trans-kom 5 [1] (2012): 40-59
Seite 40

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Constructing a Contextual History of English Language Technical Writing

Abstract

This article historically contextualises the emergence and development of English language technical writing from pre-industrial Britain onwards, looking in particular at how-to or instructional writing. In doing this, it shows the deep-rooted and enduring nature of many of the linguistic, organisational and visual features of the text in modern English language how-to or instructional manuals.

1 Introduction

In 1985, Moran stated that the history of technical writing had not yet been written. This is not to suggest that there was no literature on English language technical writing at this time. However, Hills and McLaren (1987) point out that much of the limited available literature blended the histories of scientific and technical writing so as to combine the well-developed and established body of knowledge about scientific writing with the less complete and limited body of knowledge about technical writing. Researchers such as Moran and Journet (1985) and Hills and McLaren (1987) argued for distinguishing between scientific and technical writing in order to allow technical writing to develop, among other things, its own distinct history and body of knowledge. Nevertheless, Tebeaux and Killingsworth (1992) make clear that technical writing did not have its own separate history or historiography by the beginning of the 1990s.

Several publications took a first step towards addressing this issue in the late 1990s, including book-length works by Tebeaux (1997), Brockmann (1998) and Kynell and Moran (eds) (1999). In response to this growing interest, Rivers (1999) called for more contextual approaches to historical studies. And, the following year, the technical communication field benefitted from two richly contextual, book-length historical studies on technical writing by Longo (2000) and Kynell (2000).

In 2002, Kynell and Seely renewed the call for contextual historical studies. However, the literature remains limited. In 2003, Savage would thus state that “the history of technical communication is in the very early stages of being written” (Savage 2003: 3-4). This view has more recently been supported by Tebeaux (2008) and Moran and Tebeaux (2011, 2012). Indeed, Moran and Tebeaux go so far as to state “we affirm and believe that the history of technical writing still has not been written […] We find few studies that unearth technical writing or the genres that define technical writing and show their existence and development over a sustained period" (Moran/Tebeaux 2012: 58). In addition, leading researchers from the field of technical communication tend to focus their historical research into technical writing on the United States of America.

This article addresses the above by including, but going beyond, the United States of America (henceforth USA) to historically contextualise the emergence and development of English language technical writing from the pre-industrial period in Britain to the early 20th century, looking in particular at how-to or instructional writing. It does this through tracing the development of technology, the shift from oral to textual codification and diffusion of technical knowledge, the development of modern mass consumerism and the beginnings of modern English language how-to or instructional manuals for technical consumer goods. The article has two objectives: First, to add to existing contextual histories of English language technical writing over an extended period of time. Second, to reveal the deep-rooted and enduring nature of many of the linguistic, organisational and visual features of the text in modern English language how-to or instructional manuals.

2 Pre-industrial Britain

Britain in the centuries before the start of the industrial revolution (around the second half of the 18th century) was overwhelmingly rural-based and agriculture-dependent. However, for the greater part of the population, life was not one of contented, egalitarian self-sufficiency. Poverty was widespread and deep-rooted. The success of harvests not only affected, directly or indirectly, the quality of life of the majority of the population but also the length of life. Production, trade and consumption were focused on agrarian produce. That is not to say there was not demand for non-agrarian consumer goods such as household furniture, kitchen utensils, candles and clothes. However, the majority of the labouring population was living in poverty and could not afford to buy these goods. Woodward (1985) argues that pre-industrial Britain was a golden age for recycling as inconsistent harvests and pervasive poverty meant that most of the labouring population had to continually recycle household goods and clothes rather than buy new ones.

The majority of the non-agrarian consumer goods for Britain and its colonial markets were produced by family-based, rural cottage industries and urban-based craftsmen and merchant guilds. These were still the predominant production mechanisms of goods as late as the first half of the 18th century, as they had been for centuries previously.

The production of textiles for clothing was a typical rural cottage industry and the spinning wheel was the most widely used machine of the pre-industrial textile cottage industry. It first started being used during the 13th century and was still being used in essentially the same fashion, albeit with a more sophisticated design, at the outset of the industrial revolution. This type of early machine depended on manual labour for movement. However, the operation was simple enough that the necessary technical knowledge was largely passed intergenerationally through word of mouth and emulation.

Urban-based guild craftsmen were also producing a large variety of goods in small craft workshops. The goods were predominantly hand-made in small quantities using tools, instruments and machines that had often remained unchanged for centuries. Diffusion of the technical knowledge necessary to operate these tools, instruments and machines was also largely visual and verbal, usually in the form of an apprenticeship between a craft master and apprentice.

Technical knowledge diffusion is widely associated with technical writing in industrial societies. However, the limited technical complexity and the relatively unchanged and unchanging nature of most of the tools, instruments and machines that were used in the pre-industrial cottage industries and craft workshops of Britain meant that learning how to operate them predominantly took place through listening, watching, imitating and doing. There was consequently minimal need for the textualisation of technical knowledge. However, this does not mean that there was no technical writing. Early precursors of modern English language how-to or instructional manuals can be traced back to pre-industrial Britain. An early example is Chaucer's *A Treatise on the Astrolabe* (1391).

> The firste partye of this tretyse shal shewe the figures and the membres of thyn astrolabe […] The seconde partye shal teche thee to werken the verray practike
>
> (Chaucer [1391] 1870: 19)

The purpose of *A Treatise on the Astrolabe* is thus instructional. It is divided into two sections with the first providing a description of the parts of the astrolabe and the second providing instructions on how to operate it. The first section is 10 pages long and the second section is 41 pages long, so most of it is given over to providing instructional information on the operation of this early technical instrument.

