Technical English — a 'dead' language

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SYNOPSIS

The use of a personal style (mainly active voice and first person) makes technical writing more pleasant to read, and helps the writer to express his meaning clearly and to avoid many of the stylistic errors normally encountered in that type of writing.

SAMEVATTING

Die gebruik van 'n persoonlike styl (hoofsaaklik die bedrywende vorm en eerste persoon) maak dit meer aangenaam om tegniese geskrifte te lees en help die skrywer om sy bedoeling duidelik te stel en baie van die stylfoute wat gewoonlik in sulke geskrifte voorkom, te vermy.

Introduction

The style of most technical writing in English is heavy and uninteresting, and very different from that used by competent authors. It is high time that technical writers and editors resuscitated this writing by simplifying and clarifying it, so making it both more pleasant to read and less open to misinterpretation. In this article I try to identify the factors that contribute to the dullness and ambiguity of technical English, and to suggest possible remedies.

Charles Kingsley described the language used by doctors of medicine as 'one half bad Latin, the other half worse Greek, and the rest what might have been English if they had only learnt to write it'[1]. Although Kingsley's mathematics is questionable, his description fits much of the technical writing that is being published today. No one would quarrel with the use of Greek and Latin derivatives that serve as technical terms. These, for the most part, have been carefully defined and are understood internationally. They are very useful words, being self-explanatory to anyone with a knowledge of roots, prefixes, and suffixes, and having a fixed meaning (not being affected by emotional associations).

Rules of Good Writing

My quarrel is with the portion that 'might have been English'. If it had been English, it would have followed the rules of good writing as laid down by Fowler[2], Partridge[3], and others. Quiller-Couch[4] summarizes these rules as follows:

(1) Always prefer the concrete word to the abstract.
(2) Almost always prefer the direct word to the circumlocution.
(3) Generally, use transitive verbs that strike their object, and use them in the active voice, eschewing the stationary passive, with its little auxiliary *is*'s and *was*'s and its participles getting into the light of your adjectives, which should be few.

Much technical writing today breaks all these rules, and it does so mainly because the writer is trying too hard to be objective. The widely held idea that technical papers and reports should be impersonal lies at the root of the trouble. Why it should be considered presumptuous for an author to use the first person singular, or for joint authors to use the first person plural, is difficult to understand. It was considered acceptable for scientists like T. H. Huxley and James Clerk Maxwell even before they were recognized as authorities in their fields. But the present attitude (towards technical reports and memoranda at least) seems to be that authors who use the first person lay themselves open to charges of arrogance, and that it is better to err on the side of modesty. However, the latter approach lacks the simplicity and directness of the personal approach, and sets all sorts of snares for the unwary writer.

Abstract Nouns

The first snare lies in the predilection of the impersonal style for abstract rather than concrete nouns (which breaks the first of Quiller-Couch's rules). Writers who are modest prefer passage A to passage B:

A. Mechanical *breakage* of the rock was effected by the inducement of stresses greater than its shear strength. This was achieved by the *application* of loads until cracks formed and chips were loosened.
B. We broke the rock mechanically by inducing stresses greater than its shear strength. We did this by loading the rock until cracks formed and chips were loosened.

Although passage A might be regarded as a model of objectivity and detachment, its style is heavy as a result of, among other things, the abstract nouns (italicised) and actionless verbs (*effected* and *achieved*) that it contains. Its encouragement of the use of such verbs is the second snare set by the impersonal style.

