the contemporary perception of a mathematical episode when these rumors, speculations, or opinions are presented as such, and the blatant and tacit use of these, to the point of fictionalization or falsification, as a tool for the sole purpose of presenting a "good story" as Eric Temple Bell has frequently been said to have done (see, e.g. [Drucker *1992a*, 415]) in *Men of Mathematics* [*1934*]. The "biographical approach" to mathematical history (widely said to be represented irresponsibly by Bell, represented at its best by Dauben) has been a dominant factor in the historiography of mathematics, and will no doubt remain so. The aim of presenting biographical material and personal reflections or information within the history of mathematics, in the words of Philip J. Davis [*1985*, xi] is to "link men and women of extraordinary achievement with both their material and their environment." On a broader sociocultural focus, the idea of a social history of logic has been developed as a large-scale project by Christian Thiel, Volker Peckhaus, and their co-workers at the University of Erlangen-Nürnberg.

It has also been recognized that biography, as well as history, should be tempered by what Wilder [*1985* 190] called "an awareness of the impact of cultural forces." An integrated approach to history of logic must take account the of the milieu in which an individual works as well as of the sociocultural milieu that frames the episode in the history of logic to which the individual contributes. Just as mathematics is the creation of men, so is logic. Therefore Ukrainian national historian Nikolai Ivanovich Kostomarov's view (as reported by [Mazour *1975*, 169]) that true history must deal with the lives of those who make history, with their aspirations, their vices and virtues, their intellectual struggles, successes and failures, is more forcefully true for the history of mathematics, the history of logic, the history of ideas in general, than it is for political history. Ruitenburg [*1992*, 424] noted in his review of van Stigt's study of Brouwer's intuitionism that it was precisely Brouwer's personality that shaped his work and gave it its originality. But while Brouwer's originality is the main focus of interest in his work for mathematicians and philosophers, van Stigt makes it clear that any study of the inspiration for the work requires consideration of Brouwer's personality.

With respect to "contemporary histories," historian of science and historiographer Herbert Butterfield [*1973*, 497] wrote:

> ...the "contemporary historian" has an advantage, for the passage of time, which in some respects make it possible to produce a fairer record, is attended by losses as well as gains. So much of the atmosphere of a period – or of a given circle, a given episode – may disappear; and the future may fail to recover the host of thoughts and assumptions which never needed to be expressed because they were part of the atmosphere – the future may even forget the delicate connotations of words. The "contemporary historian" may fail to realize that, by "taking sides," even perhaps unconsciously, or by otherwise accepting a framework of a story already current, ...he may pass down to the future a record of permanent and unique importance.

Since, in Fang's words [*1972*, 43], "the 'past' need not be centuries or millennia ago; it may be just a month ago," such issues as the use of inedita and "second-hand" accounts become direct problems for the historian of mathematics in general, the historian of logic included. In these circumstances, the responsibility of editors and historians alike is to encourage affected parties to present their own versions of events, and the duty of editors in this case is to provide a forum for participants to express their opinions and present their versions of the facts.

Thiel expressed the same views with respect to the history of logic as we find in Butterfield's [*1973*, 497] remark concerning contemporary history. Thiel [*1983*, 183-184] wrote:

> What is the effect of difficulties with sources and with lack or loss of data? To put it crudely: the effect is a far-reaching *naiveté* of our evaluations (if there *are* sources) and of our judgments (if there are *none*). This naiveté adds to the distortions we already suffer from by our selectivity of historiographical topics that are, *in fine*, determined by present opinions and directions of logical research. This guideline can be illuminating and save the historiography of modern logic from ending up as pure (and yet perhaps equally biased) description.
>
> But it is is also in danger of of narrowing down our outlook, our *horizon*, as it were, and of depriving our *logical* work of the consciousness about its place..., which means, in some sense, depriving it of its consciousness. It is the historian's task to keep alternatives in the logician's sight.

**3. Conclusion and summary.** If the historian of logic is to attempt to capture the essence of the history being studied, then all available data, from published documents to archival materials, to the professional and personal reflections and experiences of those

who belonged to and experienced that history as their own *present*, should be utilized to the greatest extent possible. Only in the amplitude of the milieu of the logicians of the past, whether recent or long-vanished, can we gain insight into *wie es eigentlich gewesen* for those logicians in their own time, what logic was like for them in their own day. Summarized in non-historiographical, journalistic terms, the historian functions both as a reporter and an editor, first collecting and presenting the facts of the past and then interpreting them for the contemporary audience.

Our conclusions about the need to rely upon inedita prompt the formulation of the following minimum guidelines for *Modern Logic*'s historiographic use of the less reliable category of inedita, including in particular unpublished, folkloric, or unverified materials.

## The Use of Unpublished, Folkloric, or Unverified Materials

1. Only claims regarding, or statements of, rumors or folklore that have already been stated in print or otherwise publicly disseminated, either orally or in writing, or expressions of opinion regarding the truth or falsity of rumors or folklore that have already been stated in print or otherwise publicly disseminated, either orally or in writing are "fair game" for use. Rumors and folklore for which no publicly available sources can be identified should not be used, especially in case those persons who are mentioned in the rumors or folkloric materials are not provided an opportunity to respond to such rumors or folklore.

2. As a courtesy to all participants who are the subject of their investigation and in particular to the principals, researchers should attempt to contact such participants to attempt to obtain details or explanations of incidents, rumors, etc. and in particular for incidents, rumors, etc. for which there is insufficient substantiated documentation, and should permit the subject a reasonable period within which to respond. "Reasonable" is to be construed here in accordance with the best judgment of the researcher in accordance with the specific context and nature, importance, or degree of controversy, of the episodes or events being investigated. Customarily, an initial letter of inquiry is deemed sufficient and is ordinarily regarded as "reasonable." For oral histories, researchers are encouraged to make an additional effort to recontact their interviewees in order to permit them to verify the accuracy of the transcript of their interview.

3. The use, reference to, or quotation of any statements from oral or written personal communications require written permission from the author of those materials. In case of the decease of the author of such materials, permission of the legal heirs or estate of the author whose work is used or quoted is required.

4. Quotations from archival documents, Nachlaß materials, unpublished writings, correspondence, and notes require written permission from the owners of said materials. For purposes of the mere use, mention, or paraphrasing of the contents of such materials, without quotations, these materials may be treated as published documents *provided* the materials were publicly distributed or furnished to the user by the owner of the material or by the owner's heirs or estate.

5. Unpublished but publicly available materials such as auditor's classroom lecture notes, lectures materials distributed for public use (hand-outs, etc.), or publicly distributed preprints, may be treated as published documents.

6. For purposes of printing, mechanically reproducing, or duplicating (by any known technology), publicly distributed or publicly available but previously unpublished documents are treated as undistributed or private unpublished documents, and require the written permission of the author or copyright owner of the document before printing, reproduction, or duplication can occur.

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## The Editor