The information in any how-to or instructional manual should be as widely understandable as possible. Chaucer wrote not only in vernacular English, but also with a simple grammar and vocabulary or "lighte reules and nakyd words in englissh" (Chaucer [1391] 1870: 19). A measure of his success is found in Basquin's observation that the information can be understood even in the present day "with only a little effort by any educated reader of English" (Basquin 1981: 22).

The information in the second section is organised into 42 short task-oriented chunks, with each chunk providing instructions on how to perform a specific task with the astrolabe. Figure 1 shows an illustrative extract from two of the chunks.

Chunk	II	XVIII
Heading	To knowe the altitude of the sonne, eyther of celestiale bodies.	To knowe the degre of the sonne by the rete for a maner curyosyte.
Instructional sentence	Sette the ryng of thyne astrolabie upon thy ryghte thombe and tourne thy lyfte syde again the light of the sonne and remeve thy rewle up and downe till the streme of the sonne shyne through bothe holes of the rewle.	Seke busely with thy rule the highest of the sonne in myddes of the daye; tourne than thyn astrolabie, and with a prycke of ynk marke the nombre of the same altitude in the lyne meridionale.

Fig. 1: *A Treatise on the Astrolabe* (Chaucer [1391] 1870: 33, 42)

This reveals that the headings are task-oriented[1] and have a parallel language structure and that the instructional sentences are in the active voice and imperative mood. It is common for the writers of modern how-to or instructional manuals to use the active voice and imperative mood in instructional sentences, organise such instructional sentences into task-oriented chunks and use task-oriented headings with parallel language structure for task-oriented chunks. Significantly, these linguistic and organisational features of the text can all be found in Chaucer's 621-year-old technical writing. Chaucer is widely regarded as the father of English literature for *The Canterbury Tales*. He may also be justifiably considered as a father of English language how-to or instructional manuals for *A Treatise on the Astrolabe*.

English language technical writing gradually increased in quantity and diversity during the pre-industrial period to include many of the trades that were the focus of pre-industrial technical knowledge. This gradual growth in textualised technical knowledge brought with it the emergence of English language technical dictionaries such as Chambers' *Cyclopedia; or, An Universal Dictionary of Arts and Sciences* (1728).

Chambers' *Cyclopedia* contains a large number of entries under the heading "mechanical arts", which are collectively defined as "being all practised by means of some machine or instrument" (Chambers 1728: 144). The dictionary entry for a mechanical printing press is typical in providing a description of the machine, its parts and how it is operated. The following extract is taken from the description of its parts.

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1 In total, 30 (71%) of the 42 chunks have a task-oriented heading. These are chunks I, II, III, IV, VI, VII, VIII, IX, X, XI, XII, XIV, XV, XVI, XVII, XVIII, XIX, XXI, XXII, XXIII, XXIV, XXIX, XXX, XXXI, XXXII, XXXIV, XXXV, XXXVI, XL and XLII.

> Under the Carriage is fix'd a small piece of Iron call'd the Spit, with a double Wheel in the middle, round which Leather Girts are fasten'd, nail'd to each end of the Plank. To the outside of the Spit is fix'd a Handle, or Rounce, by which the Press-man turns the Plank in or out at pleasure. (Chambers 1728: 877)

The way that the "Spit" and the "Plank" fit together, the operation of the "Spit" to move the "Plank" and the technical terms "Spit" and "Rounce" are clearly described at a time when, as pointed out by Wasson, "written English was often ponderous, wordy, and convoluted" (Wasson 2009: 24).

The 1728 edition of *Cyclopedia* has 375 listed subscribers including, for example, 42 Privy Councillors with the title "The Right Hon." or "The Rt. Hon.", 32 members of the clergy with the title "The Rev." or "The Reverend" and 32 Knights with the title "Sir". Chambers was thus writing for a numerically small British elite on whom he depended for money. As a result, his audience was unlikely to have included those members of the labouring population using the machines and instruments he described.

Textualised English language technical knowledge was thus limited in terms of both its distribution and readership during the pre-industrial period. However, this started to change around the second half of the 18th century with the advent of the British industrial revolution to which we now turn. Three facets of this industrial revolution are considered: the gradual mechanisation and centralisation of production, the relationship between technology and literacy and the role of the English language in technical knowledge dissemination.

3 Gradual Mechanisation and Centralisation of Production

In *The Wealth of Nations*, Smith points out that "Consumption is the sole end and purpose of all production" (Smith 1809: 28). However, by 1776 the demand to consume was beginning to exceed the joint production capacities of the cottage industries and craft guilds. The causes of the increasing demand are complex and multifaceted. However, they include the new purchasing power of the growing factory-based labouring classes and the increasing population. This imbalance between demand and production provided a stimulus for the gradual mechanisation and centralisation of production.

The British textile industry led the way in the transition from hand-driven to technology-driven machines and family-based to factory-based production. The second half of the 18th century witnessed a rapid succession of mechanical inventions such as Hargreaves' spinning jenny (1769), Arkwright's water frame (1769), Crompton's spinning mule (1779), Cartwright's power loom (1785) and Whitney's cotton gin (1793). These were too expensive for individual families to purchase and too large and heavy for family homes, resulting in a multiplication of factories to accommodate them.

