

VISIBLE LANGUAGE

*The research journal
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in our being literate*

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of writing for any purposes which might give insight into the functioning of the society. What I want to try to outline below, however, is the conceptual structure of the *Lebenswelt* of this society as it related specifically to the area which we call law, demonstrate the similarity between this and other non-literate societies, and show what effects the introduction of literacy (perceived as a method of communication) can have on this structure.

With the decline of Mycenaean civilisation about 1200, Greece entered what is commonly called its Dark Age; that is to say, for this period there is little in the way of archeological remains and nothing in writing. What understanding we have of this period must be based on the oral traditions to be found in the *Iliad* and *Odyssey*.⁹ The reason for the decline of Mycenaean civilisation is not known, but it is apparent that it was linked with a rapid decline (over a period of about 200 years) in the level of population, and, simultaneously, a decline in urbanism.¹⁰ Mycenaean society was based around a number of urban cities, each ruled through a bureaucracy which in turn was under the control of a lord or king called a *wanax*.¹¹

It is for our purposes worth noting that the Minoan society based around Cnossus in Crete is an extreme example of the manner in which Mycenaean civilisation used writing as a means of control, thus demonstrating a form of institutionalisation of writing which we do not normally associate with it in the Greek area. As in Sumeria writing appears to have been developed and integrated into the society because of its ability to record the organisation and distribution of goods within the society. As a result writing provided a technology which allowed those in control in the society to consolidate and extend their power through increased control of the economy. Thus the implication from the fact that the texts of tablets of the period contain "many inventories, ration lists, and lists of personnel" is that "the whole society was run from the palace-centre which organised the internal economy in every detail administratively, distributing people and goods, from the raw materials to the finished products, without the use of money as a market mechanism."¹²

It should be noted that the language in which Linear B was written — and therefore one would suggest the language of the rulers — was Greek, not a tongue indigenous to Crete, thus increasing the privatised nature of writing when used, as here, as a control mechanism.¹³

The later Dark Age society of the Greek mainland was centered upon a unit of people known as *demos*. Starr suggests that "although a

purposes is shown by the palace accounting texts discovered at Ugarit.⁶

The perception by the Phoenicians of the technology of writing was mediated by the fact that it was seen as an adjunct to an undifferentiated sphere encompassing the religion and economy. This perception must be closely related to Phoenician social structural developments. In cities kingship tended to give way to the oligarchical rule of rich merchants.⁷ However, priests often occupied the role of magistrates and the “secular” authority carried strong overtones of sacerdotal functions.⁸ Thus whilst it is hard to assess, because of lack of archeological evidence, the extent of the embedding of literacy in Phoenician society we can, nevertheless, have some idea of the nature and importance of the role it played.

By contrast, in Greece, which was in irregular contact with Phoenician society, writing was not perceived as a medium of communication integrated with the social structure for over 300 years. Moreover, when the Greeks did come to make use of literacy, it was not within a religio-economic context but in a secular and overtly political manner. In order to understand why there occurred a gap of 300-400 years, it is necessary to realise that writing, like any medium of communication, has the power to alter radically the social structure of any given society, and that what changes take place reflect not only the developing perception which the society has of the technology that it has acquired but also the capacity inherent in the particular technology in the sense of its limitations and possibilities for changing society.

Thus for a long period, ancient Greek society ignored writing as a medium of communication. Greek social structure was related to the use of another technology for communication, orality, and therefore could find no use for this new technology. Towards 650, however, Greek society started to develop severe structural tensions, and it would appear that changes in attitude towards writing were one consequence of these tensions. Writing, therefore, was utilised by Greek society as a medium of communication after already being widely disseminated as a peripheral “novelty.” Therefore, the relationship of writing with that society was very different from societies such as Sumeria where writing appears to have been under sacerdotal/governmental control from its inception.^{8a} As a result the role it came to play in Greece was also rather different.

The political and legal organisation of early Greek society can, to a large extent, only be conjectured, precisely because of the lack of use

will give greater weight to the first aspect because of my concern here with conceptual changes. That many societies not only function successfully without writing but do so to the extent that writing is perceived as having no use within the society may be demonstrated by the early history of writing in Greece when compared with Phoenicia.

Writing in the shape of the Phoenician alphabet, appeared in mainland Greece sometime in the first half of the eighth century. However, for a period of up to 400 years the Greeks hardly made use of their new acquisition. It is true that even when texts did appear we only have later copies of the originals, and it is possible that earlier texts were simply not preserved. If, though, we accept Havelock's argument² that the so-called pre-Socratic fragments are not all that remains of much longer works but are the first faltering attempts of Greek society to use writing for articulating ideas, in contrast to the earlier *Iliad* and *Odyssey* and the poetic works of people like Sappho and Archilochus, then we are left with a significant hiatus between the gaining of writing (through diffusion) and the use of it for anything other than listing winners at the Olympics, placing short inscriptions on pieces of pottery,³ and the written transposition of what was a traditional oral form — what we tend to call the epic and early Greek poetry. Had the trading cities that went to make up Phoenicia used it similarly, this period could have been seen merely as one during which writing fulfilled a specific purpose for both Phoenicia and Greece and before a changing social structure found other uses for it.

