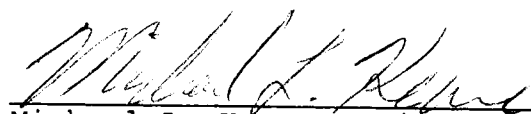
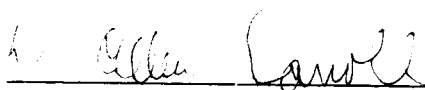


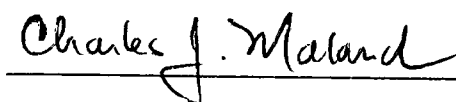
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THE ORIGINS OF TECHNICAL WRITING INSTRUCTION IN
THE UNITED STATES WITH A SURVEY OF TECHNICAL
WRITING TEXTS 1908-1977

A Thesis
Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Stuart W. Maher III

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ABSTRACT

Today we take technical writing courses for granted. Many universities and colleges offer such courses; engineering students are often required to take them. In fact, a growing number of institutions offer degrees in technical communication. Yet, at the beginning of this century, there was not one textbook devoted to technical writing. At best, the English courses in engineering curricula were the same as those for any other major. In 1911 the first technical writing textbook was published. This thesis examines the advent of technical writing as a subject separate from standard English composition and the development of textbooks from 1911 to 1979.

A review of engineering journals from 1890-1910 reveals a number of articles critical of "engineering English." These articles demonstrate an awareness of the need for training in technical writing. T.A. Rickard's Technical Writing (1908) and S.C. Earle's Theory and Practice of Technical Writing (1911) are the first book-length responses to this need. Although Rickard's book is a handbook rather than a textbook, it sets important precedents and begins to codify the rules of technical writing. Earle's text is of the greatest impact; for, as the title suggests, the book states the theories of techni-

cal writing and then puts those theories into practice. Examples of good technical writing are drawn from genuine technical reports. The influence of Earle's book can be discerned in most of the texts that followed. Clearly, there is a direct descent from the first technical writing textbook to those used today. There are, however, some books which do not follow Earle's pattern. These variant texts also show a lineal descent, but from later, more theoretical books, such as J. Raleigh Nelson's Writing the Technical Report (1940).

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INTRODUCTION

Many people think of technical writing as a recent development, a speciality that grew out of the space program or the computer explosion. Some who know a bit more about the history of technical writing would push the date back to the Second World War and the mass production of military manuals. In fact, true technical writing began as early as Roman times. There has been much discussion of what document truly constitutes the first example of technical writing; however, that is beyond the scope of the present paper. My interest in this thesis is to trace the genesis of technical writing instruction in American colleges. Once the beginning is defined, I will show that the texts used in the 1970's and 1980's are direct descendants of the earliest texts, and that we can--in some important ways--understand these recent texts by recognizing that ancestry.

In the process of finding the origins of technical writing instruction in this country, I will attempt to discover the reasons behind the introduction of this subject into the college curriculum. Next I will examine the earliest available texts, as well as other sources, to discover whether there was a "theory of technical writing" or, at least, a "theory of teaching technical writing." If such a theory did exist, we can define the principles

espoused. Once the earliest texts are considered, later texts will be examined to trace the evolution of those principles. In this way, it will be possible to determine if a mainstream of technical writing textbooks exists. If that mainstream does exist, we can define the characteristics of the main school of thought.

To accomplish these goals, I will first examine briefly the history of English composition instruction in America. Next, I will present evidence of a widespread feeling during the late nineteenth and early twentieth centuries that the technical writing of that time was substandard. The third chapter will be a close analysis of the two earliest technical writing textbooks, paying close attention to any evidence of a prevailing theory of technical writing. Having set up these first texts as models, I will examine a number of other texts to determine what similarities and differences are discernable. The fourth chapter will examine texts up to the Second World War; the fifth will cover 1941 to 1977.

The importance of such a study is more than mere bibliographic inquiry. By learning about the history of technical writing instruction, modern technical writing teachers can better understand the underlying theories of their field. An axiom of geology holds that "understanding the past is the key to understanding the present." The same is true of teaching. The motives for teaching

technical writing today are much the same as they were in 1900. By looking at the ideas that shaped the earliest texts and their evolution through the later books, we can understand how technical writing instruction itself has evolved. Perhaps we can even predict the direction it will take in the future.

CHAPTER I

THE EVOLUTION OF THE ENGLISH CURRICULUM IN AMERICA

Before we discuss the advent of technical writing in the college curriculum, we must have a general understanding of the history of English instruction in America. Courses in technical writing did not emerge in a vacuum, or explode into being overnight. Rather, these courses were one result of a movement toward a greater emphasis on the English language in American universities and colleges. That movement began in the late eighteenth century with texts and lectures in English (instead of Latin). Courses in English grammar and rhetoric followed, then the first "freshman composition" requirement at Harvard in 1874-75 (Martin, p. 35). The movement toward a greater competence in English was also demonstrated by entrance requirements at various institutions of higher learning. While these actions cannot be directly related to the creation of technical writing courses, they assuredly prepared the way.

The Language of Instruction Shifts from Latin to English

In seventeenth century America, Latin was the language of the college man. His texts, lectures, and compositions were in Latin, and it was expected that he would converse in Latin while at school. However, by the late eighteenth century, the students began to resist the classics and

demand that more attention be paid to English (Rudolph, p. 37). By 1776, the senior class at Yale received reluctant permission to study English rhetoric, history, and belles lettres. The Yale corporation did not, however, give credit for these studies nor provide facilities or subsidies for the students who took the classes (Rudolph, p. 39). In spite of the resistance by Yale and other universities, students continued to find ways to avoid Latin. They translated texts into English, made jokes out of roll calls in Latin, and generally reacted as young people do when subjected to an onerous burden. Although they did not realize it, they were taking the first steps that would lead to the creation of departments of English in every American university. Of course, the growth of English studies was only one reflection of the new American ideal. The study of the vernacular at the expense of the classics mirrored the growing egalitarian ideals and independent thinking that marked early American history.

English Grammar and Rhetoric Become College Subjects

The first English study to gain some legitimacy in American schools was grammar. Grammar managed to gain acceptability because it was a "structured" study that led the student to a greater use of logic and reasoning. Equally important, the teaching of English grammar could use the traditions and methods of teaching Latin grammar.

However, the study of English grammar involved an important change: "The shift of grammatical studies from the classics to English involved a shift from a method of teaching a foreign language to one of correcting a native one" (Applebee, p. 6). The prescriptive tradition that appeared in nineteenth century classrooms continues in some quarters to this day. While English grammar was important, it was generally seen as a preparatory subject. Therefore, the colleges turned their attention to a more suitable subject: logic. By "logic" these schools meant more than simply solving problems by examination of the facts. Their logic included the study of thought and the use of language to support or refute ideas. Influenced by Adam Smith, Hugh Blair, David Hume and others, the American educational establishment embraced the study of rhetoric. While an important part of this study was oral argumentation, it also included the use of the written word. These early rhetoricians devoted themselves to the "flowers of rhetoric"--diction, style, and figurative language. The rhetoricians, like the grammarians, used the prescriptive method of teaching. Such study of the theory of composition rather than extensive practice continued through the 1870's (Applebee, p. 9). The theory was that if students were taught the correct patterns, they could apply those patterns to any writing task that presented itself.

Growth of English Entrance Requirements

While the colleges were providing more instruction in the vernacular, they also began to require greater skills from prospective students. These entrance requirements are an index of the growing importance of strong English language skills for educated Americans.

Interestingly, the demand for better use of English came in part from the public.

Shortly after the Civil War, reporters broke out in imprecations against the schools, claiming that the tradition of teaching only other languages ... was an inadequate preparation for life in the Gilded Age ... (Martin, p. 35).

In recognition of the need for improved English skills, Harvard instituted a series of entrance requirements. In 1865, candidates had to read a passage in English; in 1872, they had to provide written proof of some skill at spelling, punctuation, and handwriting (Martin, p. 35). The Harvard example was followed by many colleges; according to Rudolph, by 1897 some eighty schools had requirements including English grammar, literature, and composition (p. 165). The increasing use of even rudimentary English entrance requirements reflects the increasing importance of composition skills in nineteenth century America.

Status of English in Engineering Schools, 1870-1920

As the previous discussion has shown, skills in English grammar and composition became increasingly important through the nineteenth century. At least through 1870, English training for engineering students was the same as that for other students. During the period 1870-1920, engineering programs experienced a great deal of upheaval in the curriculum, especially in the amount of English required. The last part of this chapter examines the changes in engineering English.

Engineering English from 1870-1900

By 1870, the Industrial Revolution had fully taken hold in America. New inventions and new uses for old inventions were being produced at a furious pace. With these inventions came a need for people who understood mechanics, physics, and chemistry. A classical education was no longer sufficient for the needs of a growing country. Railroads, factories, mines, and steamships required men with a different sort of education. This demand was met by new schools of engineering as well as departments of engineering in established schools. These early engineers studied English in some form for an average of two-and-a-half to three years (SPEE, vol. 34, p. 562). Generally, English classes for engineers did not differ from those for any other discipline. Engineering students

took the required freshman composition course, followed by one or two years of literature. However, as more and more "technical" courses found their way into the curriculum, humanities generally and English in particular lost out. In 1885, English occupied less than two years for most engineering students, and often only one year. By 1900, the English studies had again reached an average of two years for most engineers; but these courses were no doubt the bare minimum (SPEE, vol. 34, p. 562). The significance of the 1870-1900 period is indicated by H.L. Creek and J.H. McKee in "English in Colleges of Engineering" (1932): "The great decline in the amount of time given the humane subjects came between 1870 and 1885, the time at which the largest increase in the number of engineering colleges occurred ..." (p. 819).

Engineering English from 1900-1920

With the turn of the century came the beginning of an awareness that engineering English was not as it should be. Expressions of that awareness will be discussed elsewhere; we can, however, examine trends in English education. By 1915, the average engineer studied English for a bit more than two years. Between 1915 and 1923, there was only a small change in the average time provided for English in engineering schools (SPEE, vol. 34, p. 562).

While the numbers are interesting in themselves, we can also discuss the specific courses engineers were taking during the early part of the twentieth century. By looking at a series of articles from 1908 to 1932, we can discern some trends in English education. In the earlier part of the century, there was little uniformity in English education among engineering schools:

In the large majority of technical schools of which a department of English is a part, we note a great divergence of equipment and of courses. Some offer only one or two hours in freshman composition; others require composition work in the freshman and sophomore years, offer obligatory and optional courses in literature, and maintain a superintendence over the juniors and seniors in their composition work. (Telleen, p. 62-3).

Similar findings were reported by C.W. Park in 1916 (SPEE, vol. 24). Park also noted that few students took elective English "because the schedules are already crowded". Thus, although the amount of time given to English had increased slightly, engineering schools continued to face a conflict between technical courses and the humanities. Of somewhat more interest are survey results reported by Frank Aydelotte in 1917:

In a great many institutions the sole aim of instruction in English is proficiency in writing. While many composition courses, especially in the state universities, are run on exactly the same lines as elementary college courses, there is a growing tendency to give engineering students not general composition but instead some kind of instruction in technical writing. The terms "typist English," "engineering English," and

"business English" have received a good deal of abuse in different quarters, but they represent substantially the aim of English courses in an increasing number of engineering schools. (SPEE, vol. 25, pp. 217-18).

Thus, we see that technical writing was beginning to take hold, even if it was not universally respected.

We have already seen that the Civil War was at least partly responsible for the growth of engineering schools. A casual glance at the engineering journals from 1915 to 1918 shows that the First World War and its aftermath had a profound effect on the number of students entering engineering programs. The effects of that increase are detailed by H.L. Creek:

The First World War was followed by tremendous increases in college enrollments. The 'literary' student was now clearly the exception, not the rule, at least in the state institutions with their thousands. More and more was said about the failure of composition teachers to solve the problem of clear expository writing. Professors in departments other than English, especially science and engineering, were unpleasantly critical. Business and industrial concerns wanted to know what was wrong with teachers of English... (p. 8)

It is important to realize that engineering education was a fairly new concept during this period. When we consider that Freshman English did not come on the scene until 1874, it is hardly surprising that engineering English was still seeking and testing during the early twentieth century. The results of that experimentation can be seen in the textbooks discussed in Chapters III and IV.