In 1829, Carlyle claimed to be living in an "Age of Machinery […] Nothing is done directly, or by hand […] Our old modes of exertion are all discredited, and thrown aside […] There is no end to machinery" (Carlyle 1829/2007: 34). However, adoption of the new mechanical inventions, and centralisation of production in factories, did not come in an all-conquering wave as Carlyle maintains. Change was instead a gradual process with marked differences between regions and industries. Much technology, not least that concerned with the construction of the new mechanical inventions themselves, remained essentially hand-powered and reliant on manual skill until Wilkinson designed a metal cutting tool called a slide lathe in the early 19th century. However, it is generally accepted that the transition to factory-based, machine-powered industry can be traced to Britain during this period. The new machines could be invented, but workers with experience of constructing, operating and maintaining them did not exist. As a result, the pre-industrial oral tradition of passing technical knowledge from one generation to the next became less effective and relevant.

4 Technology and Literacy

Tebeaux states that "the emergence of technical writing is the story of the shift from orality to textuality; and technical writing echoes the literacy of both the writer and the intended readers" (Tebeaux 2008: 20). It is difficult to ascertain exact literacy levels at the beginning of the industrial revolution around 1760. However, 60% male literacy and 40% female literacy levels are estimates based on marriage register signatures from 1760 (e.g. Speck 1983; Cressy 1994).

There is broad consensus that there was an initial decline in literacy levels, but that they gradually increased and were generally higher by the end of the industrial revolution than at its beginning. Researchers such as West (1985) argue that the increases were more marked in the industrialising urban areas due to the range and diversity of educational establishments that became available to the growing factory-based labouring classes such as Sunday schools, night schools and the Mechanics Institute.

The Mechanics Institute was established in Glasgow in 1821, and its success resulted in the establishment of new institutes in rapid succession in towns and cities across Britain. Many leading manufacturers during the industrial revolution such as the Eastern Counties Railway, Royal Arsenal and George Stephenson and Company established new institutes. However, the purpose of much of this technical knowledge dissemination was not necessarily altruistic. Workers required instruction on how to operate the new mechanical inventions not for their protection, but for the protection of what were often expensive and complicated machines.

The Mechanics Institute was founded primarily to offer technical training to the industrial labouring classes. However, many of the institutes also offered classes in literacy as technical training was difficult to carry out without it. In addition, the sixth clause of the Health and Morals of Apprentices Act of 1802 made it a legal requirement for every factory apprentice to be given basic literacy classes each working day for a minimum of four years. This act was not widely enforced. However, it was the first government attempt to legislate the burgeoning factory system and is an example of early government recognition of the link between basic literacy and technical knowledge dissemination.

Manufacturers also needed workers who could construct and maintain the new mechanical inventions. Mokyr (2006) describes these workers as tens of thousands of literate mechanics and craftsmen who were able to understand technical writing and illustrations. The greater complexity of the new machines meant that oral descriptions of their parts were increasingly insufficient to enable mechanics and craftsmen to construct and maintain them.

The geographic concentration of these technological innovations in Britain during the industrial revolution meant that the English language had a key role in facilitating technical knowledge dissemination not only within but also outside Britain.

5 Role of the English Language in Technical Knowledge Dissemination

The British government in fact made a determined effort to stop the dissemination of British technology and technical knowledge to continental Europe in successive acts in 1750, 1774, 1781 and 1785. For example, the 1781 act made it illegal to export "any machine, engine, tool, press, paper, utensil, or implement […] or any model or plan, or models or plans, of any such machine, engine, tool, press, paper, utensil, or implement" (Evans 1817/1836: 178). These acts remained legally enforceable for the duration of the industrial revolution, not being repealed until 1843, and suggest the growing importance of non-oral forms of technical knowledge dissemination.

Continental European manufacturers did nevertheless obtain machines and documentation and smuggle them out of Britain. In 1824, Martineau, a leading British industrialist, was interviewed by a House of Commons Select Committee on the effectiveness of the aforementioned acts. An extract from the interview is reproduced below.

> Cannot specifications of every new machine, with drawings and models, be obtained from this country? I have no doubt they may be, and are daily procured […] Are those models, drawings, and specifications such, that when carried abroad, they may by expert English artizans be made up and completed? Certainly they may be. (House of Commons 1824: 7)

This extract highlights two notable points. The first is that continental European manufacturers did obtain British technical writing and illustrations. This promoted English as the de facto language of the new mechanical inventions within continental Europe. The audience of this technical writing and illustrations differed considerably from the audience of the earlier *Cyclopedia* in that it was people directly employed in the industries using the machines.

The second point is that continental European manufacturers that acquired British technical writing and illustrations still needed British artisans to construct the machines. There are two possible reasons for this. The first is the lead taken by Britain in the technical developments of the industrial revolution. This suggests that there was a shortage of continental European mechanics and craftsmen with the relevant technical skills. The second is language barriers. Continental European manufacturers who wished to construct the new mechanical inventions needed mechanics and craftsmen who could understand the technical writing. Crystal supports this suggestion in his argument that "those from abroad who wished to learn about […] [the British machines] […] would need to learn English – and learn it well – if they wished to benefit" (Crystal 1997/2003: 80).