However, this was not the case. Whilst the social and political structure of these Phoenician cities remains vague, Reveré⁴ has shown the economic factors behind the existence of a series of semi-independent cities separating the great inland Empires of Babylonia, Assyria, the Hittites, etc., from the Mediterranean. They existed primarily as ports of trade, places under weak political authority where, through the establishment of treaties, large-scale exchange could take place either directly between representatives of different countries or by means of exchange mediated by the Phoenicians themselves.

The Phoenicians, like the Mesopotamians and Egyptians, made use of writing at this time for two purposes which for us are separate but which in many societies have been intimately bound together: religion and the economy.⁵ From the Phoenician cities we have evidence of the use of writing in religious contexts, mostly in the form of dedications but also lists of sacrificial tariffs and a recognition of religious scribes. That writing was also used for what we would call economic

Writing and the Concept of Law in Ancient Greece

The concept of law is too often treated as an a-historical category; similarly, the impact of writing (when used as a medium of communication) on the conceptual order and on the social structure of a society has been little analysed. These two problems are brought together in the context of ancient Greece to demonstrate how the concepts "law" and "justice" developed in relation to changes in the social structure of that society. The impact of writing on Greek society not only produced the situation in which these changes took place but also helped form those changes.

For the purpose of this paper it is useful to differentiate two aspects of the impact of writing on a society, though in practice (as I note in my conclusion) it is impossible to have one without the other. Furthermore the two are not perceived as separable — or even, indeed, as existing in most cases — by societies which utilise writing. The first aspect might be called the conceptual, for here we are dealing with the different perceptions that societies might have of writing and how writing is assimilated, or not, into the world view of a society. Of course, world views are only such because they allow societies to operate on and in the real world, which is why the second aspect, the form of institutionalisation of writing in the society, is, in praxis, inseparable from the first. However, from the point of view of analysis, differentiation is necessary in order to allow the researcher to investigate how writing operates in a given society.

From this point of view the relation between writing and what in our society is termed "law," is very important because the concept of law cuts right to the root of the functioning of a social structure. Thus if writing comes to affect the legal concepts of a society, then it must also affect the social order itself.¹ In my discussion of early Greece I

demos or *ethnos* occupied a certain limited part of the Greek landscape, its visible political bonds were tribal unity and obedience to a particular chieftain or *basileus*.”¹⁴ He goes on to add that the *basileis* did not stand far above their fellow tribesmen and that they did not, themselves, have a monopoly of political (by which Starr also means legal) power. This was also located in village wise men and in priests and seers who gave the will of the gods.¹⁵

Thus we have a situation reminiscent of what Mair has called “minimal government.”¹⁶ That is, where society is not ordered on the basis of any overt, organised authority structure but rather is based on a coherent normative *Weltanschauung* in which certain embedded concepts operate to facilitate the continuity of order in the society. I would suggest that this situation follows from Mair’s assertion that “the inhabitants of a single homestead [to which I would add lineage group]¹⁷ always recognise the authority of their senior members.”¹⁸

This is because in a society where a more or less equal degree of authority is distributed among a large number of individuals, a perception of the world — an ideology — must exist among the members of the society which emphasises its *inherent* continuity and order. Were this ideology not to exist or to be rejected, then the society would inevitably fragment because in such a society there exists no single location of power and therefore no way of enforcing order.

As an illustration of this, in the Greek Dark Age great importance was attached to the “wise men” who, wise in their perception of the operation of their society, were able to arbitrate on matters the complexity of which questioned the normative order of the society. I use the term “arbitrate” because, as I wish to show below, the essential nature of non-literate society is that it must *appear* (rather than be) unchanging. This is not to lapse into the classical anthropological mistake of equating a concern with the appearance of lack of change with an historically unchanging society but to suggest that in non-literate societies the functioning of that knowledge/praxis area which we call law is to preserve the continuity of the society through an apparent denial of change.

Van Groningen has pointed out in *In the Grip of the Past* the Greek preoccupation with the relationship between the present and the past which was of continual concern to that society once writing had come to be used for communicating information.¹⁹ This concern with apparent lack of change is in contrast to highly literate societies where the law is concerned with individual and state rights, where change is

articulated through the writing and re-writing of laws, and where continuity is exercised through the execution of those laws by the imposition of power. Thus Gluckman suggests that for the Barotse "the aim is to reconcile the litigants," and that this stand is possible because "Barotse is, or was, a homogeneous society, all of whose members accept the same standards of right-doing as the judges."²⁰ Moore emphasises this point by her restatement of the problem of strict liability as this term applies to non-literate societies. She suggests that, contrary to the ideology of justice in literate societies: "Some instances of strict liability in tribal societies can, perhaps, be most simply explained by arguing . . . that in certain social situations the resentment of the injured or damaged must be assuaged if social relations are to go on, whether or not the injurer was apparently at fault."²¹ In other words the most important factor is the preservation of social equilibrium through reconciliation. Often, of course, equilibrium can only be restored by a redistribution of goods.