Conclusion

Through this chapter, we have seen the growth of the study of English in America. What began as a simple, prescriptive study of grammar grew to encompass literature, rhetoric, and composition. During the middle and late nineteenth century, the need for clearer expression was felt, especially in the new, rapidly growing engineering schools. By the early twentieth century, engineering education had largely separated itself from the more traditional "arts" education. In the period just prior to the First World War, some colleges began to experiment with composition courses designed specifically for technical students. Following the war, public demand saw an increase in these technical writing courses. The following chapter examines the discussions of engineering writing by both practicing engineers and educators during the early part of the twentieth century.

CHAPTER II

EARLY DISCUSSION OF ENGINEERING ENGLISH

During the early twentieth century, two groups were particularly interested in the quality of engineers' writing. The two groups were practicing engineers and educators; their concern is evidenced by journals of the period. Research of these journals indicates that these two groups were instrumental in the creation of technical writing courses. Through their discussions and experiments, technical writing courses were separated from standard composition courses. Citations from the various professional journals indicate the nature of these discussions. This chapter contains two sections: the first focuses on the discussion by engineers, and the second considers the role of the Society for the Promotion of Engineering Education in the creation of technical writing courses.

Discussion in Engineering Journals

The discussions in these journals are valuable evidence as to the state of engineering English at the beginning of the twentieth century. The material quoted in the following pages shows that these professional engineers not only had strong feelings about writing in their profession, but also had solutions to offer.

Footnotes in T.A. Rickard's Technical Writing (3rd ed., 1920) refer to journal articles critical of engineers' writing skills. Rickard's references indicate that the engineering journals of the early 1900's are a useful area for research on the origins of technical writing instruction. When I began this research, I hoped to find articles concerned specifically with the need for improved training of engineers in writing technical reports. Such articles would add to our knowledge of how technical writing came to be taught separately from Freshman composition. The publication dates of early textbooks provide a clue as to the time that technical writing instruction began, but we know very little about the reasons.

Before I began my search in the early engineering journals, I wrote to Dr. Robert J. Connors. Dr. Connors has written a number of articles on the history of technical writing instruction and could suggest the best places for the sort of research I proposed. The gist of Dr. Connors' reply was that the period 1880-1905 was relatively unknown territory, largely because researching the literature was a monumental task. Based on Dr. Connors' recommendation and the date of the first textbook, I researched engineering journals from 1890-1910.

Evidence that Engineering Writing was Substandard

The results of my research are clear--prominent practicing engineers and engineering educators were highly critical of the writing of most of their colleagues. Moreover, the criticism emanated from a variety of people holding a variety of positions in the engineering profession. The following representative citations show the tenor and number of critical comments.

The editors were led to the issuing of this book by the recognition of the following facts: ... with a few notable exceptions, students generally are not instructed at all adequately in good, sound, forcible, engineering English. (Waddell and Harrington, p. iv).

I have often been mortified at the English composition of college and even university graduates. Men who have attained eminence in particular branches of study often seem incapable of expressing their thoughts in any proper way. Their English is inexact, clumsy, and inconsequent. Clear expression seems to me to be the legitimate outcome of clear thinking, and the neglect of those early studies which enable one to express himself clearly and forcibly is a fault which can only be remedied by long years of mortification and hard labor. (Wiley, p.845).

The work done in the past-- or not done-- in the department of English by a number of our technical schools has furnished... the justification for severe criticism of our methods. Our graduates have too often been found incapable of conveying to their clients in language clear and concise and readily understandable the results of their work or investigations. (Humphreys, p. 153).

The use of the English language, as displayed in some of the special articles in our technical journals causes one to wonder whether the writers

of these articles are as careless with the subjects they treat as they are with the use of the language. One might think the large majority of the members of the engineering professions half educated. Surely a set of men cannot claim to be well fitted for any profession unless they are thoroughly prepared to express themselves. (Strange, p. 668).

The opinion of eminent engineers on the pressing need of a better use of English on the part of members of their profession is the best evidence of the neglect of instruction in English in engineering courses in the past. The acquisition of a clear, terse style is urged by them on the ground that an important feature of the modern engineer's duties is to make reports on various phases of engineering undertakings. These reports are an index of the man, and if they are defective in form or finish, the natural conclusion is that he is also deficient as an engineer. (Carhart, p. 217).

The preceding quotations show the existence of a problem with engineering writing. Two writers go further and address the underlying reasons for engineers' poor composition skills:

Among the most important deficiencies noted by practicing engineers in the recent technical-school graduate [is] inability to express himself correctly and forcibly in either writing or speaking...

Why should such a sad state of affairs exist, and with whom lies the blame? The boys that enter technical schools are not generally well prepared, and the study in which they are invariably weakest is the English language. Most of them ... speak ungrammatically, and but few of them have had proper training in spelling, grammar, and composition. Even the special preparatory schools fail to provide proper training in these essential studies; and the waiving of entrance examinations to technical institutions for graduates of such preparatory schools augments the trouble. Most technical schools give, or pretend to give, more or less instruction in English; but the courses

are usually confined to the Freshman year, and are looked upon by the student as of minor importance. The result is that they are neglected and the boys make a point of studying for them only enough to pass; consequently, when it comes to writing anything original they fail to do themselves credit. (Waddell, pp. 454-55).

Shop work has too often been exalted above language, and laboratories have been established in imitation of a factory or a central power station. The fundamentals for general culture have been pushed aside by the onrush of machinery, and a young graduate must be able to run a steam engine and take an indicator card, even though he cannot write a straight English sentence or dictate a business letter worthy to go on a postcard. Too much stress can hardly be placed on the necessity of thorough instruction in English. It is a common impression among the young that the study of one's mother tongue is a waste of time. There never was a greater fallacy. (Carhart, p. 216).

These quotations show that many influential engineers and educators were very concerned with the lack of quality English instruction for engineering students. The addresses, letters, and articles cited appeared in a variety of publications. Thus, the noted criticism and concern were not confined to a single author or a single group of engineers. Throughout the country, and throughout the engineering profession, there was an awareness that something was seriously wrong with engineering education as it existed.

One Proposed Solution--More English Training

The foregoing quotations are only part of the evidence; if, as one writer says, engineers are "men of action," it is unlikely that they would simply stand still and wring their hands over the situation. Rather, these leading engineers would seek solutions. The following citations clearly show some of the solutions suggested.

I am satisfied that extraordinary efforts should be made to teach every engineering student to write a report or letter in clear convincing English, putting forth the facts and arguments and conclusions pertaining to any question he may have to consider. The student should be taught to state in clear and logical form the nature of any given problem (Gherardi, pp. 1459-60).

Unquestionably there is a crying need for more efficient work in the teaching of English in the schools of technology, and perhaps this statement may fairly be extended to include some of the colleges and universities. Reform in this direction is most difficult of accomplishment. The work performed is too often of a perfunctory character, whereas it should be characterized by enthusiasm and originality. The time available is limited, and, therefore, the first care should be to give such a training in English as will be most efficient to meet the requirements of professional practice. (Humphreys, p. 115).

The study of English should be continued throughout the entire technical course, and should be carried even into the graduating thesis, making proper wording and grammatical construction essential for graduation. Too much stress cannot well be laid on the importance of a thorough study of the English language. (Waddell, p. 455).

These writers, however, did not want engineers to be trained as journalists or fiction writers; they saw the need for writing courses that emphasized logic and concise expression of technical information.

Creation of English Courses for Engineers

Some writers were doing more than simply calling for more English; they suggested the creation of English courses designed for engineering students. Still more interesting are those articles calling for an integration of English and technical courses. Such integration is the forerunner of specific training in technical writing. Three writers describe the need for English courses for engineers:

We hear that college graduates have no mastery of language, cannot express themselves logically, and it is therefore recommended that more time be directed to literature and instruction in the English language. But as long as we do not teach logic, but have English taught by philologists, more or less of the character of the florid newspaper style, that is, to write very many words on a very small subject, no useful results can be expected. ...the principle of English teaching to engineers should be to enable them to explain a subject intelligently and logically, with as few words as possible. That is, Faraday's researches and not the product of the successful novel writer should be the example aimed at. (Steinmetz, p.1148).

From this point of view discipline in English is not to be regarded as producing mere literary polish, but as enforcing correct thinking in regard to each and every question upon which [the student] has to write. (Gherardi, p. 1460).

I do not mean by this criticism that engineers should spend long periods in learning the grammatical and rhetorical constructions of the language; but I do mean that English composition should be kept up in engineering schools and that engineers should be drilled in the use of English until they can express with entire accuracy the meanings which they so often commit to formulae. (Johnston, pp.1488-89).

Finally, there is evidence which directly supports the idea of integrating writing and technical courses. The first quotation also proposes that good writing skills be made a necessity for graduation.

The study of English should be kept in mind in each of the other departments and should be finally kept prominently in view in connection with the writing of the graduation thesis, which should be a business-like report on some experiment, investigation, or construction. And the engineer-student should not be graduated until he has given proof in his thesis of the thoroughness and breadth of his training and of his ability to express himself clearly and explicitly. (Humphreys, p. 184).

The most intriguing quotation, however, suggests that a system of writing and revising technical reports was already being used as early as 1903. The following citations represent a paper and response from the 20th Annual Convention of the American Institute of Electrical Engineers.

English should be taught... from the beginning to the end of the college course. In order to have this drill continue throughout the college course, it may be necessary to have a considerable part of the training incorporated into the writing of laboratory reports, examination papers, and other similar documents. (White, p. 1453).

The following quotation is part of a response to the address by White, above.

...I would like to say that to make these reports valuable, it is necessary that they should be very carefully corrected by the instructor, both for technical matter and for English, handed back, rewritten by the student... this process continued if necessary until the report is satisfactory in every respect. Unless this is done, the work of writing is of little value as an exercise in English. We are doing some of this work and hope to do more.... (Ganz, p.1471).

Thus, as early as 1903, one technical school was using some very progressive ideas to teach writing. More to the point, educators and engineers were calling for specific engineering writing (or technical writing) courses. The next section provides a detailed discussion of the role played by the Society for the Promotion of Engineering Education.

The Society for the Promotion of Engineering Education

One important source of information about the history of technical writing is the Proceedings of the Society for the Promotion of Engineering Education. Members of the Society included S.C. Earle, Frank Aydelotte, Sada Harbarger, and other authors of early technical writing texts. In the following pages, I will discuss the central place of the Society in the development of technical writing courses during the early part of the twentieth century.

The Society Questionnaires

The reports from the Committee on English from 1905 through 1930 show that the Society was very interested in discovering the status of English education in engineering colleges throughout the country. Part of the work undertaken by the Committee was the development and administration of a survey of English teaching in departments of engineering (SPEE, vol. 24, 1916, pp. 178-79). The survey was intended to reveal the attitudes of the schools toward English as well as the amount of time given to the subject. In 1918, another questionnaire was sent out. The Society also sent a letter to engineering firms to find out what employers thought of the abilities of recent technical school graduates.

Unfortunately, the discussion of the first school questionnaire does not include a facsimile of the form that was sent out. However, we can assume that the questions on the later survey (SPEE, vol. 26, 1918, pp. 206-209) are somewhat similar. Also, we can speculate about the status of technical writing from the answers provided. The first point of interest is the number of schools surveyed. The report indicates that 107 questionnaires were mailed. At the time of the report, only a few had replied. In any event, the discussion of the results reveals the concerns

of C.W. Park, who reported to the Committee:

As regards electives, the situation is not so satisfactory as it might appear. For instance, nine schools out of twenty-six offer no elective courses in English; the remaining seventeen in one group examined offer electives in one or more of the following courses: English literature, business English, advanced English, and public speaking. Only two institutions report many takers for these elective courses. (pp. 179-80)

The important point here is that five years after the publication of Earle's Theory and Practice of Technical Writing, most engineering students were still only taking Freshman Composition. The reasons given for this situation were lack of time, hostility between technical and humanities departments, and student indifference to English. Park quotes one response as representative of the indifference:

'We have not very much to do with English, and trouble ourselves about it as little as possible. We send our students to the college of liberal arts, and they give them a few hours a week for one year, and we call it quits.' (pp. 180-81)

Park reported that such an attitude seemed widespread.