The successful diffusion of knowledge in print form also requires widespread access to it. Widespread access to English language technical writing and illustrations within Britain was partly underpinned by improvements in printing technology such as the invention of a power-driven printing press by Koenig in London in 1810. This period witnessed a never before seen number of technology-related publications in English. The greater literacy of the population, and the greater interest in and exposure to machines and mechanisation, created an expanding market for trade and general interest books, journals, magazines and leaflets about new mechanical inventions.

The books included titles such as *Observations on the use of Power Looms by a Friend to the Poor* (Friend to the Poor 1823), *The New Invention of Double and Quadruple or British National Looms* (Sadler 1831) and *Scott's Practical Cotton Spinner* (Scott 1851). The journals and magazines included titles such as *Glasgow Practical Mechanics' and Engineers' Magazine*; *Mechanics' Magazine, Museum, Register, Journal, & Gazette* and *Practical Mechanics Journal*.

The *Mechanics' Magazine, Museum, Register, Journal, & Gazette* was published weekly in Britain between 1823 and 1872 for both professional mechanics and a general target audience interested in machines. The article from the September 2, 1826 edition about an Applegath and Cowper mechanical printing press is typical in providing a description of the machine, its parts and how it is operated. The following extract is taken from the description of how it is operated.

> The operation of printing is performed as follows:-The sheets of blank paper are laid, one by one, upon the table, B, so as to bear upon the linen tapes which extend over its surface. In this situation, the rollers C and D are caused to move a portion of a revolution, by the operation of a lever fixed upon the axis of the roller, D [...] This motion advances the sheet of paper sufficiently to enable it to be seized between the two systems of endless tapes at the point where they meet each other, or between the rollers h and E.
>
> (Mechanics' Magazine Volume Sixth 1827: 280)

A comparison of this extract with the extract from Chambers' description of a mechanical printing press reveals that the use of technical terms is much more limited. Yet, advances in printing technology in the century since Chambers' *Cyclopedia* was first published had led to the creation of a large number of new technical terms in English. The limited use of these technical terms suggests that the writer was aware that the magazine would be bought by a general population with an interest in machines – in addition to professional mechanics – and used technical terms sparingly to make the information as widely understandable as possible.

The textile manufacturer Motte-Bossut described Britain at this time as “the centre of the most advanced industry of Europe and of the Universe” (Motte-Bossut cited by Stearns 1993/2007: 53). On the one hand, the nation was developing the machines for making goods and, on the other, the technical documentation for making machines, for manufacturers both within and outside its borders. Yet, even as Motte-Bossut spoke, manufacture was expanding and being mechanised in other countries, particularly the USA and Germany to which we now turn.

6 Increasing Mechanisation and Centralisation of Production

The mass production of identical goods from identical parts by power-driven machines can be viewed as a hallmark of modern production. This was the direct outcome of technological developments in the USA during this period.

Whitney is widely regarded as one of the fathers of modern mass production due to his being a pioneer of the system of identical, interchangeable parts. In 1798, he was contracted to manufacture and deliver 10,000 muskets to the US government. Muskets, like most goods produced by craftsmen in the USA at this time, were made individually by hand in small workshops. Finished muskets were, therefore, similar but not identical. Whitney built a firearms factory in which each worker was responsible for making just one musket part by machine rather than a complete musket by hand, with the aim of having the same part of each musket identical and interchangeable. He was ultimately unable to produce truly interchangeable machine-made musket parts. However, he did successfully promote the principle of interchangeable, uniform parts to other manufacturers across the USA.

The successful production of machine-made interchangeable parts actually started only one year after Whitney delivered his final muskets in 1809. Wilkinson designed a general-purpose metal cutting tool called a slide lathe in 1806 that enabled the precision cutting of dimensionally identical metal parts. He set up a machine shop in 1810 to produce interchangeable metal parts for textile machines. The standardisation of textile machine parts enabled the standardisation of textile machines and thus the standardisation of machine-manufactured goods produced by the textile industry.

This system of producing goods using interchangeable parts was gradually adopted by other manufacturers both within and outside the USA and was a critical step on the way to modern, high-volume factory production of standardised goods using machines.

7 18th- and 19th-century Technical Writing

Stevens (1995) argues that learning how to operate machines in the USA at this time necessitated access to existing ones. However, this period saw the publication of, to borrow the words of Ong, "how-to-do-it manuals for the trades" (Ong 2002: 42). These how-to or instructional manuals were targeted at a general population of would-be tradesmen who needed to be able to construct, operate and maintain new mechanical inventions yet had no access to existing ones as they often lived in isolated parts of the USA.

The most popular of these technical publications was possibly Evans' *The Young Mill-Wright and Miller's Guide*. This was first published in 1795 and reprinted 14 times in English by 1860. Brockmann (1999) points out that it was reprinted more times than any other technical publication by a writer in the USA prior to 1861. Its target audience was a general population of aspiring mill-wrights and millers and its purpose was to provide them with all the information necessary for the construction, operation and maintenance of the milling machine that Evans had designed.

The fact that it was being reprinted in the USA as late as 1860 suggests that it met the needs of this target audience. Evans' milling machine was, as with the British textile machines, also adopted in continental European countries such as France. In fact, descriptions of it were widely published and available in French technical publications such as *Rapport sur les machines et outils employes dans les manufactures* (Poncelet 1857) and *The Young Mill-Wright and Miller's Guide* was published under the title *Guide du meunier et du constructeur de moulins* in 1830 (Evans/Benoît 1830) and reprinted in 1863.