An analogous perception of the ordering of the world and human relationships may be found in ancient Greece. Let us turn first to the term *nomos*. Ostwald, who has written extensively on the Greek use of this term, informs us that "[Hesiod is] the earliest author to use *nomos* [and] is also the first to employ the term in its widest range."²² He goes on to remind us that *nomos* here does not carry the implication of "law" or "ordinance" but "designates the behaviour itself."²² The most general meaning of *nomos*, which is also its earliest extant written (*sic*) meaning, is that of "an order of living, a way of life."²² Thus it might be suggested that a term which later came to mean custom or customs, carrying for the Greeks, as for us, its connotations of relativity — each society has its own *nomoi* by the time we reach Herodotus²³ — in some period before Hesiod referred to the only conceivable order, which would therefore be the correct — the just — order. Before we develop this argument any further, we must take cognizance of Vlastos' point that "the expression [cosmic justice] is redundant in Greek since *Kosmos* itself means a just order."²⁴

Vlastos cites Solon as a justification for this comment which goes some little way towards evidencing the resistance to change of the Greek *Weltanschauung*, because even for Hesiod the *nomos* is split: Zeus has created one behaviour for beasts and one for man. However that may be, if *nomos* is the order by which man lives in society, what we may ask — unlike the earliest Greeks — is the basis of that order? Bearing in mind Ostwald's point that "the etymological method is

fraught with . . . danger,”²⁵ we can read on that “there is universal agreement, as far as I know, that this noun is derived from the same root as *nemo* whose basic concept involves a ‘distribution’ or an ‘assigning’ of some sort.”²⁶ Thus it could be suggested that in the Greece of which we have no written record — in non-literate Greece — harmonious order, which I have termed social equilibrium, was maintained through some taken-for-granted idea of distribution.

In order to emphasise this point we may look at what differentiates the *nomoi* of beasts and of man for Hesiod; it is the idea of *dike*. The development of the idea of *dike* as justice in relation to the increased use of writing by the Greeks has been analysed by Havelock.²⁷ Here I wish to refer to what Havelock says of justice in the *Iliad*: “Justice, whatever it is, can be seen as something exchanged between two parties, or added to both, in the course of a settlement; or, alternatively, as symbolizing the process of exchange itself.”²⁸

To expand on what has been written above, we might surmise that, at the time the *Iliad* was sung, the taken-for-granted *nomos* was preserved by the exercise of *dike*.²⁹ Justice here, then, refers to the continuous process of ordering, not to an abstract concept hedged by moral judgements and in relation to which the individual has rights, the last being more how we moderns understand the term. Indeed, Hesiod’s use of the term *dike* to differentiate man from the beasts would appear to be a movement towards our usage of the term.³⁰

The link suggested earlier between social equilibrium and reconciliation is important because in high literate societies the idea of law is related to the idea of the exercise of punishment by means of sanctions.³¹ In non-literate societies in what we tend to call civil disputes, or disagreements relating to problematic relationships, reconciliation is achieved by judgemental insight. This is true only to a limited extent in literate societies.³²

In what we might call criminal disputes, however, where a member of a society has apparently infringed a well-known norm, the reparation asked of that person — or his kin group — would appear to be not punishment in our sense but a donation, the equivalent in quality to the disruption caused in the functioning of the social structure.³³ This is born out by the statements in many anthropological works³⁴ which indicate a degree of variability of the donation, dependent on not only the importance attached to the norm infringed (something which remains true in literate societies) but also the nature of the kinship relations between the parties concerned.³⁵ Thus this reparation,

which is usually seen in terms of punishment/compensation, should really be seen as a restoration of structural equilibrium.

It was suggested above that in early Greek society there was a link between the generalisability of the idea of *nomos* and the degree to which it was taken for granted. Whilst we are unable to ascertain what happened in that society when an individual stepped outside of the *nomos*, we may look at non-literate societies studied by anthropologists who inform us that there is a difference in treatment accorded to individuals who deviate occasionally as compared with those who do so regularly. In the former case social equilibrium can be maintained; in the latter the individual is either killed or banished — in other words he is no longer perceived as a member of the society.

Hoebel, for example, shows that the Eskimo draw a distinction between murder and homicidal recidivism. In the former case numerous social obligations are placed on the murderer and his victim's relatives. In the latter case, where the murderer obviously does not accept the society's perception of the world by continually ignoring the obligations asked of him, he may be killed by any member of the community, provided the community has given its agreement.³⁶

As this may appear a rather extreme example, another may be of use. Goldschmidt in his book on the Sebei writes of recidivist theft: "The victims of the thief ask his clansmen to take action against him, with the result that the clansmen either restrain him or kill him. If they refuse to do so, these outsiders may avenge themselves against any member of his clan, or may kill him with impunity."³⁷ It may be suggested that non-literate Greece applied the same solution.