An interesting contrast is found in the response to a letter sent to engineering firms by the Committee on English. In the following year (1917), the Committee reported on an "opinion poll" that was sent to "... twenty-five ... leading employers of recent engineering-school graduates." (SPEE, vol. 25, 1917, p. 219). The letter requested that the employers address three areas of English education: the language ability of recently hired

graduates, the nature of any deficiencies, and suggestions for courses to correct any problems. Ten of the fifteen responses expressed some dissatisfaction with the English abilities of young engineers (p. 220). The second question (the nature of any deficiencies) elicited a wide variety of responses. Of particular interest though is the fact that employers wanted engineers who were better able to analyze and adapt to a variety of audiences, better able to present information graphically, and better able to organize information into a coherent report. Again, it is important to realize that this was 1917. The skills desired by these employers over seventy years ago are the same skills we attempt to teach in technical writing courses today.

The importance of these surveys is twofold: first, they provide valuable information about the state of engineering English in the early twentieth century; second, the fact that the Society took the time to develop, deliver, and report on the surveys indicates a real commitment to improving the writing and speaking skills of engineers.

Proposals for Better English Education

The Society not only observed the condition of engineering education; they also sought ways to improve it. While most of the discussions provide general ideas for the

improvement of English education, one article from the 1926 Proceedings proposes a specific curriculum in concrete terms.

The proposal by J. Raleigh Nelson (Proc. SPEE, vol. 34, 1926, pp. 542-46) reviews the goals cited by the Board of Investigation and Coordination, then suggests a course of study to meet those goals. The Board of Investigation saw two important goals for the teaching of English. First, the student needed an appreciation of English literature to "...fit him ultimately to take his place intelligently in society as well as in his profession" (p. 542). Second, training in English composition and public speaking should allow the student to express himself more clearly. These goals are also expressed in most of the early technical writing textbooks. Those texts agree that clear thinking equals clear expression.

In order to achieve this result, Nelson suggested a sixteen-hour English curriculum for engineers. The main points of the program were:

Freshman Year: Two three-hour courses, encompassing composition, literature, and speech.

Sophomore Year: Two two-hour courses in the appreciation of literature.

Junior Year: One two-hour elective in literature.

Senior Year: A two-hour literature elective and a course in English composition, related, if possible, to the students' technical courses. (Nelson, p.545)

Nelson believed that English instruction had to be

integrated with the rest of the engineering program to have any effect. Moreover, he called specifically for a required technical writing course. The Society not only recognized the need for better English training but also proposed methods to meet that need.

Increase in Technical Writing Courses

We have already seen that, as late as 1916, most engineering students were still taking only the freshman course in English. A report from 1932 shows a dramatic change in those numbers. According to the report, on average, engineers were taking nine required semester hours of English. The courses included six hours of composition, two hours of literature, and one hour of speech (Creek & McKee, p. 819). Thus, we see the embodiment of the ideal expressed by Nelson. Although the reality was nine hours rather than sixteen, the distribution was very similar to Nelson's proposal. The survey by Creek & McKee also shows the arrangement of courses within the curriculum:

Another matter of some importance is the distribution of English through the four years of the college course. The Freshman composition is all but universal. An advanced course in technical, report, or business writing is required in nearly half the institutions; and this is placed most commonly in the Senior year ... (p. 823)

Note how closely this arrangement parallels that suggested by Nelson. I do not contend that everyone in the country was intentionally aware of following that particular

proposal. However, Nelson does seem to reflect the mainstream thought about English education during the early years of technical writing instruction. It is safe to say that the Society was at the leading edge of growth and experimentation in English education for engineers. More than any other group, the Society studied the problems of engineering education and developed strategies for solving those problems. I have already noted that a number of members of the Society were authors of early technical writing texts; S.C. Earle was the chairman of the Committee on English. There is more at work here than mere coincidence. Individually and collectively, the members of the Society were the parents of technical writing instruction in this country.

Conclusions

Engineering journals of the early 20th century provide clear evidence that engineering students needed better training as writers. Numerous articles discuss the shortcomings of engineering English and the implications of an inability to express ideas clearly. By themselves, these discussions do not necessarily foreshadow courses in technical writing. When we include the work of the Society for the Promotion of Engineering Education, we can see the foundations of technical writing courses. The fascinating picture is that the engineering profession as a whole was

moving toward better English training. Both professional engineers and educators wanted more than simple training in grammar or literature. They felt that for English courses to be of use to engineers, those courses must deal directly with the problems that confront engineers in the field. Engineering firms wanted students who could analyze their audiences, prepare graphics, and organize periodic reports. That is, engineering students needed training as technical writers. During the period 1905-1932, we can see the results of these discussions. The amount of English increased and more schools began to include a specific course in technical writing. Another part of the interest in technical writing was expressed in texts outlining the principles of the subject. The next chapter discusses two early books devoted specifically to the subject of technical writing.

CHAPTER III

TWO EARLY TECHNICAL WRITING TEXTBOOKS

The advent of technical writing courses was followed in short order by the appearance of English composition texts designed specifically for engineers. According to Connors, engineering writing and technical writing were synonymous during the early part of the twentieth century (p. 332). The books discussed in this chapter represent the two main approaches to the problem of teaching technical "engineering English." However, the importance of these texts is not merely representative--they are also the earliest books that deal with technical writing as a subject distinct from general composition. The handbook approach to technical writing instruction was first used in T. A. Rickard's Guide to Technical Writing (1908); S. C. Earle's Theory and Practice of Technical Writing (1911) is arguably the first true technical writing textbook (Connors, p. 332). This chapter includes a brief biographical background of each author as well as an analysis of these important early texts. A summary of the ideas discussed and approaches used in these books will tell us something about how technical writing was perceived in the early part of this century. Using that perception as a starting point, we can trace the evolution of technical writing texts from 1908 to today.

T.A. Rickard--A Guide to Technical Writing

T.A. Rickard is an important figure in early technical writing for several reasons. First, he wrote the earliest text dealing exclusively with technical writing. A Guide to Technical Writing was published in 1908; a second edition appeared in 1910. In addition, Rickard was the editor of the Engineering and Mining Journal and the Mining and Scientific Press, and founded The Mining Magazine in London. Some reasons for Rickard's interest in better technical writing can be found in his educational background.

Thomas Arthur Rickard was born in Italy in 1864. His father, grandfather, and uncle were all mining engineers. In spite of that background, Rickard considered majoring in literature during his time at Queen's College, London. However, his uncle persuaded him to take up the family profession. As a result, he entered the Royal School of Mines in 1883. There he came under the guidance of T.H. Huxley, who was Dean of the School. Huxley's lucid prose, still used as an example of good technical writing, certainly helped to form Rickard's concept of scientific writing. Thus, when he graduated, Rickard had completed a classical as well as a technical education, a background that served him well when he became the editor-in-chief of the Engineering and Mining Journal in 1903. In 1909, Rickard founded and edited the Mining Magazine in London

and later served as editor of the Mining and Scientific Press. Rickard's editorships placed him in a perfect position to observe, comment upon, and improve technical writing during the early twentieth century.

Rickard used his editorial experience to prepare his first book, A Guide to Technical Writing, in 1908. This book was intended for use as a desk reference for practicing engineers writing technical articles for publication. Therefore, it is unlike the "pure textbooks" that will be discussed later. This text combines the prescriptive format of A.S. Hill and Sir Clifford Allbutt with manuscript preparation material from the U.S. Geological Survey's Suggestions to Authors.

The table of contents shows very clearly that Rickard's intention was to provide a style guide for prospective authors. Included are chapters on abbreviations, numbers, hyphens, relative pronouns, titles, and specifications. On a broader scale, there are chapters dealing with usage, grammar, "journalese," education, and "good and bad writing." The text ends with a reprint of "A Plea for Greater Simplicity in the Language of Science," an address Rickard had delivered several years earlier. A glance at the table of contents does not reveal the

significance of this text, however. There is more to this text than a simple application of the rules of grammar to the language of engineers.

Rickard's Guide also provides an idea of how technical writing was perceived eighty years ago, at least how it was perceived by one person with a great deal of relevant experience. Some of the suggestions seem remarkably modern. A major tenet of current technical writing instruction is the concept of audience awareness and analysis. In simple terms, that concept is: the writer must consider the needs, education, biases, and interests of the reader and adapt the paper to those conditions. Rickard provides an earlier definition of audience awareness in his introduction:

Language is a vehicle of expression designed to convey ideas ... Careful composition facilitates the conveyance of ideas, the primary purpose of writing being to transfer ideas from one man to another in such a manner as to give the least amount of trouble to the recipient. (pp.7-8)

Later in the same introductory section Rickard says:

Write simply and clearly, be accurate and careful; above all, put yourself in the other fellow's place. Remember the reader. (p. 13)

These guidelines are clear statements of the concept of audience awareness. The succinct admonition, "Remember the reader," is as useful today as it was eighty years ago.

From Rickard, we can see that at least one principle of modern technical writing is not new at all. However,

the idea of many different audiences had not yet been developed in the field of technical writing. Although the text notes the possibility of diverse audiences, Rickard then concludes that most technical writing is communication among professionals:

If you describe a stamp mill to an experienced millman, a mining student, or a bishop, you will vary the manner of telling. The most effective will be that which has a sympathetic appreciation of the other fellow's receptiveness. As a rule, the process is simplified by the fact that technical writings are intended to be read by technical students ... (p. 12)

That is, most writing done by engineers is intended for other engineers. Of course, that attitude is not surprising in light of the perceived purpose of the text. Rickard expected his readers to be involved in the preparation of articles for technical journals or reports for other engineers. Perhaps it is not so much that Rickard had a narrow view of technical writing as that technical writing was a narrower subject in 1908 than it is today.

Rickard's Guide to Technical Writing is an effort to adapt the prescriptive tradition of nineteenth century composition texts to the needs of a specific group of twentieth century writers--engineers. While the approach may seem crude by present-day standards, the text is important as one of the first to distinguish technical writing from standard composition. Of still greater

significance is the fact that Rickard places the emphasis on the reader, rather than the writer, of a technical document. "Remember the reader," Rickard told his audience in 1908. That guiding principle is equally important to modern technical writers.

S.C. Earle--Theory and Practice of Technical Writing

The most significant figure in early history of technical writing instruction is Samuel Chandler Earle. As chairman of the SPEE Committee on English, Earle exerted an influence that is still felt today. He was the author of the first text to discuss technical writing in theoretical as well as practical terms. Earle developed a framework of technical writing principles, tested those principles in his English classes at Tufts College, and finally codified them in his textbook, The Theory and Practice of Technical Writing. Earle's ideas are still recognizable in technical writing texts used today.

S.C. Earle was born in Vermont in 1870. He attended Harvard College and received A.B. and A.M. degrees in English. In 1895, he was appointed as an English instructor at Tufts College. He moved steadily up the academic ladder, attaining a full professorship in 1906. Particularly interesting is the fact that Earle served his professorship in the Engineering School of Tufts. So, from the beginning, his teaching career was a marriage of

English and engineering. In spite of his untimely death in 1917, Earle played a major role in changing the teaching of engineering English. The effects of his work are visible in current technical writing courses and textbooks.

Unfortunately, no biography of Earle exists, so one can only speculate whether his interest in technical writing was planned or simply happenstance. The fact that Earle served as chairman of the SPEE Committee on English provides some evidence that he was fully aware of his place at the forefront of formal technical writing instruction. The discussion in Chapter II shows the SPEE's strong interest in developing better writing courses for engineers. Earle is often credited in the SPEE Proceedings as the driving force behind the English Committee. His obituary says, in part:

... he rendered a unique service for the advancement of English in technical education, and to him is largely due the present method of teaching English in engineering schools. More than a decade ago he abandoned the old methods of teaching English by "formal Rhetoric," and inaugurated his plans for making the subject of English vital to the development of technical education by creating a really live interest on the part of the student.
(Proc. SPEE, vol. 25, pp. 246-7)

We have already seen that the SPEE provided much important early research on the state of engineering English at the beginning of this century; moreover, some Society members developed experimental courses and proposed major changes in the engineering curriculum. In 1911, the year his

technical writing text was published, Earle also published "English in the Engineering School at Tufts College" (Proc. SPEE, vol. 19, pp. 33-47). The article is useful because it provides a description of the way technical writing was taught at one school. Here we can see Earle's ideas at work in the classroom. A brief discussion of the article provides a useful background for the discussion of the textbook.