It is not possible to do more than speculate, in the absence of research evidence, as to why *The Young Mill-Wright and Miller's Guide* was translated from English into French. However, an absence of mill-wrights and millers with sufficient knowledge of this American mechanical invention in neighbouring Britain, or French mill-wrights and millers with sufficient command of English to understand the English language version of Evans' work, are the most likely explanation.

The Young Mill-Wright and Miller's Guide is divided into five sections with the final section providing instructions on how to construct, operate and maintain the milling machine. This information in this final section is organised into short task-oriented chunks as with Chaucer's earlier *A Treatise on the Astrolabe*. Figure 2 shows an illustrative extract from one chunk.

DIRECTIONS FOR CONSTRUCTING UNDERSHOT WHEELS, SUCH AS SHOWN IN FIGURE I, PLATE XIII.

1. DRESS the arms straight and square on all sides, and find the centre of each; divide each into 4 equal parts on the side, square, centre, scribe and gauge them from the upper side across each point, on both sides, 6 inches each way from the centre.

2. Set up a truckle or centre post, for a centre to frame the wheel on, in a level piece of ground, and set a stake to keep up each end of the arms level with the truckle, of convenient height to work on.

3. Lay the first arm with its centre on the centre of the truckle, and take a square notch out of the upper side 3-4ths of its depth, wide enough to receive the 2d arm.

4. Make a square notch in the lower edge of the 2d arm, 1-4th of its depth, and lay it in the other, and they will joint standing square across each other.

5. Lay the 3d arm just equi-distant between the others, and scribe the lower arms by the side of the upper, and the lower edge of the upper by the sides of the lower arms. Then take the upper arm off and strike the square scribes, taking out the lower half of the 3d arm, and the upper half of the lower arms, and fit and lay them together.

6. Lay the fourth arm on the others, and scribe as directed before; then take 3-4ths of the lower edge of the 4th arm, and 1-4th out of the upper edge of the others, and lay them together, and they will be locked together the depth of one.

7. Make a sweep-staff with a gimlet hole for the centre at one end, which must be set by a gimlet in the centre of the arms. Measure from this hole half the diameter of the wheel, making a hole there, and another the depth of the shrouds towards the centre, making each edge of this sweep at the end next the shrouds, straight

Fig. 2: *The Young Mill-Wright and Miller's Guide* (Evans 1795/1850: 304)

A first feature of this extract is that the heading is task-oriented. In total, 18, or 42%, of the 43 headings in the final section are task-oriented and have a parallel language structure, starting with the words “Directions for” and then describing a specific task.[2] A further 14, or 56%, of the remaining 25 headings have another parallel language

2 These are the headings for articles 120, 131, 132, 133, 134, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147,148, 149 and 154.

structure, starting with the word “Of” and then describing either a specific task or a specific part of the milling machine.[3]

A second feature is that a different typeface and font size are used for the heading to visually differentiate it from the instructional sentences. A third feature is that the instructional sentences are in the active voice and imperative mood. A final feature is that the instructional sentences are numbered to indicate their consecutive nature and group together related instructions. These linguistic, organisational and visual features of the text have become standard in modern English language how-to or instructional manuals. Historically, they can all be found in Evans’ 217-year-old technical publication.

Tebeaux and Killingsworth define technical writing as “writing that enables readers to perform tasks associated with their work in a particular society” (Tebeaux/ Killingsworth 1992: 8). This definition is equally applicable to Evans’ 19th-century technical publication as it is to modern how-to or instructional manuals on the setup, operation and maintenance of industrial machines. However, a different kind of technical publication also appeared during the second half of the 19th century. American sewing machine manufacturers of this period – such as the American Sewing Machine Company, Domestic Sewing Machine Company, Singer Sewing Machine Company and Wilson Sewing Machine Company – started producing domestic sewing machines for private use. The sewing machine became the first technical consumer good and it brought with it the beginnings of how-to or instructional manuals for technical consumer goods. These provided information on how to setup, operate and maintain the new technical consumer goods.

The opening pages of these new how-to or instructional manuals had two important purposes. The first was to persuade the end users of the new technical consumer goods that learning how to operate them was not difficult. By way of illustration, the opening page of a Wilson domestic sewing machine manual from the second half of the 19th century states that it is a “paragon of simplicity, and the most unsophisticated persons can learn to use it effectually, and likewise do all kinds of family sewing” (Wilson Sewing Machine Co. 1870: 1).

The second purpose was to show the importance of the manual in learning how to operate the new technical consumer goods. The first page of the aforementioned Wilson manual also states that “You cannot use the Machine until you thoroughly understand the Directions […] We have prepared very explicit instructions; with which, any one, from a careful perusal, can learn to use it” (Wilson Sewing Machine Co. 1870: 1). These dual purposes were particularly important during the second half of the 19th century when mechanical and electrical consumer goods were still new and unfamiliar. Figure 3 shows an illustrative extract from the Wilson manual.