What the Greeks thought might happen when an entire society lacked the reciprocal basis of social equilibrium is well illustrated by the cameo story of the Cyclopes in the *Odyssey* who, we are informed, lack *themis*. *Themis* is the word most often used in the *Iliad* and the *Odyssey* that tends to be translated with legislative overtones. Havelock, for instance, translates *themis* as "oral law"³⁸ and when deified, as the Goddess of Law.³⁹ However, when what has been said above concerning *nomos* is taken into account, it is obvious that *themis* cannot mean anything like what we understand by law. Jaeger points out that "etymologically the word means institution."⁴⁰ Perhaps the place in the *Iliad* where the word most tends towards its original meaning is in the phrase: "Let there be one ruler, one king, to whom the son of devious, devising Kronos gives the sceptre and [*themistas*] right(s) of judgement to watch over his people."⁴¹

However, even here where the institution of kingship is being articulated, the idea of law as an institution in its own right is not present. Instead, *themis* refers to the judging (I would prefer to say ordering or re-ordering) act. Moreover this decision is based on, and given through, the order of society, thus keeping the society in harmony with “the institutions set up by Zeus. . . .”⁴² In other words we could say that *themis* as judgement and as institution are inseparable because, since *themis*, or *Themis*, represents an aspect of the established harmonious cosmic order, it manifests and justifies itself as institution through its operation of preserving order. Thus lack of *themis* must also imply the lack of society, as in the case of the Cyclopes: “The Cyclopes have no assemblies for the making of laws, nor any settled customs, but live in hollow caverns in the mountain heights where each man is law-giver to his children and his wives, and nobody cares a jot for his neighbours.”⁴³

The idea of an organised system of established relationships — Maine’s status relationships governing and fixing the nature and organisation of economic reciprocity and thus reinforcing the order of the society — has been well outlined by Sahlins.⁴⁴ As further evidence of the link between the social order and the economic order in the context of Greek society, the fact that cognates of *nomos* refer to pasturage, herdsman, and roaming about for pasture may be mentioned.⁴⁵ The importance of this conceptual link may be illustrated by returning to the Cyclopes for a moment. In spite of the fact that they kept sheep — which allied them to mankind through the conceptual links of *nomos* — they did not, we are very emphatically informed, farm crops.⁴⁶ Thus once again, they are only half within the human *nomos*. Analogously, I would suggest, the Cyclopes did not have laws, nor did they trade with other nations as did the Greeks, nor indulge in establishing the reciprocal action of giving gifts to strangers who came as guests.⁴⁷ Throughout the Cyclopes’ activities there can be seen a link between the social and the economic,⁴⁸ but there still is no true *nomos*. The emphasis on the lack of foreign trade reminds us of ports of trade, discussed above, which had as one of their most important functions, the regularisation of interaction in the sense of appropriate equivalences between societies that otherwise have no connection. It would appear, then, that in non-literate societies law operates in a similar way to manifest and preserve social equilibrium through a reciprocity of equivalences. Lacking ports of trade, modern societies resort to that strange hybrid International Law.⁴⁹

The social organisation of the Greece of the Dark Age seems to fit very well the type of outline suggested above. From centralised societies, each under the kingship of a *wanax* and organised through centralised economic control made possible by the use for administration purposes of Linear B writing, the social organisation metamorphosed into small-scale units, each under the minimal control of a *basileus*, a term which in Mycenaean society appears to have referred to a minor official.⁵⁰ In Dark Age Greece it appears to be best translated as chieftain, a position carrying the minimal powers suggested above. However, over time it would appear that the *basileus* accrued more power until it is best to translate the term as king. This change, of course, occurred in different areas at different times, as did the subsequent shift from rule by a *basileus* to rule by *archons*. My object here is not to look at when such changes happened but at the conceptual shifts related to them in relation to the rise of writing.

In this governmental context, the shift in the use to which the term *demos* was put is important. Starr notes that in Homer the question often put to a stranger was “What is your *demos*?”⁵¹ and he then emphasises the vagueness of this term as a reference to a physical place. Rather, as would be expected in societies based on kinship relations, the term seems to refer to a request for the specification of one’s social group, which would have been primarily one’s kinship group. In Mycenaean Greece, Chadwick informs us, there appears to have been a link between *damos* with a meaning of something like the “collective voice of the district” and *demos* as meaning the plot-holders.⁵² The shift in later times, therefore, to a meaning associated with kinship group would be a shift of emphasis only, reflecting the movement of the society towards having a basis in kinship. The more abstract aspect of the meaning of *demos* is important because, whilst it also came to have the meaning of village — almost one might think an inevitability given the combination of sedentary kinship groups and its original Mycenaean meaning — its more abstract meaning shifts from kinship group to citizen (if only in a low social category) by the time of Solon (c. 594). Thus Solon writes: “To the *demos* I have given such honour as is sufficient, neither taking away nor granting them more.”⁵³