Earle prefaced his article by describing three ways in which Tufts had departed from the more usual method of teaching English, "shaping the work ... more completely for engineers, giving systematic training in technical writing, and adopting special means of increasing... efficiency..." (p. 33). The body of the article describes how each of these objectives is carried out. The freshman course is not discussed in any detail, although Earle does say it "... begins with a lecture on the engineer in the twentieth century." However, a fuller description of the course in argumentation provides a better idea of the work being done:

... the engineer will probably find no occasion to argue in... formal ways. [However] the engineer needs to be able to present subjects convincingly... to carry on investigations not so much in order to convince others as to form a just opinion himself.

In turning from the study of formal forensic writing to more practical argumentation and in putting the main emphasis on the formation and expression of just... opinion, we are adapting the subject to the needs of the engineer... (p. 35)

Thus, the faculty at Tufts saw English composition as something more than a Procrustean bed to which all students must conform; rather the subject itself was malleable and capable of adaptation to the needs of a given group of students. In later pages Earle provides the rationale for specific training in technical writing:

No lawyer, dramatist, novelist, or poet would assume that because he had had a general training in composition he could become a master of his peculiar form without special study. Certainly the engineer, using a form of discourse which ... has not been carefully studied ... has no less need for special instruction. Clearly the engineering schools should give him the instruction he needs ... in writing on technical subjects. (p. 37)

Tufts fulfilled this requirement by providing an "elementary course in the principles of technical exposition ..." and "an advanced course in the writing of theses on research or construction work which the individual students have done." But Earle points out that these courses are additional rather than in lieu of regular composition classes. He saw the technical writing classes as providers of the "mental discipline" students had once received from courses in Latin.

Finally, Earle explains how the program at Tufts fulfilled the requirement of "efficiency." Some of the ideas seem quite progressive seventy-five years later. The idea that compositions must be based on areas of genuine student interest rather than assigned topics has found new life in

"writing-as-a-process" texts in recent years. Note the description of the problems facing a student in a college composition course:

For years he has labored over English until he is tired of it, and the subjects he is generally asked to write on are not themselves interesting enough to carry him through the wearisome process of composition. The instructor can do much through sympathy and personal knowledge of the students; but in addition he needs to consider two facts. ...no one can write to advantage on a subject about which he knows little ... [and] ... the knowledge that the writing [serves] no real purpose is enough to wilt the nascent determination of any but those who have a natural talent for writing.

Obviously if we would increase the efficiency of the work we must cease to require students to do what we would revolt at doing ourselves. (p. 41)

Earle points out that many opportunities for writing are present in technical classes and that using such assignments for practice in composition helps instructors as well as students. "To give the students a few hours per week of artificial drill in the use of the language in his 'English' class, and neglect the real practice ... they get the rest of the time is certainly poor economy." (p. 45). The concept of finding assignments in technical classes is at the leading edge of composition teaching today; we can only wonder what happened in the intervening seventy-eight years. Of great interest is the fact that, according to Earle, all the texts for these courses were written at Tufts. So at least one school was "writing across the curriculum" in the early 1900's.

A useful way to begin the discussion of Earle's text is to determine the author's reason for writing the text. We have just seen that The Theory and Practice was created for a particular course at Tufts; therefore, Earle was not writing an abstract work for an imagined audience--rather, this text was based on classroom experience. Earle points out in the Preface that good engineering writing is difficult, yet engineers who must write have nowhere to turn for proper training as writers. He then provides a summation of the texts available to technical writers in 1911:

Of late a few schools have introduced tentative courses in technical writing, and a number of text-books are being put upon the market. So far the efforts have resulted mainly in publications of three sorts: (1) specimens of technical writings, which show the finished product but do not indicate to the bewildered writer how he may produce the best results; (2) dissertations on correct English together with notes for the guidance of authors in the submission of manuscripts to publishers ...; (3) treatises on technical writing addressed, with a certain condescension, to engineers, but in reality based on a study of literary exposition. No one of these would seem to get down to underlying principles or to deal with technical writing in a way which is general, yet definite and detailed enough to serve as a practical guide for the engineer.

S.C. Earle, p. vi

Into that void Earle introduces his text, which considers the "underlying principles" as well as the more practical aspects of technical writing. The accuracy of Earle's assessment of which principles were most important can be seen in the texts used today. The basic concepts Earle

discusses in his text are the same basic concepts discussed in texts by Houp and Pearsall, Mills and Walter, and other "definitive" present-day technical writing texts. The clearest evidence of continuity from Earle to the modern texts is the fact that both use the modes of discourse as the basis for teaching technical writing. Also indicative of that continuity is the concept of audience analysis and adaptation. Finally, Earle introduced the use of real-world examples to illustrate the forms of technical writing.

The table of contents gives no real clue that Theory and Practice is a text on technical writing. Earle divided his book into two large sections: (1) A Study of the Principles of Logical Structure, and (2) Practical Application of Principles. Just as Rickard's handbook reflects the prescriptive format of nineteenth century grammar texts, Earle's book bears a close relationship to the rhetoric and composition texts of the same period. Those rhetoric texts are also organized around the idea that training in logical thought is an essential part of writing instruction. The antecedents of Earle's text are clearly recognizable in the late nineteenth century texts of Genung and Barrett Wendell. Even the chapter headings in Theory and Practice could be taken from a "standard" rhetoric text of the period.

Let us first consider Earle's approach to the concept of audience analysis and adaptation. Earle devotes one chapter each to the problems involved in writing for general readers or for specialists. The philosophy espoused is a refinement of the concept of "economy" expressed in Herbert Spencer's Philosophy of Style. Spencer first gave voice to the idea that the writer should "conserve the mental energy" of the reader. That early form of audience awareness was adopted by many composition texts in the last quarter of the nineteenth century. Before I discuss Earle's adaptation of this idea of economy, however, I will consider his application of the principles of rhetoric to technical writing.

The table of contents sets the stage for a discussion of rhetorical forms and principles: included are chapters on Analysis by Means of Synopses, Descriptive Exposition, Narrative Exposition, Directions, and the Essentials of Logical Structure. Earle begins his text by defining the "rhetorical forms": description, narration, exposition, directions, argument, and criticism. His application of these forms to technical writing has been used ever since (cf. Houp and Pearsall, Mills and Walter). Earle illustrated the rhetorical forms as applied to technical writing by presenting a hypothetical visit of an engineer to Panama. In the discussion of this trip, he shows how

the engineer might call upon each rhetorical form to detail some aspect of his trip:

He may undertake to tell his correspondent something of the country as he sees it: in that case the form of writing is called description. He may relate his experiences getting to Panama and traveling about in the Canal Zone: in that case the form of writing is called narration. He may explain the geological structure of the Isthmus or the method of carrying on the excavating: in either of these cases he would be writing exposition. He might tell a correspondent who intends to visit the best way to reach the Zone: in that case he would be writing directions. He might give in some detail his opinion of what another had written about the country: that would be criticism. In the last place he might attempt to convince his reader that the lock canal is after all the best form for Panama: in that case he would be writing argument. (Earle, p. 3)

Having illustrated each form of composition, Earle provides chapters discussing description, exposition, and directions. An appendix provides sample articles illustrating each type of writing. In the chapter on exposition, Earle concerns himself particularly with the exposition of processes. This emphasis on description, exposition, and directions occurs consistently in technical writing texts up to the present day. The technique of illustrating a given type of writing with a "real world" example is also commonly used in modern texts.

I have already noted that Rickard considered the idea of audience analysis and adaptation; Earle also provides a rudimentary treatment of the subject. However, his text refutes the idea that technical writing is only for

technicians; he provides an entire chapter devoted to the general reader. Within that chapter, Earle defines three special problems facing an engineer addressing a general reader: he must make himself clear, he must make the subject interesting to the audience, and he must be convincing (pp. 139-40). Earle then devotes twenty pages to these problems and their solution. Included in the discussion are notes on completeness versus over-elaboration, clarity versus interesting writing, appealing to the reader's self-interest, and so on. Earle follows with a chapter on the methods that should be used when the writer wishes to address a specialist. Among the points to remember when addressing specialists, Earle includes use of the special language of the particular profession and avoidance of "flights of the imagination"; otherwise, the problems are similar to those of addressing general readers. Although Earle's division of the audience into the general public versus specialists is somewhat simple by today's standards, it is a very important step toward the current concept of technical writing.

While the most obvious evidence of Earle's impact on technical writing is his textbook, he was also an important figure in the educational establishment of the early twentieth century. As chairman of the SPEE Committee on English, Earle exerted tremendous influence on the direction of engineering education. His ideas were well-

known to leading professors of engineering; his leadership provided a focal point for discussion of English in the engineering curriculum. His stature during the early part of this century is made clear by the obituary quoted previously. The importance of the SPEE can be seen from a brief comparison of the membership list and the names of authors of early technical writing texts. At least eight members of the Society authored textbooks during the 1920's and 1930's. They include Frank Aydelotte, Sada Harbarger, Thomas Agg, and W.O. Sypherd. The meetings and publications of the Society gave all of these people a chance to discuss ideas and develop their particular views on technical writing.

Conclusion

The textbooks by T.A. Rickard and S.C. Earle exerted a powerful influence on the direction of technical writing instruction. As we will see in Chapter V, one has to look no further than current texts to see the evidence of that influence. Rickard's handbook approach is most often seen in the various style guides sold to practicing engineers and scientists or produced in-house by scientific enterprises. Earle's discussion of the various types of writing (description, narration, and exposition) is still a basic of technical writing texts used in today's classrooms. Most significant is Earle's division of the

audience into specialists versus the general public. In an expanded form, that division is a part of practically every modern technical writing textbook.

In the next chapter, I will examine some of the texts written by other members of the SPEE, as well as non-SPEE texts, from the 1920's and 1930's. This study of early texts will provide a broader picture of technical writing instruction in its beginning. Moreover, the analysis of these texts will provide evidence about the existence of a mainstream of technical writing texts and whether such a mainstream began with S.C. Earle.

CHAPTER IV

TECHNICAL WRITING TEXTS 1917-1940

Although the SPEE made a concerted effort to improve engineering English, the technical writing texts produced by individual Society members were by no means uniform. Nor were SPEE members the only authors of technical writing texts during the early twentieth century. The texts produced from 1917-1940 took a number of approaches to the teaching of technical writing. While the discussion of Rickard and Earle in Chapter III shows the two earliest approaches, the texts discussed here are also significant. The Preparation of Reports by Ray P. Baker, first published in 1924, remained in print until 1953--a clear indication of its success and importance. This chapter discusses that text as well as the following:

Watt, Homer A. and Philip McDonald. Composition of Technical Papers, 1917.

Aydelotte, Frank. English and Engineering, 1917.

Trelease, Samuel and Emma Yule. Preparation of Scientific and Technical Papers, 1925.

Park, Clyde. English Applied in Technical Writing, 1926.

Gaum, Carl and Harold Graves. Report Writing, 1929.

Naether, Carl and George Richardson. A Course in English for Engineers, vol. 1, 1930.

Sypherd, W. O., A. M. Fountain, and Sharon Brown. The Engineer's Manual of English, 1933.

Agg Thomas and Walter Foster. The Preparation of Engineering Reports, 1935.

Harbarger, Sada. English for Students in Applied Sciences, 1938.

Nelson, J. Raleigh. Writing the Technical Report, 1940.

Howell, Almonte. A Handbook of English in Engineering Usage, 1940.