Passive Voice

The third set of snares is that laid for the unwary writer by the passive voice, which he adopts in his attempt to achieve impersonality. When the passive is used sparingly, it provides welcome variation and emphasis (because of its reversal of normal word order). But, when it is over-used, as so often occurs in technical writing, it results in one ineffective sentence after the other. Because it does not reflect the writer's natural thought (the active voice is the natural vehicle of thought in English), the writing becomes artificial: it becomes verbose because it requires additional phrasing to name the actor of the verb, and it uses abstract words and woolly phrases. That the use of passive verbs 'wraps a man's thoughts round like cotton wool'[5] is clear from the following:

> Before the precipitation [abstract noun] of gold could be commenced [passive verb], the pulp had to be filtered [passive verb] by the operator [actor of the verb] with a view to [woolly phrase] reducing its undissolved solids to a minimum.
>
> Before he [personal pronoun] could precipitate [active verb] the gold, the operator had to filter [active verb] the pulp to reduce its undissolved solids to a minimum.

The passive has the disadvantage that it encourages the use of complicated periodic sentences (sentences in

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which the meaning is not apparent until the end of the sentence is reached). Although some variety of sentence structure is desirable, the modern reader expects to find the basic pattern of subject–verb (loose sentences) in reports, especially if, in an attempt to keep abreast of the published material on his subject, he has taken a course in speed reading. Such courses train people to look for key words in particular places and to skim over modifying words. A speed reader would find his speed considerably reduced by a sentence like the following:

> If, on the one hand, the line of decrease is extrapolated — as outlined by Jones — and, on the other hand, the growth trends are seen as being in the direction of higher production and more widespread consumption, which will make the product more economically attractive, then it is clear that the number of people employed by the industry will have to be increased immediately and will need to be increased even further in the years to come.

The use of the passive voice very easily gives rise to dangling (or hanging) participles, gerunds, and infinitives. The scientist, who frequently uses these grammatical forms in his speech and non-technical writing, continues to use them in his impersonal technical writing, often forgetting that his sentences now have few, if any, personal nouns or pronouns to which these parts of speech can be related. His scientific writing then contains sentences such as the following, which mark him as a careless, ungrammatical writer and, even worse, may result in ambiguity:

> *Studying* the results, the procedure was found to be satisfactory [dangling participle].
>
> *To apply* this form of treatment, the process has to be conducted very slowly [dangling infinitive].
>
> Darwin was impressed 'by the manner in which closely allied animals replace one another in *proceeding* southwards'[6] [dangling gerund because it was Darwin who was proceeding southwards, not the animals].

As my last example indicates, personal writing is not free of these errors. However, it is more difficult for a writer to avoid them when he is writing an impersonal account. Darwin's sentence is easily corrected: it merely requires re-positioning of the phrase *in proceeding southwards*. The other two sentences call for more drastic treatment: the provision of a suitable noun or pronoun to which the participle or infinitive can apply (Examining the results, *we* found the conclusions obvious), or the rephrasing of the participial or infinitive phrase (*When the results are examined*, the conclusions are obvious).

The passive voice is not essential to an impersonal style. Objectivity can be achieved in the active voice: equipment has functions, and there are several verbs that can take inanimate subjects. Thus, one can say 'The experimental furnace produced several batches of acceptable ferromanganese', rather than 'Several batches of acceptable ferromanganese were produced in the experimental furnace'; or 'Table 2 shows the particle-size analyses of the samples', rather than 'The particle-size analyses of the samples are shown in Table 2'.

Unfortunately, in a writer's search for impersonality of style, his use of the passive can become so habitual that he does not use the active voice at all. The result is a dreary succession of passive sentences without any forceful active verbs to relieve the monotony.

Grandiloquence

If such sentences are heavily encumbered with elaborate, pretentious words — as happens frequently in technical writing — the style is even more repellent to the would-be reader. The grandiloquence encountered in technical writing is normally of three types: compound adjectives (that is, adjectival phrases consisting of two or more nouns sometimes accompanied by other words), non-technical words of Latin or Greek derivation, and jargon.