In the first place, the change of meaning implies a shift away from a kinship-based social structure. In the second place, *demos* as citizens suggests an individualisation of the social group only made possible by a shift in conceptualisation which allows another abstract overarch-

ing, unifying term to take its place. This is important because, unless a social group has the ability to perceive itself as unified, there must follow a breakdown of social organisation. Indeed this relationship might better be expressed the other way round: without a social organisation a society will not perceive itself as a unit. In fact the differing emphases in these two foregoing statements reflect different *Weltanschauungen*, which in turn reflect alternative developments in politico-legal institutions. Thus the former reflects the emphasis in modern, literate societies on objective, general constitutions coupled with an objective, enforceable set of laws both of which are administered by a governing body who perceive the politico-legal institutions as in some way protecting, or giving shape to, the state (a term not without problems itself, of course). The latter statement reflects better the situation in non-literate societies where the perception of unity is lodged within the on-going social structure or, to put it more basically, unity *is* what unified *does*. In Greece there was a movement away from this latter idea to the former. It is this movement which I consider to be closely linked to the changing perception of writing and the use to which it was put.

If *demos* came to represent the citizens, then it was *polis* which came to be used for the general unity of people. However, "in the epics the word *polis* means only a central geographical point, often a citadel."⁵⁴ In other words, this was probably the most lasting physical representation of the spatial aspect of the meaning of *demos*. From this meaning the concept of *polis* shifted until it came to mean the area within which all people were subject to one set of politico-legal regulations. Thus by the time we get to Aristotle (c. 384-322) we find him writing: "Man is by nature an animal intended to live in a *polis*."⁵⁵ By this time also the use of archives for storing documents had become so important that Aristotle himself regarded "the archives office as one of the indispensable institutions of his model state."⁵⁶

However, I would not like to give the impression that the relationship between *demos* and *polis* at Athens was equivalent to that between citizens and state in modern terminology. Although the importance of written law was by this time so great that in 330 Lycurgus could write: "Come now gentleman, if anyone went into the Metroon [archives house] and erased a single law and then alleged in defence that this law meant nothing to the city, would you not have put him to death? I believe you would have been justified in doing so if you wanted to protect the other laws,"⁵⁷ nevertheless the distinction be-

tween the interests of the individual and the interest of the state was not present. Bonner makes the point, which relates to what has been noted above concerning non-literate societies, that "the modern division of suits into criminal and civil was unknown in Athens."⁵⁸ He then states that there was a separation into private suits and public suits but that this distinction reflects only whether or not the state as a collective body was involved. Posner points out that the Metroon held a collection of documents which in the modern state would be divided into public documents and those for private use; he suggests that "in as much as the state, the *polis*, was identical with, and the sum total of, its citizens (*poltai*), many seemingly private aspects of their lives were of concern to the state."⁵⁹ Even at this time, then, social cohesion was still maintained by the idea of an essential unity — an order — within the society, although this was becoming increasingly tenuous. Indeed it was precisely because Athenian society still perceived society as essentially unified that the works of the Sophists caused such political, as well as intellectual, unrest as is noted later.

One other aspect of the concept *polis* is important for present consideration and that is the religious development on the ground of the old physical *polis*. Starr emphasises that *polis* should not be translated as city state because, whilst originally being the focus of activity within the community, it came to represent a holy place — a place not necessary always at the urban centre: "As the Greeks began to build temples they normally located the shrine of the patron deity of their state at that site [the *polis*]."⁶⁰ These temples started to be built about the seventh century. At one level the building of the temples at this time reflects the change in social organisation from *demos* to *polis*, for the former would not have had the manpower or the skills to build the new stone temples. At a conceptual level the creation of the temples reflects a shift in the whole attitude towards religion. Instead of religion functioning within the social group, based in the family unit — in other words, an aspect of the *demos* — it now came to be based in the abstract structure of the *polis*. As a result there was created a necessity for focal religious points, places where individuals could communicate with the gods, and these came to be situated on those spots which had had special ritual meaning for the more important *demoi*.

Thus religion, which for the Greeks included the cosmic order as manifested in the behaviour of the gods, gradually came to be decontextualised from the social situation. As this occurred, so was it reconstituted in the abstracted umbrella concept within which the new

individuals organised their society. Another way of describing this transition which highlights developments in early Greek philosophy and which reached culmination in the Sophists would be to talk of the demythologising of society.

At the same time the people created points — temples — which could be used as links with the distanced cosmic order. Perhaps the best example of this process can be found in the building of the Parthenon at Athens in the late fifth century. The Parthenon, built dominating not only Athens but the Acropolis itself, was not the centre of the worship of Athena (the goddess of Athens); this worship was situated at the Erechtem as it always had been. The Parthenon was a religious monument to the glory and unity of Athens — a visible symbol of the new singlemindedness in politics and religion, which allows us to talk of the creation of an Athenian state. This type of development is by no means unique. The monasteries functioned as linking points with God in the *societas christiana* of medieval Europe⁶¹, as did the temples of ancient Egypt.⁶²

The shift in the conceptual and physical location of religion is important because the evidence suggests that in non-literate societies the religious order is conflated into the social order, and the social order is justified by teleological recourse to the cosmic (religious) order. This, indeed, would appear to have been the case in the Greece of the early period described above. Thus it is not surprising to learn that it is not until the fifth century, the time when a separation was taking place, that *nomos* is used in a political or judicial sense.⁶³ For until this time these meanings would have been subsumed within the more general meaning of *nomos*.