Obviously, this is not a complete list of the technical writing texts published between the World Wars. However, the list is representative. Seven of the books were written by members of the SPEE; a number of these texts enjoyed remarkable longevity, surviving well past the Second World War. By examining these texts we can gain a broader understanding of technical writing instruction from 1917 to 1940. Such an examination will also reveal any trends in the approach to technical writing instruction. If such trends do exist, we can see whether a particular approach begins to predominate. That is, we can see whether a mainstream of technical writing texts really exists. This chapter begins with a discussion of seven texts written by members of the SPEE. The second section provides analysis of five texts written by non-SPEE members. A standard framework will be valuable for an examination of so many texts; therefore I will use the following format:

- 1) A brief description of the author's background, plus a publishing history of the text.

- 2) The "philosophy" set forth in prefatory material.
- 3) Analysis of Table of Contents.
- 4) My conclusions about how each text relates to the others.

This uniform approach will help reveal any common threads in the technical writing textbooks of 1917-1940.

Society Members Address the Problem
of Technical Writing Instruction

The first SPEE member to write a technical writing text was, of course, S.C. Earle. However, he was not alone--by 1940, at least seven other Society members had also produced technical writing books of one sort or another. They are:

Watt, Homer A. and Philip McDonald. Composition of Technical Papers, 1917.

Aydelotte, Frank. English and Engineering, 1917.

Park, Clyde. English Applied in Technical Writing, 1926.

Sypherd, W. O., A. M. Fountain, and Sharon Brown. The Engineer's Manual of English, 1933.

Agg, Thomas and Walter Foster. The Preparation of Engineering Reports, 1935.

Harbarger, Sada. English for Students in Applied Sciences, 1938.

Nelson, J. Raleigh. Writing the Technical Report, 1940.

Homer Watt and Philip McDonald--1917

Watt, the principal author, was an English teacher at the University of Wisconsin and then at New York University. The book was the result of Watt's experience at Wisconsin and was intended for use in a one-semester upper division course (Watt, p. vii). A second edition of the text (quoted here) was published in 1925.

Philosophy. The authors state that engineering English instruction to 1917 has followed two directions: a "liberal" approach and a "narrow" approach (Watt, pp. vi-vii). The liberal approach teaches essentially the same sort of composition to engineers and to liberal arts majors. The narrow approach is intended to teach engineers how to write professional reports and papers. However, the two approaches are not (and should not be) mutually exclusive. The best plan is to teach a standard freshman course to all students plus a specialized composition class for upper division engineering students. Finally, the authors cite Frank Aydelotte's English and Engineering as an example of a "liberal" text, while their own represents the "narrow" sort.

Table of Contents. Although the authors present this text as an example of a specialized approach to technical writing, the first 160 pages are devoted to "General Principles of Expository Writing." This first section was probably intended as a refresher for students several years

away from freshman composition. Part One includes chapters on the reader's point of view; unity, coherence, and proportion; the sentence; and the paragraph. Beyond the brief treatment of audience analysis in Chapter Two, there is nothing remarkable in the first part of the text.

Part Two, entitled "Types of Technical Exposition", bears a strong resemblance to S.C. Earle's 1911 work. The authors provide chapters on description, exposition of processes, and exposition of ideas. Additionally, there are chapters on engineering reports and business correspondence. Just as Earle did, Watt and McDonald provide professional examples of each type of engineering writing.

Conclusions. While the Watt and McDonald text is similar to S. C. Earle's, it also shows an evolution of the basic ideas. Still prominent are the types of expository writing (in this case, Description, Exposition of Processes, and Exposition of Ideas). The concept of audience analysis and adaptation has achieved a greater prominence, being granted a separate chapter in the section on fundamental principles. The chapters on correspondence and engineering reports will also become familiar fixtures in later technical writing texts. Overall, this seems to be a transitional work.

Frank Aydelotte--1917

Aydelotte was a professor of English at MIT and served on the SPEE English Committee. He wrote a number of articles on the importance of good engineering English and was prominent throughout the English Committee's early period. The 1917 imprint discussed here was the only edition of the text.

Philosophy. According to Aydelotte, the essential object of instruction in composition is the teaching of clear thinking. In his Introduction, he says, "There is no profitable treatment of words that is not also a treatment of ideas" (p. xi). Aydelotte considers literature to be the best means of teaching clear thinking and thus, clear expression. He says, in part:

...the ideas with which the engineering student and his English teacher can most profitably deal are those embodied not in his technical engineering subjects but in literature, once the connection between engineering and literature is made clear.
(Aydelotte, p. ix)

On the following page of the Introduction, the author makes clear his philosophy of English for engineers:

This book is accordingly built on the theory that the function of English in technical education is two-fold: in the first place to train students to express themselves in writing and speaking, not merely grammatically, but with order, force, sincerity, and such charm as their natures will allow; in the second, to furnish something of the liberal, humanizing, and broadening element which is more and more felt to be a necessary part of an engineering education.

(Aydelotte, p.xii)

Throughout the Introduction, the author returns to the theme of the engineer as a member of the human community. His text reflects the belief that engineers should be leaders of society; that, as men of ideas, they must use those ideas to further the advance of all men.

Table of Contents. The text consists of six sections: Writing and Thinking, the Engineering Profession, Aims of Engineering Education, Pure Science and Applied, Science and Literature, and Literature and Life. Included in these sections are literary essays on the given topic. They include material from Ruskin, Carlyle, Emerson, Wordsworth, and other such authors. The thrust of the text is as much to teach about the engineering profession as about writing in the profession. Aydelotte was interested in teaching a set of values rather than a set of specifications.

Conclusions. Instead of teaching a mechanical course, laden with types and forms of reports, Aydelotte sought to provide a "liberal" view of engineering education. His belief was that any educated man must also be a cultured man, whether he is an engineer or an English teacher. The philosophy behind this text is familiar: one must train a student to think before that student can be taught to write. Although this book does not fit into the concept of a mainstream, it does provide an interesting guidepost to the battle between the "liberal" and "vocational" camps in technical education.

Clyde Park--1926

Clyde Park served on the SPEE English Committee and authored a number of articles on engineering English, including an analysis of one of the SPEE surveys discussed in Chapter II. He was teaching English at the University of Cincinnati when English Applied in Technical Writing was published. A second edition appeared in 1927, followed by a third in 1932, and a fourth in 1946.

Philosophy. Park's attitude toward technical writing is that "English is English." That is, there is no need to teach a particular type of composition to technical students; rather, a good general grounding in composition will lead to good professional writing. In this way, Park's philosophy is similar to Aydelotte's--train writers in the basics of good composition, and they can apply the lesson to any field. In Park's view, the basics are clarity, correctness, critical taste, and cultural background (p. vii). The one concession made to the idea of specialized technical writing practice is that technical students should be assigned compositions tied to their technical courses (p. xvi). In Park's preface we find the clearest evidence of communication among members of the SPEE: on page x, Park acknowledges Sada Harbarger's "...suggestions regarding the plan of treatment"; on page xv he notes Earle's views on English as an interdepartmental subject.

Table of Contents. The best way to place this book in context is simply to list the chapter headings and then analyze one or two of those chapters in more detail. Park divides his work into the following categories:

The Point of View	Good Mechanical Form
Logical Organization of Material	Clear Statement of Ideas
Logical Grouping or Development of Statements	Accurate Use of Words
Appropriate Style	Revision of Manuscripts
Types of Written Work	The Use of the Library
The Technical Writer's Literary Background	Suggested Exercises

First, it should be noted that the chapter on Point of View refers to the approach taken by this text rather than the application of point of view to a composition. Except for the chapter on literary background, none of these headings give any clue that this is a technical writing text. Again, we see the idea of simply applying the precepts of correct composition to a new type of composition. Given Park's expressed attitude that "English is English," the similarity to a standard composition text is not surprising. The content of several chapters provides clearer indications of Park's approach to technical writing.

Two later chapters in the text are worth mentioning "Types of Written Work" and "The Use of the Library." In the chapter on types of composition, we see some movement away from the rhetorical forms. Instead, Park concentrates on specific types of reports, such as lab reports, progress reports, inspection reports, and so forth. This discussion includes examples of each type of report, just as do many current texts. Also of interest is a footnote on p. 206 in which Park refers readers to Baker's Preparation of Reports and Harbarger's English for Engineers. The interesting point about the chapter on the library is that Park is talking about a school or public library rather than a personal library. Here we see the growth of the body of knowledge required for technical students from 1911 to 1925. That rapid expansion was, of course, a major factor in the growth of technical writing education.

The most interesting chapter in this text has the simple title--"Appropriate Style." On the surface, such a chapter would seem to have little to concern the modern technical writer. Such a first impression would be wrong, however. To quote directly from Park:

We may recognize degrees of style within the same general class; for example, 'technical style,' which is written by and for specialists; 'semi-technical style,' which is addressed to educated persons who are without expert knowledge of the subject; and 'non-technical,' or 'popular scientific style,' which is intended to interest the general reader by translating the facts of science into terms of his limited experience. pp.146-7.

First, note the refinement of Earle's idea of two broad classes of readers; we are no longer simply talking about specialized versus general readers. More important is how closely this division parallels Houp & Pearsall's discussion of lay people, executives, technicians, and experts (p. 21). Note that Park's text was written in 1926, while the Houp & Pearsall citation is from the 1984 edition. Clearly, the modern theory of audience analysis dates back at least 60 years. Park summarizes the writer's task thus:

The natural and obvious thing for [the writer] to do is to think of his subject, his readers, and his purpose, and to shape his language accordingly.
p. 147

There, in a single sentence, is the essence of technical writing theory: audience, subject, and purpose.

Conclusions. Through the early 1960's English Applied in Technical Writing provides a bridge between the first technical writing textbooks and those of today. The ideas expressed by Earle and others have been expanded, especially in the area of audience analysis. This text also serves as a bridge between the purely literary texts (such as Aydelotte) and more "vocational" texts (such as Rickard). Park confirms the idea that good writing is a product of clear, logical thinking and that composition courses should include familiarity with literature. However, he also acknowledges the need for special training for a special type of writing. We can see that English

Applied in Technical Writing as the next step in the evolution of technical writing instruction. Moreover, we see evidence of the important role the SPEE played in that evolution.

Sypherd, Fountain, and Brown--1933

William O. Sypherd and Sharon Brown were at the University of Delaware when the first edition of The Engineer's Manual of English was published. A. M. Fountain of North Carolina State University joined Sypherd on the 1943 edition. A complete revision, entitled The Manual of Technical Writing was published in 1957.

Philosophy. In the Preface to the 1933 edition, Sypherd explains the two purposes of his textbook: (1) a textbook for college engineering students (2) a reference book for practicing engineers (Sypherd, p. vii). I have already shown that technical writing texts from the 1920's began to move away from training in rhetoric. In the Sypherd text, we find the first direct mention of that change:

[This manual] aims less to teach the principles of formal rhetoric, already available in a sufficient number of textbooks, than to show the actual application of those principles to the problems of the engineer-writer. (p. vii)

Thus, this text is, as the title suggests, a manual of

composition for engineers. Although the author was a member of SPEE, the antecedents of this text are closer to Rickard than to Earle.

Table of Contents. The text itself consists of eight chapters and four appendices, plus a number of "samples" exemplifying each type of composition. The first chapter is devoted to general problems of engineering writing--one of those general problems is of particular interest. The second section of Chapter One is called "Adaptation to Reader." Sypherd's text finally removes the discussion of audience analysis and adaptation from the realm of "style." In the preceding section, Objectivity in Technical Writing, Sypherd explains why the engineer must adapt to the reader:

The engineer is becoming more and more conscious of his social responsibility. He is no longer the recluse of the laboratory He is constantly called upon to explain his work to audiences and readers with widely varied training in the sciences. (p. 2)

In the section on adaptation, Sypherd explains the way the writer must approach audience analysis:

Inherent ... is the realization that the reader is not only another person, but also a particular kind of person, with definite limits of technical knowledge, experience, and interest.

The technical writer, then, must fit his writings to the reader. (pp. 3-4)

The author then turns to a discussion of the types of readers an engineer will encounter, providing brief illustrations of adaptation to each audience. The three

possible audiences defined by Sypherd are: technical, non-technical, and intermediate (p. 4). While Sypherd doesn't add anything new to the concept of audience adaptation, the fact that he isolates and illustrates the technique is extremely significant. Also significant is the fact that Sypherd puts his discussion of audience into the chapter on basic problems. That placement indicates that audience adaptation is not a mere sidelight, but rather a necessary part of good writing.