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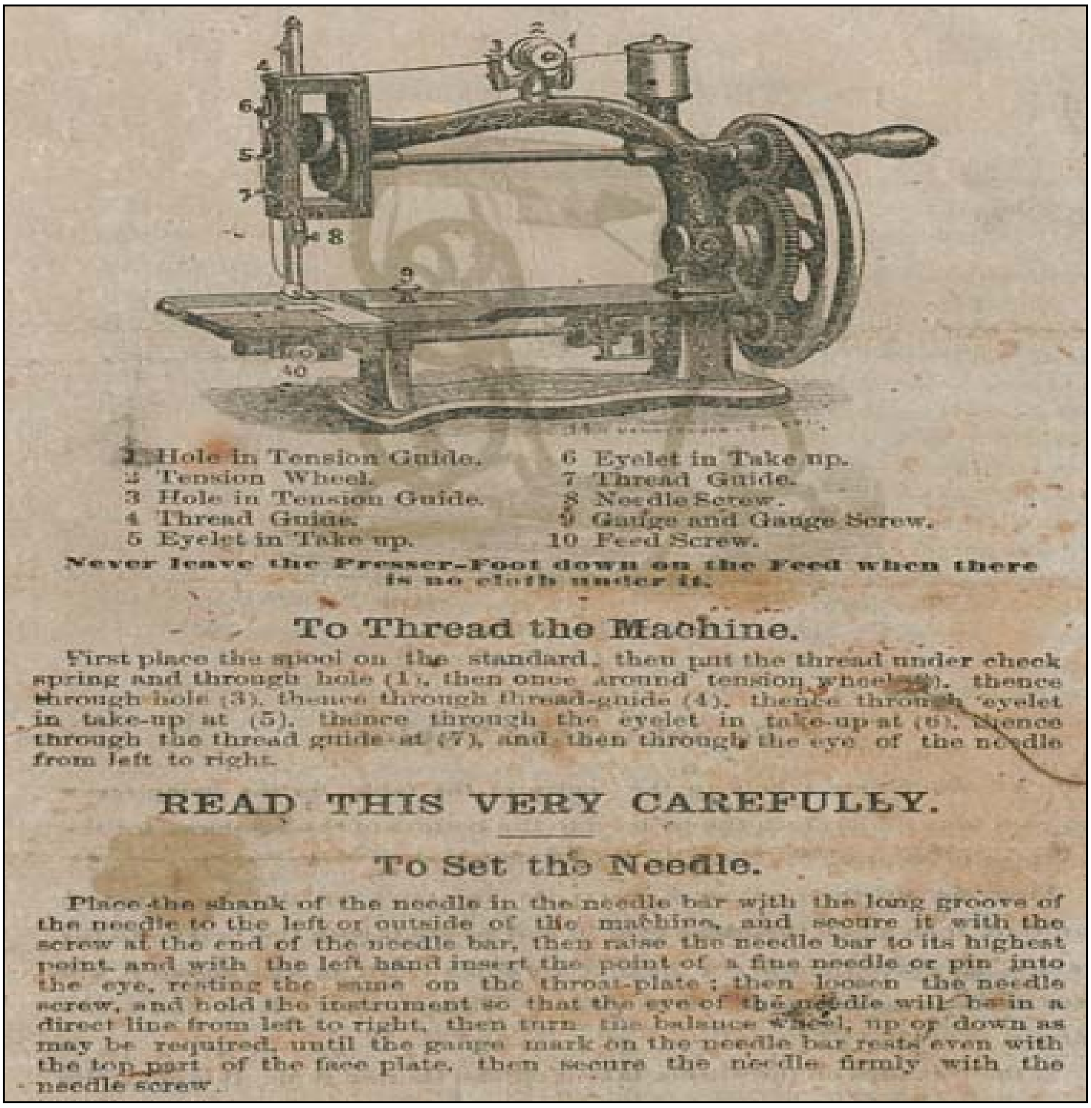
[3] These are the headings for articles 122, 123, 124, 125, 126, 135, 136, 137, 150, 151, 152, 153, 158 and 159.



1 Hole in Tension Guide.
2 Tension Wheel.
3 Hole in Tension Guide.
4 Thread Guide.
5 Eyelet in Take up.
6 Eyelet in Take up.
7 Thread Guide.
8 Needle Screw.
9 Gauge and Gauge Screw.
10 Feed Screw.

Never leave the Presser-Foot down on the Feed when there is no cloth under it.

To Thread the Machine.

First place the spool on the standard, then put the thread under check spring and through hole (1), then once around tension wheel (2), thence through hole (3), thence through thread-guide (4), thence through eyelet in take-up at (5), thence through the eyelet in take-up at (6), thence through the thread guide at (7), and then through the eye of the needle from left to right.

READ THIS VERY CAREFULLY.

To Set the Needle.

Place the shank of the needle in the needle bar with the long groove of the needle to the left or outside of the machine, and secure it with the screw at the end of the needle bar, then raise the needle bar to its highest point, and with the left hand insert the point of a fine needle or pin into the eye, resting the same on the throat-plate; then loosen the needle screw, and hold the instrument so that the eye of the needle will be in a direct line from left to right, then turn the balance wheel, up or down as may be required, until the gauge mark on the needle bar rests even with the top part of the face plate, then secure the needle firmly with the needle screw.

Fig. 3: *Directions for Using the New Buckeye Under-Feed Sewing Machine* (Wilson Sewing Machine Co. 1870: 4)

This reveals that the headings "To Thread the Machine" and "To Set the Needle" are task-oriented, have a parallel language structure and are visually differentiated from the instructional sentences through the use of a different typeface and font size. In addition, the instructional sentences are in the active voice and imperative mood. They are not numbered. However, the consecutive nature of the instructions is indicated by the use of "first", "then" and "thence" in the first sentence and "then" in the second sentence.