A writer uses compound adjectives in the mistaken belief that they create an impression of terseness and accuracy. So, he talks of 'a gold fluidized bed ion exchange contactor' when he means 'a fluidized-bed contactor for the extraction of gold by ion exchange'. This telegraphic style may be the expression of a conscious or unconscious laziness that omits the extra words required by the correct grammatical expression. Baker[7] gives a striking demonstration of the peculiarity of this habit of writing: he points out that one would never dream of saying 'a tea-containing cup', but that expressions like 'iron-containing globules' frequently occur in scientific articles. He ascribes this habit to the influence of English-speaking German scientists, and quotes as an example 'adenosine triphosphate activated actomyosin contraction', which means 'the contraction of actomyosin, activated by adenosine triphosphate'. Noun clusters that are far less complicated than the above example can be ambiguous if hyphens are not used: for instance, 'a large mill testing programme' could refer to a large programme for the testing of mills or to a programme for the testing of large mills. Writers should avoid using nouns as adjectives whenever they can, for even a single epithet noun can result in ambiguity: '*zinc* contamination', for instance, could equally refer to contamination by zinc and to contamination of zinc by some other substance.

Some authors believe that elegant learned-looking words add tone to their writing, and, in an effort to impress their readers, they use words of Greek or Latin derivation to express simple ideas. Thus, they *commence* (and *terminate*) experiments, which they *essay* in the hope of *evincing* that there has been a *veritable amelioration* in the process. Similarly, they use Latin expressions like *vide supra, circa, ad libitum* where the simple English equivalents would be better. Some, indulging in what Fowler[2] calls elegant variation, talk of *barren solution* one moment and *raffinate* the next, or of *pachucas* one moment and *Brown tanks* the next, which only serves to confuse the reader.

As defined by Van Hagan[8], jargon (the third type of grandiloquence) is 'the technical or secret vocabulary of a science, art, trade, sect, profession, or other special group — in short, shop talk'. If technical writers did not use the jargon of their particular technologies, they could not convey their meaning adequately, but they would do well to confine its use to those contexts in which there is no simple English equivalent. Instead, many writers make extensive use of the wide vocabulary of jargon available to them. Savory[9] points out that, of the 6000 or so terms peculiar to the coal-mining industry, few would be intelligible to the outsider. That

UNESCO should have proposed a reduction of this vocabulary to 30 words[9] is a clear indication that the remainder are unnecessary, and that their meaning could be expressed in words that would be known by people who are not involved in coal mining.

Clarity and Directness

In pointing out the above errors, I do not suggest that technical writers should try to become English literary stylists — only that they should learn to write with a clarity and directness that will easily be understood by their readers, especially those whose first language is not English. The faults of writing I have mentioned can have two effects: they give rise to misinterpretation of the writer's meaning, or they distract the reader's attention from the subject under discussion. Either effect defeats the writer's purpose, which is to communicate with his reader.

Importance of Communication

The importance of technical writing is readily apparent when it is realized that, according to an estimate[10] made in 1962, technical journals transmit 3 million scientific and technological articles annually throughout the world. If the English-language articles represent 50 per cent of these (which is probably a conservative estimate), about $1\frac{1}{2}$ million technical and scientific articles are appearing in English every year. Additional to these is a mass of scientific and technical material that is published in the form of books, manuals, reports, and memoranda. It was the beginning of this information explosion that led Sir James Barrie to remark more than sixty years ago, 'The Man of Science appears to be the only man who has something to say just now — and the only man who does not know how to say it'[4].

The situation has not improved over the past sixty years. The scientific and technical literature has vainly attempted to keep up with the growth of knowledge, which has been phenomenal in this century. According to one estimate[11], even in the years between about 1974 and Yuri Gagarin's historic flight in 1961, our knowledge in every technical field of endeavour doubled. And the scientist or technologist who struggled to describe his findings in the earlier years of this century has been succeeded by two or more specialists who have the same, or even greater, difficulty in expressing themselves in good, lively English.