The other seven chapters cover generally familiar territory: elements of the composition, mechanics, correspondence, reports, writing for journals, writing bulletins, and the development of specifications.

Conclusions. The Engineer's Manual of Technical Writing is a further development of the handbook approach introduced by Rickard. Although the text does not add to the idea of a mainstream descended from Earle, it does provide valuable information on the growing importance of audience analysis and adaptation. It should also be noted that such handbooks occupy a significant place in the body of technical writing literature. Even today, many texts on "business writing" or "scientific writing" are handbooks for professionals rather than classrooms texts for students.

Thomas Agg and Walter Foster--1935

The authors of The Preparation of Engineering Reports were on the faculty at Iowa State University; Foster taught classes on report writing there. An interesting historical note is found on page vi of the text; Walter Paul Jones of the Iowa State English Department reviewed the manuscript. In 1946, Jones authored the very successful Writing Scientific Papers and Reports, which went through an eighth edition in 1981. Again we see authors of separate technical writing texts working together to develop ideas and approaches to the subject.

Philosophy. The first two paragraphs of the Preface clearly detail the authors' expressed intent for this text. The text was designed to serve as a classroom text for an upper-level writing course and as a desk reference for practicing engineers. The subject matter is restricted to the form, style, and elements of reports. The authors assume that the readers of this text have already had introductory composition courses (Agg & Foster, p. v).

Table of Contents. The chapter titles bear out the authors' intention of producing a book confined to report writing. The eight chapters consider the engineering report in general, informal engineering reports, the parts of reports, data collection, style and arrangement, graphic elements, and form reports. (The last chapter refers to reports written in a standard format). The text also

includes four appendices: Suggestions on Style, Abbreviations for Technical Terms, An Outline of a Course on Reports, and a bibliography.

It is worth noting in passing that this is the first text we have examined that devotes a chapter to the graphic elements of reports or "visuals." As we will see, visual presentation of information will become an integral part of technical writing instruction. However, of even greater interest is the chapter on style and arrangement, for here we find the authors' views on audience analysis:

If [the engineer] takes some thought as to the prospective reader and tries to write in a manner suitable to the reader's mentality and education, it will do a great deal to insure that the report will actually be read. (p. 85)

The text then discusses methods used to accomodate prospective readers: clearness, interesting style, vocabulary, maintaining reader interest, careful transitions, illustrations, use of correct English, careful editing, and mechanical arrangement. In the section on vocabulary, the authors provide their list of possible audiences: engineers in the same branch of the profession, engineers in other branches, non-technical readers. Finally, they suggest that it may be useful to write a report that is suited to all possible readers. While this division of audience is rudimentary, the discussion of ways and means is quite exhaustive and more complete than any text we have yet considered.

Conclusions. The Preparation of Engineering Reports is an interesting transitional text that falls somewhere between Rickard and Watt. The coverage is that of a manual (in fact, the authors call it a manual), yet the presentation is for classroom use, as well. The text seeks to distill those parts of technical writing that deal directly with engineering reports. There is no discussion of the basic elements of composition or the principles of rhetoric; those are assumed to be a part of earlier training. If Aydelotte's text has been the most "liberal" so far, then this text is the most "vocational." This type of book continued, and in fact continues today, in the form of numerous "how to write" books aimed at various professions.

Sada Harbarger--1938

Sada Harbarger's importance in the development of technical writing cannot be overestimated. She was extremely active on the SPEE English Committee, working with S.C. Earle to design and evaluate the surveys of technical writing discussed in Chapter II. Her first textbook, English for Engineers, remained in print from 1928 to 1943. Her standing in the SPEE and her professorship at Ohio State put Harbarger in a position to exert a powerful influence on the direction of technical writing in this country.

Philosophy. The preface to Harbarger's text provides the most detailed discussion of teaching philosophy we have yet seen. The entire section is worthwhile reading if one wishes to gain insight into the state of technical writing in the late 1930's. The text was designed for use in a first-year course for applied science (engineering, agriculture, and pharmacy) students. The aim of the text is to show students how English applies to their chosen field and why good writing is essential in their professions. A brief quotation sums up Harbarger's approach to technical writing:

...all the aspects of English have been scrutinized, but only those which have a direct bearing upon proficiency in functional writing have been retained for extended development and study
All study of writing and practice are in preparation for report writing. (p. vii)

Although this textbook concerns itself with neither the mechanical nor the cultural aspects of English, the author does point out the importance of both. For practice in grammar, students are referred to a handbook; for cultural enlightenment, a reading list is provided.

Finally, one other passage from the preface shows a remarkable similarity to the avowed philosophy of some current composition texts:

The method of teaching set forth in this text is in line with the ideas of progressive education, for it offers practical writing problems which not only stress the general college objectives but also, tend to make students aware of writing situations and demands in their everyday life. Every discussion,

too, aims toward definite concrete pieces of writing in which they can achieve some definite measure of success. (p. ix)

Indeed, there is nothing new under the sun--especially in the teaching of composition.

Table of Contents. The text is divided into two main sections, "Writing Principles" and "Writing Principles Applied" followed by three appendices of suggested reading and references. The first section contains nine chapters, which discuss such subjects as collecting facts, outlining, materials, language, and the final copy. Of interest is a chapter devoted to figures and tables--discussion of such visual elements has become a staple of today's technical writing texts. The second section consists of five chapters, all devoted to various types of written work. The chapters are: Reports, Reports of Experience, Reports of Observation, The Simple Research Report, and The Make-Up for the Long Paper.

The text deals specifically with letters, reports, and examination papers. Examples of these types of writing are provided. The emphasis in the text is on clarity, completeness, and the physical aspects of the report. In her discussion of the major types of reports, Harbarger concentrates on reports of experience, laboratory reports, observation reports, and research reports. In other words, although she does not specifically mention the rhetorical forms, she is concentrating on narration, exposition of a

process, and description. As I noted in the analysis of Park, the section on using the library reflects the tremendous information explosion that began in the early part of this century.

Finally, Harbarger says surprisingly little about the concept of audience analysis. However, her summary statement is one of the best:

Technical writing is not 'broadcast' or 'to-whom-it-may-concern' writing. It is planned for a definite purpose, it is addressed to individuals with special interests and needs (p. 8).

Thus, although the text does not define types of audience, it does make clear that the writer must have a specific audience and specific purpose in mind.

Conclusions. This text has moved a great distance from the ideas of general composition. Instead, the author focuses directly on the subject of technical writing. While the importance of grammar is noted, Harbarger simply recommends a good handbook on the subject; grammar is outside the scope of her text. The coverage is very similar to the various "report-writing" texts--the emphasis is on the form of the report. Harbarger assumes the importance of narrative and description by default; there is no discussion of the rhetorical forms. Audience analysis is treated briefly, but the definition is excellent. One

interesting idea (also expressed by Park) is that student writing must have a specific purpose, rather than serve merely as practice in composition.

J. Raleigh Nelson--1940

Nelson was a professor of English at the University of Michigan. He began a course in report writing in 1915 and became the editor for the Engineering Research Department at Michigan in 1923. In that capacity, he worked on research projects and other writing tasks with faculty members as well as students. The text is largely based on that experience--helping engineers produce reports satisfactory to the companies or agencies that provided the funding. Writing the Technical Report appeared only in the 1940 edition discussed here.

Philosophy. Nelson considers designing reports the most important writing task for engineers. He also feels that writing a report is like any other assignment an engineer may take up: the report should be designed to fulfill a specific purpose. The textbook itself grew out of Nelson's experience teaching a course at Michigan. In sum, Nelson's view of reports strongly resembles Harbarger's concept of "functional writing." His "main thesis" is:

...that a report is no appropriate place for a parade of literary skill, but that it is a practical document made for use, which, like anything else made for use, must be planned to serve its purpose effectively. (Nelson, p. x)

That emphasis on a specific design for a specific purpose is an important part of technical writing instruction today.

Table of Contents. The text is divided into four parts: "The Design of the Report," "Some Suggestions as to the Form and Style of the Report," "The Criticism of the Report," and "Suggestions for Class Use." The first part is by far the longest, encompassing seventeen chapters and 140 pages. The first three chapters lay the groundwork for the rest of the text. Nelson defines reports, lists procedures for the report writer, and provides tests of progress in the writing. Of greater interest to us is Chapter Four: Three Ways to Help the Reader. Nelson states that the introduction should provide the reader with these three fundamental concepts: "the subject, the purpose, and the plan" (p. 26). So, his main princixle of audience adaptation is consonant with Harbarger: "Have a definite purpose and a definite plan before you begin to write." Once the subject, purpose, and plan have been presented, they should be kept before the reader at all times. Although this philosophy does not further the concept of audience analysis, the idea of a definite purpose is very much a part of modern technical writing.

Having presented this overview of the report as a whole, Nelson devotes the rest of the text to a discussion of specific parts of the report. There are three chapters on the introduction; six chapters discussing paragraphs and sections; and one chapter each on "tests for success," form reports, and grammar. Overall, this approach is similar to that of Park. That is, the details might relate to any form of exposition, not just technical reports.

Part Two of the text concerns details of typography and format, presentation of visual elements and tables, and other details of final appearance. Part Three is divided into a number of "clinics" designed to make the writer a better editor. Included are sections on Finding the Point of Attack, Introductions, Coherence, and so on. The last section details how the text might be used in a class on report writing.

Conclusions. In many ways this is the first text to deal largely with the theoretical aspect of reports. Most of the text is devoted to discussing reports in the abstract; relatively little space is given to a consideration of specific elements of form. The idea is that the reader, armed with an understanding of the theory of reports, can apply that theory to any report-writing task. We will see that this approach is still in use when we examine the work of Mathes and Stevenson in the next chapter.

Non-SPEE Texts

While SPEE members wrote many of the technical writing texts published between the World Wars, there were also many texts written by authors independent of the Society. This section will consist of an examination of five of these texts. Again, the analysis will attempt to determine the extent to which a unifying theme existed in early technical writing instruction.

Ray Palmer Baker--1924

Ray P. Baker is one of the most important figures in the history of technical writing instruction. His text, The Preparation of Reports, was one of the most successful ever written. Editions of the book appeared in 1924, 1933, 1938, 1940, and 1953. That success has led at least one writer to the mistaken assumption that Baker's was the first technical writing textbook (Schmelzer, 1977). While that honor may be incorrect, it would not be far wrong to call this the first "successful" technical writing textbook. Baker was head of the English Department at Rensselaer Polytechnic Institute. The text was a result of his classes in report writing. The 1938 edition, examined here, was co-authored by Almonte Howell of the University of North Carolina. Howell later wrote a text himself; it is examined later in this chapter.

Philosophy. In his Preface, Baker notes that reports are a cornerstone of most engineering, scientific, financial, and administrative work. The report must inform a decision-maker who may be unable to study the problem firsthand. Thus, any technical student should be trained in writing of effective reports (Baker, p. v). The author also makes an interesting point about the structure of reports:

The experience of specialists in various fields has led to substantial agreement regarding the structural aspects of reports. (Baker, p. vi)

That simple statement means that formal standards for technical reports existed as early as 1924. However, these standards were apparently understood rather than written, for Baker then says, "These features, [structural aspects of reports] however, have never been treated comprehensively" (Baker, p. vi). The text is intended to provide such a treatment.

Baker next considers how to address the particular problems of student report writers. The text provides sample reports which the students can analyze to see how the material reported affects the structure. They may then "...prepare a series of reports upon topics which fall within the range of their experience" (Baker, p. vi). Therefore, students are briefly shown the theory of reports next shown that theory put to use in real-world examples, and, finally, required to demonstrate their knowledge by

writing reports on familiar subjects. This method of teaching report writing is still used today; little wonder that Schmelzer saw this as the first technical writing textbook.