Growing sales of domestic sewing machines in the latter half of the 19th and early 20th century brought how-to or instructional manuals increasingly into the homes of ordinary American consumers. This is not to suggest that this was a strictly American phenomenon. The major American manufacturers of this period, such as the Singer Sewing Machine Company, had extensive national and international factories and markets for their sewing machines by the turn of the century. In fact, Vaghefi, Paulson and Tomlinson state that "The Singer Sewing Machine Company has long been recognized as America's first major entry into the international business community" (Vaghefi/Paulson/Tomlinson 1991: 138). The era of international manufacturers and mass-produced, mass-distributed consumer goods had arrived.

8 Turn-of-the-century Technical Writing

Henry Ford, like Eli Whitney, is widely regarded as one of the fathers of modern mass production due to the Ford Model T. Cars in the late 19th century were individually custom-crafted by manufacturers such as the Daimler Motor Company, Peugeot and Benz for wealthy consumers. However, Ford announced in 1903 that he would produce a mass-market car "for the great multitude […] it will be so low in price that no man making a good salary will be unable to own one" (Ford 1923: 73). The resultant Ford Model T was bare and basic in comparison with the Daimlers, Peugeots and Benzes being sold at this time. However, its relative cheapness had a powerful effect on democratising access to what had been a luxury consumer good for the wealthy few.

Ford envisaged the Model T as a "universal car". He consequently started opening factories and establishing markets nationally and internationally. The immense popularity of the Ford Model T in countries such as Australia, Britain, Canada and the USA means that the English language how-to or instructional manual for the Ford Model T was widely distributed internationally. Its opening page echoes the Wilson domestic sewing machine manual.

> The Ford is the simplest car made. It is easy to understand, and it is not difficult to keep in proper adjustment and repair. That the Ford construction may be thoroughly understood – and that there may be an authoritative guide for the making of Ford adjustments – this book is published. (Ford Motor Company 1919: 2)

The information is organised into 136 short chunks, of which 114, or 84%, are wholly or predominantly task-oriented.[4] The chunk headings are similarly predominantly task-oriented and have a small number of parallel language structures. By way of illustration, 32, or 24%, of the 136 chunks have a heading that starts with "How is" and describes a specific task.[5] Figure 4 shows an illustrative chunk.

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4 The 22 non task-oriented chunks are question and answers 18, 19, 21, 36, 37, 42, 44, 47, 53, 54, 66, 69, 70, 71, 83, 112, 117, 118, 121, 122, 126 and 133. These primarily provide information about the workings of the car and truck.

5 These are question and answers 7, 8, 11, 12, 13, 14, 15, 30, 32, 35, 42, 45, 56, 65, 67, 72, 73, 76, 77, 78, 80, 82, 84, 86, 97, 107, 114, 115, 122, 128, 129 and 130.

How is the Car stopped?

Answer No. 12

Partially close the throttle; release the high speed by pressing the clutch pedal forward into neutral; apply the foot brake slowly but firmly until the car comes to a dead stop. Do not remove foot from the clutch pedal without first pulling the hand lever back to neutral position, or the engine will stall. To stop the motor, open the throttle a trifle to accelerate the motor and then throw off the switch. The engine will then stop with the cylinders full of explosive gas, which will naturally facilitate starting.

Endeavor to so familiarize yourself with the operation of the car that to disengage the clutch and apply the brake becomes practically automatic—the natural thing to do in case of emergency

Fig. 4: *Ford Manual For Owners and Operators of Ford Cars and Trucks* (Ford Motor Company 1919: 7)

A first feature of this chunk is that a different typeface is used for the heading "How is the Car stopped?" to visually differentiate it from the instructional sentences. A second feature is that the instructional sentences are in the active voice and imperative mood. The average number of words per instructional sentence is 24. This is less than a quarter the 97-word average per instructional sentence in the extract from the 1870 Wilson domestic sewing machine manual shown in Figure 3. This suggests a gradual historical movement towards the use of shorter sentences in how-to or instructional manuals.

Technical consumer goods such as sewing machines and cars were thus being produced and distributed both nationally and internationally. The prominence of the USA in the discussion thus far might give the incorrect impression that this was an overwhelmingly US development and phenomenon. However, this was not the case. Manufacturers from other countries were also selling their own technical consumer goods in international markets that included Britain and the USA. The most prominent of these was Germany.

By the second half of the 19th century, German low-priced, machine-produced consumer goods were in fact flooding Britain. The German goods were cheaper than similar British ones and this cheapness ensured consumer demand for them. Furthermore, many German manufacturers labelled their goods as being British at a time when "Made in Britain" meant quality, thus making them doubly attractive to consumers.

The Merchandise Marks Act of 1887 came out of growing British opposition to this misrepresentative labelling. The act stated that:

> […] all goods of foreign manufacture bearing any name or trade mark being or purporting to be the name or trade mark of any manufacturer, dealer or trader in the United Kingdom, unless such name or trade mark is accompanied by a definite indication of the country in which the goods were made or produced, are hereby prohibited to be imported into the United Kingdom. (Singer 1907: 393)

It was, nonetheless, to prove unexpectedly beneficial to German manufacturers. First, it drew attention to the cheaper German consumer goods, thus inadvertently promoting them. Second, it provided an immediate incentive for German manufacturers to improve the quality of their machine technology and consequently their machine-produced consumer goods. The result, as pointed out by Head (1992), was that the quality and technical excellence of German machine-produced goods was equal to, if not better than, British ones by the early 20th century.