Deadly dull writing does a disservice to science and technology. It adds to the burden of those who need to read such writing in order to keep up with advances in their fields, and may even prevent the spread of knowledge. According to Gilman[12], it was R. Buckminster Fuller's peculiar language that caused his geodesic dome to remain relatively unknown for three decades. The following is an example of Fuller's tortured writing:

Wave embodiments of cyclic experience appear everywhere

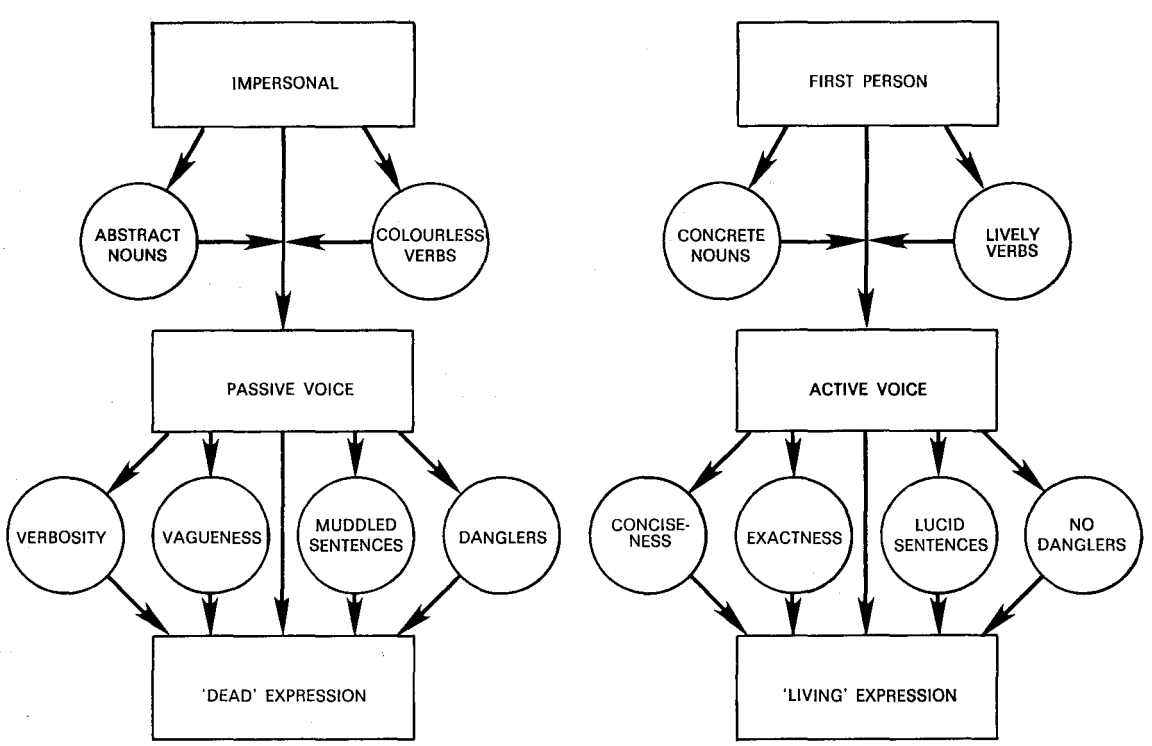

Fig. 1—Which is your style of technical writing?

in the accreted morphology of nature's omnidirectional, convergent–divergent, synchronous–dissynchronous, infinite plurality of pulsating controls of interactive events in principle.

The Remedy

There is a single course of action that goes far towards removing many of the faults I have mentioned. This course involves the use of the active voice and of personal nouns and pronouns, and, as shown by Fig. 1, leads to a pleasantly light style. The writer who adopts this approach is able then to pay more attention to *what* he is saying and to worry less about *how* to say it.