Table of Contents. Perhaps an appropriate one word summary of this text would be "functional." Baker provides a minimum of theoretical material before moving straight into a discussion of the formal elements of reports. Three introductory chapters detail the history, elements, and characteristics of reports. The fourth chapter defines the types of reports covered in the text. The four types considered are: Information, Examination, Recommendation, and Research reports. Sixteen of the remaining eighteen chapters are devoted to these four report types. There is a single "theoretical" chapter discussing the use of statistics in reports and a final chapter covering manuscript preparation. Thus, the bulk of the text is devoted to the characteristics and functions of these four report types. The chapters on reports are illustrated by "real world" examples, a practice followed by modern textbooks, as well.

Conclusions. The extreme functionality of Baker's text was the primary reason for its success. This single volume was more than a theoretical, classroom textbook--it was a handbook that could be used beyond the university. Yet it provided more than the other handbooks that were available. The emphasis here was on writing a report to

meet a specific need rather than on grammar, punctuation, and spelling. This direct approach is used by textbooks today, often causing the protest that technical writing course are "too vocational" for a university student. Nevertheless, just such a vocational book is the most successful technical writing text of all time. (In this case, the success of the text can be seen from the number of editions and the widespread use of the text).

Trelease and Yule--1925

When The Preparation of Scientific and Technical Papers was first written, both authors were in at the University of the Philippines. At the time the first edition was published, Trelease had moved to Louisville. Trelease was a professor of plant physiology; Yule, a professor of English. The text went through new editions in 1927 and 1936. In 1947 and 1951, a re-titled version was published; in 1958 and 1969, the text appeared under a third title. That longevity is one indication of the significance of this text; also, this is an excellent example of the handbook approach to technical writing.

Philosophy. This book was written in response to a need at the University of the Philippines. Originally, it was a set of mimeographed pages given to graduate students in the College of Agriculture (Trelease, p. 7). Thus, it was intended as a style guide for someone with a specific

writing task before them. There is no attempt to discuss rhetoric or grammar; the authors feel that those subjects are adequately covered in other texts (Trelease, p. 8). The main purpose of the text was as an aid in preparation of theses and dissertations; it could also be used to help someone writing a scientific article or report.

Table of Contents. The text deals exhaustively with the preparation of manuscripts--included are sections on every possible stylistic element of a paper. Trelease considers the use of capital letters, the choice of type-faces, use of numbers, italics, and so forth. However, the text makes no attempt to discuss the process of composition. There is no consideration of description, exposition, or narrative. This is strictly a style guide for someone with a writing task at hand.

Conclusions. This small book by Trelease and Yule is an example of the handbook approach to technical writing instruction. Moreover, this is a remarkably successful handbook, with a publishing history spanning 44 years. The importance of this book in the overall picture is the fact that not all early technical writing books were intended for classroom use. That does not lessen the significance of this particular book. Throughout the history of technical writing instruction, there has been a market for handbooks or style guides--The Preparation of Scientific and Technical Papers is one of the best.

Gaum and Graves--1929

Both authors of Report Writing were professors at Penn State University. Carl Gaum was a mechanical engineer and professor in the engineering extension program; Harold Graves was a professor of English composition. The first edition of their text went through five printings up to 1942, appeared in a second edition in 1943, a third in 1950, and a fourth in 1965.

Philosophy. According to the Preface, the text is intended to apply the principles of rhetoric and composition to reports (p. iii). The authors also point out the importance of audience awareness, clarity, and the ability to select and organize material (p. iii). Above all, the text is intended for use in an introductory course in business or technical writing. In general, the approach is very basic--an attempt to provide the fundamentals for a course in report writing.

Table of Contents. The text is divided into two sections: Part One deals with the actual principles and concepts of composition, letters, and report writing; Part Two consists of real-world examples of each type of report covered in Part One. This arrangement follows the example of S.C. Earle and especially of R.P. Baker.

Part One, Elements of Report-Writing, is divided into nine chapters. The first chapter provides modern and historical contexts for report writing; the second

describes the relationship between reports and letters. Chapters Three through Five deal with the basics: forms of composition, style, and manuscript preparation. The last chapters of the section are devoted to specific report types: Periodic, Progress, Examination, and Recommendation reports. Of particular interest are Chapters Three and Four, dealing with the basic forms of composition and matters of style. The treatment of the basic forms of composition is very similar to the discussion in Earle's text. The forms isolated for study are: the summary, the definition, descriptive exposition, narrative exposition, exposition of facts and ideas, and argument (p. 47). With the exception of the summary, those are exactly the forms emphasized by Earle.

Chapter Four, "Some Matters of Style," contains information on audience analysis and adaptation. In Chapter One, the authors provided their classification of possible audiences for reports: executives, laymen, and specialists (pp. 4-5). That classification is very similar to the one used by Houp and Pearsall, as well as other "modern era" texts. The addition of the executive or decision-maker is an interesting example of the evolution of technical writing instruction. With that addition, we can see that the concept of technical writing has moved a long way from the earlier idea of one specialist writing

only for other specialists. By 1929, there is a recognition that reports are used for more than the dissemination of technical information.

As for adaptation to the reader, Gaum and Graves feel that the writer must consider these questions about the reader:

What are his education, training, and experience?
How much information does he have on this subject?
What information does he want?
Has he indicated any prejudices?
Has he shown any preference for reports in a particular form or style?

Gaum and Graves, (pp. 91-92)

The idea of asking specific questions about each potential reader is a fundamental principle of current technical writing instruction. The evolution of audience analysis and adaptation is of great interest because that concept is central to modern technical writing theory. From this text, we can see that technical writing instruction has moved from simple classification of possible audiences to the idea of fitting a report to a particular individual.

Conclusions. Gaum and Graves' Report Writing serves as a bridge between the extremely functional text of R.P. Baker and the rhetoric-based text of S.C. Earle. There can be no question that the authors were strongly influenced by Baker; practically every chapter lists The Preparation of Reports in the notes. However, the discussion and use of the rhetorical forms clearly recalls the treatment of

technical writing in Earle's text. Yet Report Writing has still greater impact than a mere continuation of established concepts. Gaum and Graves added an important principle to technical writing instruction--the idea that each individual reader must be considered as a separate audience and the writing must be tailored to that individual.

Naether and Richardson--1930

The first volume of this two-volume set, A Course in English for Engineers, was written by George Richardson, a professor of English at the Universities of Texas and Missouri. Carl Naether, a professor of English at the University of Southern California, wrote the second volume. Volume One is concerned with the general principles of writing and speaking; Volume Two deals with specific problems of business and technical writing. The two-volume approach was used because a number of schools provided introductory and advanced courses in technical writing (Naether, p. x). (Volume Two was not available; therefore this discussion involves Volume One only.)

Philosophy. The text was designed with the idea that technical writing instruction needed some sort of standardization. The authors want to make English courses more useful and interesting for engineering students by

presenting material adapted specifically to engineering. However, the text is also intended for use by professional engineers who want to improve their writing skills.

Table of Contents. The text is divided into the familiar two part format. Part One contains the discussion of the principles of composition; Part Two, an Appendix, covers the formal elements of compositions (sentences, paragraphs, and so forth). Our main interest is in the first section of the text.

The nine chapters of this text are almost indistinguishable from a standard composition text.

Richardson examines the following:

- Types of Discourse
- Essential Qualities of Good Speaking and Writing
- Exposition: Desirable Charactersitics
- Exposition: Kinds, Gathering, Selecting, and
Organizing Material
- Exposition: Development
- Reasoning
- Argument
- Descriptive Forms of Composition
- Narrative Forms of Composition

As becomes clear from the text within each chapter, this book is intended for a basic course in English composition. The only distinguishing feature is that the examples used are from engineering. Otherwise, the discussion of rhetoric might just as easily appear in any composition text of the late nineteenth or early twentieth century.

Conclusions. Although at first glance this text may seem to have no place in a discussion of technical writing texts, it is important to remember that there were many approaches to the question of how to make engineers better writers. It is also important to recall that this is the first volume of a two-part series. Finally, let us remember that throughout the history of technical writing instruction there have been two camps: the "liberal" and the "narrow." Just as the text by Baker is an example of the "narrow" school of thought, this text is an example of the "liberal" school.

Almonte Howell--1940

Almonte Howell was a professor of English at the University of North Carolina when this text first appeared in 1930. A second edition of A Handbook of English in Engineering Usage (discussed here) appeared in 1940.

Besides his work on this text, Howell worked with R.P. Baker on the 1938 edition of The Preparation of Reports.

Philosophy. The first sentence of Howell's Preface makes his attitude clear:

It is time to face squarely the fact that for the majority of engineers English is primarily a tool for advancement in their vocation. (Howell, p. v)

To meet that need, Howell wrote a handbook that could be used in a classroom or as a desk reference. Clearly, this text is of the "narrow" or "vocational" sort.

Table of Contents. The chapter headings confirm the belief that this is another example of the handbook approach to technical writing instruction. Included are chapters on the word, the sentence, the paragraph, punctuation, grammar, and business letters. There is no material requiring more extensive analysis within the text.

Conclusions. Almonte Howell's text, widely used in industry and in technical schools, is another example of a technical writing handbook. As we have already seen, handbooks have a long history within the field of technical writing instruction. Handbooks are still extensively used today.

Conclusions

This chapter has examined a large number of technical writing texts in an attempt to discover whether a mainstream of technical writing instruction existed from 1917 to 1940. The results of that examination show that there are, in fact, four distinct classes of technical writing texts. I have separated the fourteen texts discussed in Chapters III and IV into four categories: handbooks, "liberal" texts, rhetorically based texts, and theoretical texts. The categories of texts, plus a brief description of the salient characteristics of each category, are given below.

Categories of Technical Writing Texts 1908-1940.

<u>HANDBOOKS</u>	<u>LIBERAL</u>	<u>RHETORICAL</u>	<u>THEORETICAL</u>
Rickard- 1908	Aydelotte- 1917	Earle- 1911	Nelson-1940
Trelease- 1925		Watt- 1917	
Sypherd- 1933	Park ----->	Park- 1926	
Howell- 1940	Naether- 1930	Baker- 1924	
		Gaum- 1929	
		Agg- 1935	
		Harbarger- 1938	

Technical writing texts based on the rhetorical forms predominated during this period. Also prominent were technical writing manuals or handbooks. Notice that liberal and rhetorical texts were sometimes closely related, as evidenced by Park's inclusion in both categories.

Handbooks are the easiest to recognize. They deal with formal elements of technical composition, such as words, sentences, and paragraphs. Grammar and usage are the major topics discussed. They contain no material on the theory of technical writing.

Liberal texts are those which attempt to exert a "humanizing" influence on the technical student. The writers of these texts believe that no one should receive a college degree without exposure to literature and the fine arts. These texts are based on the theory that clear thinking is a prerequisite to clear writing, and that the composition class should teach both. This goal is attained

by exposure to great literary works, the implication being that analysis of the classics will lead to better writing by the student.

Rhetorical texts begin by considering the modes of discourse. These rhetorical forms are then applied to the tasks of the technical writer. The forms most often discussed are description, definition, exposition, and narration. Some texts also include argumentation and criticism. Most of these books provide some guidelines for analyzing and adapting to the audience. Another key feature of these texts is the use of "real-world" examples of technical writing to illustrate the theoretical material.

There is only one theoretical text, Nelson's Writing the Technical Report. I consider this text to be separate from the rhetorical texts because Nelson is much more concerned with the design of reports. His text sets forth ideas for creating specific reports to meet specific needs. In contrast, most of the rhetorical texts provide ready-made forms to be used for specific writing tasks.

Of the fourteen texts examined, seven use the rhetorical or modes of discourse approach to teach technical writing. As we will see in the following chapter, that approach is still widely used. These texts, then, do form a mainstream of technical writing instruction.

However, the success of handbooks and the other types of texts demonstrates that "variant" branches of that mainstream also exist. Another important factor in the growth of technical writing instruction was the SPEE. The texts produced by members of the Society show that there was constant discussion of technical writing instruction. Even texts written by non-SPEE authors often cite various SPEE texts.

CHAPTER V

INTO THE MODERN ERA

In Chapter IV, we saw the rapid expansion of technical writing instruction, evidenced by the many texts available. Also evident was the development of a "mainstream" of technical writing textbooks. The major factor these texts have in common is their use of the modes of discourse to teach technical writing. The question posed in this final chapter is whether that mainstream has continued into the modern era, i.e. the texts in use during the late 1970's and early 1980's. To answer the question, I will examine seven well-known modern texts for evidence of the pattern noted previously.