The Leica range of cameras exemplifies this quality and technical excellence. The German manufacturer Ernst Leitz GmbH produced and distributed the Leica in international markets that included Britain and the USA from the first half of the 20th century. The opening page of an English language how-to or instructional manual for an early Leica camera echoes the domestic sewing machine and car manuals.

> If at the outset the camera and the instructions for use are taken in hand together, most of the following instructions will at once become obvious. (Ernst Leitz GmbH 1937: 3)

Figure 5 shows an illustrative extract from this manual.

D. Taking the Photograph

1. Pull out lens, and turn it **to the right (clockwise) so as to lock it in the bayonet catch.**
2. Adjust iris diaphragm by means of lever or ring **21** (Fig. 18).
3. Wind knob **1** in direction of arrow right to stop.
4. See that shutter speed is correct or set it by lifting the speed dial **7**, at the same time turning it so that the required figure lies against the index arrow **8**. Let go knob which will then settle in position. At **Z** the shutter remains open as long as the button is pressed down.

4a. See further remarks page 22 re Leica Model F and G.

5. Sight the object through range finder **11**, turning focusing lever **17** until the two images coincide (fuse into one). Use view-finder **10** to view the whole field and gently (not jerkily) release press button **5**. When photographing rapidly moving objects the range finder should be used as view-finder.

Fig. 5: *Leitz Directions Leica Camera* (Ernst Leitz GmbH 1937: 14-15)

This reveals that the heading is task-oriented and visually differentiated from the instructional sentences through the use of a different typeface and font size and that the instructional sentences are in the active voice and imperative mood. In addition, numbers are used to group together related instructions and to indicate the consecutive nature of the instructions. Finally, the average number of words per instructional sentence is 15. This further suggests a gradual historical movement towards the use of shorter sentences in how-to or instructional manuals.

9 Conclusion

This article set out to historically contextualise the emergence and development of English language technical writing. It did this through tracing the evolutionary development of English language technical writing from the pre-industrial period in Britain to the early 20th century, looking in particular at how-to or instructional writing. Brockmann states that this kind of historiography “can reveal, for instance, whether a contemporary standard in technical communication is enduring or transitory” (Brockmann 1998: 1). This article has revealed the deep-rooted nature of many of the linguistic, organisational and visual features of the text that have become standard in modern

English language how-to or instructional manuals such as the use of the active voice and imperative mood in instructional sentences, the organisation of instructional sentences into task-oriented chunks, the use of task-oriented headings with parallel language structure for task-oriented chunks and the use of different typefaces and font sizes to differentiate headings from instructional sentences.

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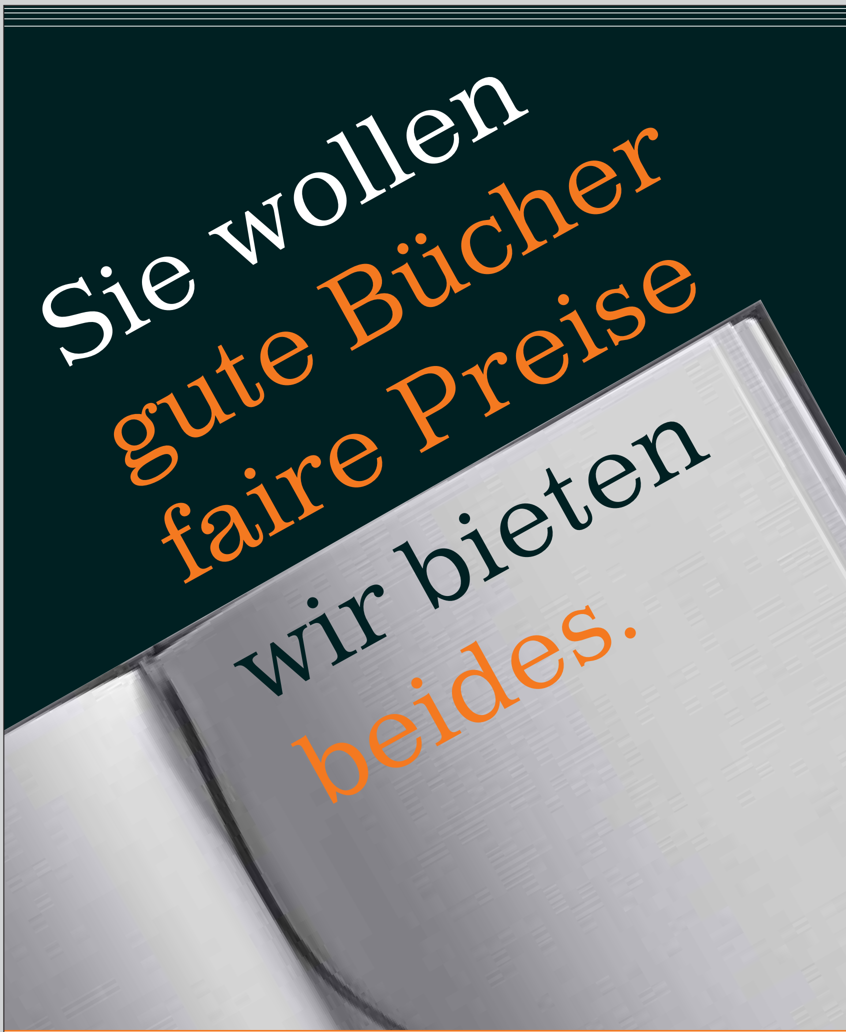

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