We can, therefore, say that the preservation of the social equilibrium discussed above is perceived as of overwhelming importance for the preservation of the society by the members of that society because the social equilibrium is perceived as the physical manifestation of cosmic harmony.⁶⁴ Should a society with this understanding of the world then alter from a position of minimal government (which is not minimal government at all but merely minimum overt government) to a monarchic government, where order is seen to be preserved by decrees from the king, then one would expect some divine overtones to accrete to kingship. This indeed occurs: in Egypt the Pharaoh was a complex god-king,⁶⁵ in Mesopotamia kingship itself was from the gods,⁶⁶ and for the Inca, Viracocha “was the supernatural analogue of the Inca Emperor.”⁶⁷ We may also note that in the *Iliad* the sceptre

which is the sign of Agamemnon's kingship is given a lineage of ownership which states that it originally belonged to Zeus.⁶⁸

Now whether or not Wittfogel is correct in seeing the development of systems of counting and writing as being linked to the needs of societies based on hydraulic agriculture,⁶⁹ given the evidence of the use to which the earliest writing was put, we must agree with Gelb when he writes: "The Sumerian writing owes its origin to the needs arising from public economy and administration."⁷⁰ This in turn occurred because the centralising of power tends to be reflected in such a centralising of the economy that a multi-focused system of reciprocal exchange becomes unified into a unicentred system of accumulation and redistribution.⁷¹ As production increases, or the system expands, memory cannot keep up, so either the society becomes self-limiting (potlatch may be an example of this) or a mnemonic system must be developed. Sumeria and Egypt made use of writing; the Incas invented the *quipu*. Thus, whilst literacy cannot be said to instigate the development of hierarchical societies it does become a potent force in their elaboration. At first this happens through the increased opportunity which writing allows for control over the economy.⁷² But later it is manifested in the use of writing to articulate laws.

In non-literate society law, as an aspect of cosmic harmony, appears integral to the functioning of the society, and arises out of it. By way of contrast in literate societies I would suggest that power, and its manifestation in law, tends to operate the other way around. Law in hierarchical societies tends to be generated by those who have power, placed in writing for remembrance and referral, and executed on to the individuals who compose the society. At this stage the whole ideology of the integration of social equilibrium and cosmic harmony is lost; the idea of justice must be redefined in social terms, and there is the development of what Bohannan has called "double institutionalisation," which allows a society to develop an overtly political concept of law. To quote Bohannan, "legal rights have their material origins (either overtly or covertly) in the customs of non-legal institutions but must be *overtly restated*⁷³ for the specific purpose of enabling the legal institutions to perform their tasks."⁷⁴ The phenomenon of double institutionalisation may be seen as the premise on which has been built the Austinian concept of law as a series of regulations to be enforced. Furthermore, it is writing which allows for the expansion of overt restatement into constitutions, law-codes, collections of precedents, and the like which make up the basis of the

idea of a modern legal system. Thus writing and the long-term, large-scale wielding of hierarchised power are intimately linked.⁷⁵ It is writing — by allowing for the objectification, classifying, and coding of law — which provides the technology for the dislocation of the society's concept of social organisation based on equilibrium from the ideology of cosmic harmony. When this separation begins, the premise or organic equilibrium tends to be replaced by an ideology based on coercion, punishment, and a pyramidal power structure.

This is what I wish to suggest occurred in Greece where the developments may be well observed through the preservation of a significant amount of the documentary evidence.⁷⁶ In Greece in general, and Athens in particular, the uncontrolled spread of writing through the population allowed for the possibility that individuals might realise the potential of script for the elaboration of critiques of, and even alternatives to, the *nomos*. This, of course, would be even more likely in a time of social upheaval — which itself presupposes some idea of alteration of the *nomos* — such as Athens experienced about the fifth century. As Burn suggests, “the [law] Codes are typically a product of an age of revolution.”⁷⁷

The generation and expansion of debate over *nomos* from the pre-Socratics onwards implies the gradual destruction of the previously taken-for-granted human and cosmic harmony. This harmony became lost in relativistic questioning of good, bad, right, and wrong, and the generation of a large number of competing ideas as to the composition of reality. Indeed these two aspects of Greek thought were so comingled that we can, with justification, talk of conflicting ideologies. The climax of this questioning of the taken-for-granted order came with those people whom we classify as Sophists and it may be suggested that it was because of the threat which they posed to the harmonious basis of the *polis* that they were disliked by many in the society.