The seven texts examined in this chapter are:

Jones, W. Paul. Writing Scientific Papers and Reports, 1946.

Mills, Gordon and John Walter. Technical Writing, 1954.

Ulman, Joseph and Jay Gould. Technical Reporting, 1959.

Tichy, H.J. Effective Writing: For Engineers, Managers, Scientists, 1966.

Houp, Kenneth and Thomas Pearsall. Reporting Technical Information, 1968.

Mathes, J.C. and Dwight Stevenson. Designing Technical Reports, 1976.

Fear, David. Technical Communication, 1977.

I selected these texts because they provide continuity from

the 1940's to the early 1980's. (Although none of the first editions appeared in the 1980's, later editions of these texts continued into that decade.) In some cases, I will discuss an edition other than the first. The texts are analyzed using an abbreviated form of the system in Chapter IV. The main object of the discussion is to determine if the mainstream of texts noted earlier is still discernable.

W. Paul Jones--1946

Writing Scientific Papers and Reports first appeared in 1946. As of 1990, it had gone through eight editions. The sixth edition (analyzed here) was published in 1971. At that time, Jones was at Iowa State University. His book was planned to take upper-level students beyond the training received in freshman composition.

The intention is ... to confront students with a number of simple problems in scientific exposition and give them instruction and practice in organizing ideas and communicating them to the reader.

(Jones, p.v)

Table of Contents. The text is divided into four sections: Background; Scientific Papers; Proposals and Reports; and Style, Sentence Structure, and Diction. We are primarily concerned with the second section. Here we see the familiar classes of scientific or technical writing--definition, classification, analysis, comparison, and description. The section on description includes

mechanisms, processes, and directions. An interesting addition is the proposal, a form that came to prominence during the Second World War.

Conclusions. Clearly, this is a mainstream text. Jones uses the modes of discourse (even if the term is not used) to begin his discussion of technical writing. However, one characteristic of the mainstream is oddly lacking: Jones has no discussion of audience analysis. In that way, this text resembles Harbarger more than Earle.

Mills and Walter--1954

Technical Writing is one of the best-known texts of the 1950's and 1960's. The authors were both at the University of Texas when the first edition of their book was published. The book was written as "...a logical bridge between...professional writing...and the content of a course for students in technical writing" (Mills and Walter, p. v). The authors decided that they would first determine what practices were most necessary to training in technical writing; They then undertook the task of formulating a theory of technical writing, perhaps the first time anyone had done so (Mills and Walter, p. v). Since this is the first text we have examined that provides a definition of technical writing, I will quote the definition in full.

- A. Technical writing is about scientific subjects and about various technical subjects associated with the sciences.
- B. Technical writing is characterized by its use of scientific and technical diction, certain types of graphic aids, certain conventional report forms, and so forth.
- C. Technical writing is ideally characterized by the maintenance of an attitude of impartiality and objectivity, by extreme care to convey information accurately and concisely, and by the absence of attempt to arouse emotion.
- D. Technical writing is writing in which there is a relatively high concentration of certain complex and important problems of writing technique, in particular description of a mechanical device, description of a process, definition, classification, and interpretation.

(Mills and Walter, pp. 4-5).

It is interesting to notice that the fourth part of the definition makes mention of the modes of discourse most often cited in earlier texts.

Table of Contents. The text is divided into six sections: Preliminary Problems; Special Techniques of Technical Writing; Transitions, Introductions, and Conclusions; Types of Reports; Report Layout; and The Library Research Report. I will discuss material from those sections that are directly related to evidence of a mainstream: Preliminary Problems, Special Techniques, and Types of Reports.

The section on "Preliminary Problems" contains the definition already quoted plus material on audience adaptation. The text does not go into any great detail about

audience analysis and adaptation; a summary of the text material is: "Know who the reader is and why he is reading this report" (Mills and Walter, pp. 17-18).

The section on "Special Techniques of Technical Writing" is significant because here the authors discuss the application of the rhetorical forms to report writing. The five chapters in this section are: Definition, Description of a Mechanical Device, Description of a Process, Classification and Partition, and Interpretation. Although narration has fallen by the wayside, the emphasis here is almost identical to that of S.C. Earle in 1911. Moreover, these are the forms emphasized in most modern texts.

The final section relevant here is "Types of Reports." The report types Mills and Walter consider are: Progress Reports, Recommendation Reports, Oral Reports, Business Letters, and Writing for Professional Journals. We have merely to look back to the contents of the pre-1940 report-writing texts to find similar coverage. The descent here is perhaps more from Ray P. Baker than from Earle.

Conclusions. This is another mainstream text--the modes of discourse are prominent in the authors' definition of technical writing. The emphasis of the text is also on particular report types. That combination--the modes of discourse plus report types--has become the standard for modern texts. The text emphasizes audience analysis and

adaptation, another characteristic of modern technical writing texts. An interesting note is the fact that this text has brought together the most important elements of Earle and Baker to form a rhetorically-based text that emphasizes reports as the most important type of technical writing. That combination is characteristic of modern mainstream texts.

Ulman and Gould--1959

Joseph Ulman was with Consumer Reports and Jay Gould was at Rensselaer Polytechnic Institute when Technical Reporting was published. Gould was the editor of the Journal of Technical Writing and Communication from 1970 to 1982. Besides the first edition, a second edition (discussed here) was published in 1963. The first edition was based on technical writing courses at MIT; the second on courses at RPI and the Technical Writers' Institute (Ulman and Gould, p. v).

The text is designed for students or professionals who have a specific writing task before them. The authors' intent is to distill the study of technical writing to the most important principles. They feel that readers have specific problems in mind, and that too much detail is not only useless, but counter-productive (Ulman and Gould, p. vi).

Table of Contents. The text is a combination of technical writing theory and the principles of grammar. The emphasis is on particular types of reports, such as formal reports and laboratory reports. The only mention of the modes of discourse is Chapter 4 on Technical Description. The authors briefly mention audience analysis and adaptation in the second chapter. The basic principles discussed are reminiscent of Harbarger--have a specific audience and a specific purpose (Ulman and Gould, pp. 6-7).

Conclusions. This text is somewhat of a hybrid--there are elements of the handbook approach plus a large amount of theoretical material. The modes of discourse are generally ignored, so we cannot call this a mainstream text. There is some similarity to Baker and Harbarger, but not enough to put Technical Reporting in the same classification. Of the four categories available, "theoretical" provides the best fit.

H.J. Tichy--1966

The author of Effective Writing was a professor of English at Hunter College of the City University of New York when the text was published in 1966. According to her Preface, this book is very much for professionals and executives who have a writing task (Tichy, pp. v-vi). This text could be used for a college-level professional writing class, but it is not really designed for it. Thus, we have

an excellent example of a new type of technical writing text--a book designed for professionals and executives who have specific writing tasks. The emphasis here is on "effective writing", i.e. getting the job done. That emphasis recalls Earle's idea of improving the "efficiency" of technical writing. The text incorporates elements of the handbook approach with a large amount of the philosophy of effective writing and the philosophy of style.

Houp and Pearsall--1968

When the fourth edition of Reporting Technical Information was published in 1980, Kenneth Houp was a professor of English at Penn State and Thomas Pearsall head of the Department of Rhetoric at Minnesota. According to the Preface, the text is intended to teach these skills: ability to analyze an audience, ability to organize material in a way that is appropriate to the particular audience and purpose, ability to design an effective letter or report, and ability to write clearly and correctly (Houp and Pearsall, p. x). Within that philosophy we can again see what Harbarger called "functional writing"--a document written to a specific audience with a specific purpose.

Table of Contents. The text is divided into four sections: Process of Technical Writing, Creating the Professional Report, Applications, and Handbook. The first part contains three chapters of particular interest:

Analyzing Your Audience; Technical Exposition; and Technical Narration, Description, and Argumentation. Within the chapter on audience, the authors define five possible audiences: laymen, executives, experts, technicians, and the combined audience. Notice how closely this division of audience follows that of Clyde Park (technical, semi-technical, and non-technical). The chapters on exposition, narration, and other rhetorical forms show that this is a modes of discourse text.

Conclusions. Reporting Technical Information contains elements of a number of earlier modes of discourse texts: Harbarger's "functional writing," Park's classes of audience, and Earle's approach to teaching by use of the rhetorical forms. Where Earle had "Theory and Practice," Houpp and Pearsall use "Process and Applications." In many ways, this text is the most representative of the mainstream.

Mathes and Stevenson--1976

The authors were professors in the Department of Engineering at Michigan when Designing Technical Reports was published. They begin by noting that most of the writing engineering students do in college has no bearing on the writing they are expected to do in the real world (Mathes and Stevenson, p. xv). Therefore, this text is

written to teach engineers to approach the design of reports just as they would approach a technical design problem.

Table of Contents. The text is divided into three sections: Determining the Function of the Report in the System, Designing the Report, and Writing and Editing the Report. Throughout the ten chapters, the emphasis is on developing approaches that will work for any writing task within an organization. There is no discussion of the rhetorical forms or of particular report types. Chapter Two, dealing with audience analysis, borrows generously from communication theory. There is much discussion of the writer, the message, and the audience. The authors then describe the flow of information within an organization. There is no discussion of laymen, experts, or other audience types--instead, the student is told how to analyze any audience for any reporting situation. Each chapter follows a similar pattern--very few hard and fast rules, but a lot of theory.

Conclusions. This is very much a theoretical text, the heir-apparent of J. Raleigh Nelson. Both texts consider reports in structural terms. The main theme is that engineers are trained to design structures for specific purposes, therefore they should be able to design reports for specific purposes.

David Fear--1977

One of the most important and widely-read texts of the 1980's is Fear's Technical Communication. The second edition (discussed here) appeared in 1981. At that time, Fear was a professor at Valencia Community College. The title of this text represents one of the changes of the 1970's: "technical writing" had become "technical communication". The author defines his purpose as: "...to help students learn to assess a communication situation, to write clearly and concisely, and to practice these skills" (Fear, Preface).

Table of Contents. The text is divided into three sections comprising eighteen chapters. The broad divisions are: Basics, Applications, and Handbook for Reference and Review. Three chapters in the first section are of particular interest: Preliminary Considerations, Five Technical Modes, and Process and Instructions. In the chapter on preliminaries, Fear isolates the following types of readers: Highly technical, Semitechnical, and Nontechnical. This is the same division used by Park and others in the mainstream. The five technical modes described in Chapter 3 of the text are: Description, Narration, Definition, Comparison and Contrast, and Partition and Classification. Fear's use of these modes, combined with Chapter 4 on Processes and Instructions, clearly marks this text as a part of the mainstream.

Conclusions. The second edition of Technical Communi-
cation brings the tradition of S.C. Earle into the 1980's. Although the focus has changed from engineering to the world of work in general, the basics principles have remained the same. The emphasis on writing and revising and on effective communication, defines the major concerns of technical writing courses in the 1980's.

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CONCLUSIONS

I began this thesis with a two-part question: 1) Is there a mainstream of technical writing texts? 2) Did that mainstream begin with S.C. Earle? By examining twenty texts from 1908 to the present, I have reached these conclusions:

- 1) Yes, a mainstream of texts exists. Eleven of the twenty-one texts examined in this thesis use the modes of discourse (or rhetorical forms) to teach the principles of technical writing.
- 2) Earle's Theory and Practice of Technical Writing was the first true classroom text. That text uses the modes of discourse approach and proposes the concept of audience analysis. Therefore, Earle is clearly the founder of the mainstream of texts.

The mainstream texts have not remained the same over time; there has been a process of evolution. Authors now suggest three, four, or five possible audiences instead of two. New forms of technical writing have been added (notably proposals and resumes). The books are no longer written only for engineers; instead, they are aimed at any field of

study that requires special skills or special language. Thus, the texts reflect changes in society and in education. Although eighty years have passed, the ideas of S.C. Earle and other early technical writing teachers still have vitality and significance. Earle's importance is not merely that he was the first, but that he laid the foundation for modern technical writing theory. By recognizing the contributions of the earliest technical writing teachers, we can better understand the needs of today's students.

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