Although most scientific journals seem quite happy to publish papers written in the first person, many technical writers have become so accustomed to the impersonal style that they use it when writing papers that are to be published in journals. This habit usually arises from the requirement of commercial and State organizations that technical reports and memoranda should be written in an impersonal way. These organizations would do well to consider the advantages of the first-person approach, and to ponder Rickard's summing up[13] of the need for first-person technical writing:

> a technical writer is a scientific witness; his testimony is valuable because he vouches for the accuracy of it; if he hides his identity under the mock-modesty of the impersonal pronoun he frustrates the purpose that is supposed to prompt his utterance. To begin a statement in the first person may seem assertive, but it simply asserts the responsibility of the writer, identifies the witness, and places him on record as testifying to the fact . . . . In technical writing, it is best to use the first person singular when making statements involving individual experience or personal responsibility; in other statements it is easy to avoid the intrusion of personality.

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Coal extraction and processing

The South African Institute of Mining and Metallurgy and the South African Coal Processing Society, in collaboration with their Witbank–Middelburg Branches, are to hold a colloquium on 'Mining methods and economics for improved coal extraction, and coal processing and preparation' on 3rd and 4th October, 1979, in Witbank.

The first technical programme (on 3rd October) is to be devoted to 'Mining Methods and Economics for Improved Coal Extraction' and will include the following papers:

Review of Mining Methods for Improved Extraction of Coal, by P. King, Chamber of Mines of South Africa.

The Application of Continuous Miners in South African Coal Mines, by J. D. Inch, Bosjesspruit Colliery, I. Brumby, South Witbank Coal Mine Ltd, J. D. Stone, Matla Coal Ltd, and C. J. Beukes, Usutu Collieries, Ltd.

Longwall Mining Experience at Coalbrook Collieries, by P. G. Henderson, General Mining and Finance Corporation Limited.

Pillar Design in Coal Mines, by Dr H. Wagner, Chamber of Mines Research Laboratories.

Open-cast Coal Mining at Kriel Colliery, by I. Buchan, Anglo Power Colliery, Kriel Division.

South African Coal Export, by J. M. Heath, Transvaal Coal Owners' Association.

Richards Bay Coal Terminal, by B. Dunne, Richards Bay Coal Terminal, Companies.

Mr G. G. Thompson, General Mining and Finance Corp. Limited, and Mr D. Rankin, Anglo American Corp. of S.A. Limited, will serve as Chairmen, and Mr D. A. Viljoen, President of the South African Institute of Mining and Metallurgy, will deliver the opening address.

The second technical programme (on 4th October) will deal with 'Coal Processing and Separation' and will include the following papers:

Coal Preparation in South Africa — a General Review, by D. W. Horsfall, Anglo American Corporation of South Africa Limited.

Comprehensive Performance Testing on a Routine Basis, by P. J. F. Fourie, Fuel Research Institute of South Africa.

Froth Flotation Beneficiation of Fines from Transvaal Seams, by P. Armstring, General Mining and Finance Corporation Limited.

Coal Preparation Routes for Maximum Coal Recovery, by H. C. Voges, Iscor, Pretoria.

Potential Value of Discard Material, by R. B. McGillivray, Rand Mines Limited.

Use of High Ash Coal in Fluidized Bed Systems, by E. A. Glaysher, Babcock and Wilcox of Africa (Operations) (Pty) Limited.

Char Tests at the Fuel Research Institute, by E. F. E. Müller, Fuel Research Institute of South Africa.

Factors Affecting the Resistivity and Reactivity of Various Carbonaceous Reductants for the Electric Smelting Industry, by H. M. Dijs and D. J. Smith, National Institute for Metallurgy.

Mr A. Sealey, Rand Mines Limited, and Dr A. Brink, Sasol I, will serve as Chairmen. The opening and closing addresses will be delivered by Mr J. Shilling, Chairman of the Coal Processing Society, and Mr R. Smith, Chairman of the Witbank Branch, respectively.

Technical visits are being arranged to collieries of various kinds, to ferro-alloy producers, to various power stations, and to a special drill for use in rescuing people trapped underground in collieries.

Further details are available from the Secretary, South African Institute of Mining and Metallurgy, P.O. Box 61019, Marshalltown 2107 (Telephone 834-1271).