There was one intriguing exception to this otherwise general Greek development, and that was Sparta. This is not the place to discuss Sparta other than to suggest that, unlike the other Greek states, in Sparta a high degree of control was exercised to limit those to whom literacy was made available and for what purposes writing could be used. For example, Lycurgus, that obscure Spartan law-giver, having codified a number of laws, is credited with a further decree that there should be no more written laws. Thus the oral, embracing *nomos* of Spartan society survived long enough for writers from other *poleis*, such as Xenophon, to look on its stability with envy.⁷⁸

The critical conceptual point in the changes in the structure of the *Weltanschauungen* that occurred from the sixth century onwards may, I think, be found — as Havelock finds it — in the developing importance of a concept of justice,⁷⁹ for justice becomes the metaphysical link between the human order and the cosmic order. Ehrenberg points out that, for Solon, “his *eunomia* implied the rule of *dike*, of justice.”⁸⁰ *Eunomia* here is given the meaning of good order. However, for Solon, as for earlier Greek society, the attempt to establish good order implied the re-establishment of cosmic equilibrium where the goodness is taken for granted.⁸¹ As a result *dike* is still in the background. Moreover, in spite of his position as an *archon*, a person who at this time governed in the *polis*, Solon was still perceived as *diallaktes*, a mediator. He was perceived, therefore, as one who re-established a harmony based on a concept of a fair, that is to say, an accepted, cosmically based distribution.

Eunomia, then, whilst in practice referring to the ordering of society, conflates those aspects of social interaction which the early Greeks appear to have taken for granted as being basic to social equilibrium. Versenyi states these succinctly as “proportion and right balance between man and man in possession, freedom and power. This is . . . what Solon’s legislation was intended to bring about in the service of justice — legal, political, and economic.”⁸² Here again we find ourselves referred to the link, noted above, between an economic order based on reciprocity and a social order based on the same, for here again as in the root word *nomos*, *eunomia* carries both aspects in its meaning.

Solon’s laws, the written laws promulgated to restore order to the *polis*, were described as *thesmoi*. *Thesmoi* was a term used of the judgements in earlier cases and the first thing which should be noted is that Solon’s decrees were not judgements in the old sense. Rather Solon’s judgements were a series of rules to be followed which would regularise Athenian society.

In other words, Solon used writing to articulate a series of rules disobedience to which would be judged. This form of articulation would have been all but impossible without writing because, in order to re-establish a harmonious society, Solon was creating new rules to be followed, rather than preserving a harmonious society by the practice of judgement. Thus the application of writing to legislation by Solon, and previously by Draco, changed the context of the use of the term *thesmos*.

In earlier Greek society *thesmoi* had been the manifestation in practice of *dike*. As *thesmoi* moved towards the meaning of rules, so *dike* increased in importance and its meaning altered to create a concept which we might translate as justice, in other words the correct execution of the rules laid down. Here, then, is the key to the conflict between Maine⁸³ and Diamond⁸⁴ as to the nature of *thesmoi*. At an early period in Greek history they were both religious (Maine's argument) and secular (Diamond's argument) because they represented utterances intended to keep the human and cosmic worlds in harmony. It is possible to see how the term shifted to apply to the coercive written regulations laid down by Draco and later by Solon who, nevertheless, still thought they were re-establishing a harmonious cosmos. Indeed Solon states that "*Eunomia* renders all things well-ordered and harmonious."⁸⁵

If the logic of this argument may be accepted, then we are able to give an answer to the problem raised by Ostwald⁸⁶ that *thesmoi* seems at one moment to refer to oral decrees, at another to those which are written. Concepts alter as new material situations arise. *Thesmos* carried an earlier meaning of a judgement or decree correct within the world order; this made it the most appropriate term for Solon's code of laws for, as has been noted, human and cosmic harmony were still perceived to prevail. Only later, with the breakdown of this idea, do written laws come to be termed *nomoi*, or enforced customs.

The reason for Draco's and Solon's written articulation of laws was to set out a number of precepts by which all groups, including the *demos*, could live in a state of *eunomia*. Hesiod deified *Eunomia* as the daughter of Zeus and Themis. She has been described as "one of the guardians of the social order, keeping the city from violence and lawlessness."⁸⁷ In the deification of *eunomia* we see in practice a striving to keep unified the social order and (good) cosmic order.

It is of interest to note that later writers confine *Eunomia*'s sphere of influence to individual city states. This occurs at the same time that there is a shift from the perception of law as *thesmoi* (individual judgements of a generalised *nomos*) to *nomos* as a relativised law perceived as custom and specific to individual *poleis*. It must be remembered that Athens at this time was undergoing a period of considerable unrest during which the normative order was breaking down. The abiding concern with cosmic harmony may be emphasised by noting that the *archons* appointed to govern after the demise of kingship were known as *Thesmothetai*, or Givers of Decisions, and

that their job was not merely to give judgements on cases brought before them but to govern the *polis*.⁸⁸ A change in the perception of written laws is apparent in the generations following Solon.

By the time of Cleisthenes we find written regulations being called *nomoi* and the type of society that he claimed to create by these regulations *isonomia*, which is translatable as a society based in equality — as Ehrenberg writes, “equality before the law as well as equal political rights, equal share in the state.”⁸⁹ Equality, here, in no way implies anything like social equality; rather it marks the end of any social order based on a system of reciprocity. Equality in this context implies that the written *nomoi* are applicable to everybody. The transition has passed its climax, the people of the *polis* are now all individuals subject to written *nomoi* laid down by the rulers of the *polis* and those rulers themselves are (officially) subject to them. I use officially parenthetically because now that *nomos* has to a crucial extent lost its sense of a pre-established order, the link between social order, law, and power in the form of coercion becomes paramount. At this moment *nomoi* become an example of double-institutionalisation. A movement has occurred whereby the *polis* is no longer ordered by *thesmoi*, which are enforced by *thesmothetai* to give *eunomia*. Written regulations themselves are now seen as *nomoi* to be obeyed. The purpose of the *thesmoi* had been to regulate *nomos* in the proper manner. The transference of the term *nomos* to written regulations emphasises the increasing authority of a legal system based on writing combined with an executory government and a corresponding decline in the idea of judgement as the practical expression of a harmony based on reciprocity. Simultaneously, the use of writing opened up to the Athenians the possibility of debate concerning which written *nomoi* were good *nomoi*. This problem, and the realisation of the importance of written laws for the day-to-day government of the Athenian state by the Athenians themselves, is reflected in the development of the validating mechanism of *nomosthesia*. This in turn was made possible by the appointment of *nomosthetai* sometime in the late fifth century to rationalise and elaborate the written law.⁹⁰

The uncontrolled spread of literacy in Greece meant that, as writing came into use as a medium of communication, conflicting ideas could be elaborated and preserved which, as a result, threatened the homogeneous, holistic world view. This, in turn, dispersed what Dodds, following Murray, has called the “Inherited Conglomerate.”⁹¹ This conglomerate may be understood as the complex of

embedded religious ideas and customs with which Greek oral society operated. It was replaced by a series of conflicting views of the world which in turn entailed conflicting epistemologies and conflicting ideas of how society should be governed and what laws should therefore be instituted. Writing made these organised elaborations possible. It was the realisation of the relativity of these views by that heterogenous group known as the Sophists, through their investigations concerning, among other things, the relation of *nomos* to *physis* (which had a meaning like *natural* in English), which created the break between the idea of cosmic and human harmony and the experience of government through written laws in a *polis*. It is no wonder the conservative authorities in Athens reacted against this group of disparate thinkers. As Dodds points out,⁹² the beginnings of the realisation of the relativity of ideas can be traced back to the earliest Greek philosophers and these people whom we call philosophers were also the first Greeks to realise the power of writing as a medium of communication.

What I have attempted to show is how writing aided the development of a concept of law in Greece and how this reflected a changed understanding of the idea of power. In doing this I have emphasised the aspect of the use of writing which at the beginning of this paper I called conceptual. Because of considerations of length the second aspect, that of the institutionalisation of writing, has been sadly underexamined in this paper. In spite of this I must repeat that changes in the conceptions surrounding writing and changes in the mode of institutionalisation of writing are intimately linked.

In Greece writing was perceived without any religious overtones and, as a result, its use for the preservation of order allowed for the secularisation of government, which in turn aided the development of a fracture between cosmic and human societies.⁹³ In consequence the idea of power in society had to be redefined in terms of secular authority. Furthermore the equation of harmony with the preservation of equilibrium through reciprocity was replaced by concepts of justice and punishment within *human* society.

I would like to suggest that one of the most important reasons for the rapid flowering of written Greek thought was the early lack of governmental control of literacy. As a result of this lack, the Athenian government, in spite of all its late attempts, was unable to stop the rapid development of moral and ethical debates which were directly related to the increasing secularisation of the idea of social order.

This, in turn, led to the rapid development of an idea of law based on control and therefore on exercised power.

There is, I would go on to suggest, an important relationship between the development of a concept of law as it is understood in modern societies and the different uses to which writing has been put.

In Greece, and most particularly in Athens, lack of control of writing allowed for the possibility of the elaboration of conflicting sets of ideas, thus necessitating the development of a state system based on repressive written laws created and amended by the government. This development also requires changes in attitude towards justice and towards what came to be called punishment. We might ask what changes may occur in our own society as a result of a combination of changing economic circumstances and the acceptance of new technologies as media of communication.

1 On the relation between law and social structure, vid., e.g., E. Durkheim, *The Division of Labor*, New York, 1964; K. Marx, *Capital*, III, Moscow, 1962; and later Marxist theories such as E. Pashukanis, *General Theory of Law and Marxism*, London, 1978; P. Hirst, *On Law and Ideology*, New York, 1979.

2 E. Havelock, "Preliteracy and the Pre-Socratics," *Bulletin of the Institute of Classical Studies of the University of London*, XIII, Part I, 44-67.

3 M. I. Finley, *Early Greece: The Bronze and Archaic Ages*, London, 1970, pp. 88-89.

4 R. Revere, "No Man's Coast: Ports of Trade in the Eastern Mediterranean," in K. Polanyi, ed., *Trade and Market in the Early Empires*, New York, 1957.

5 It is noted by D. Harden (*The Phoenicians*, London, 1963, p. 122) that a great library of Punic literature was known to have existed at Carthage in 146, i.e., before the sack by Rome. However, Carthage does not appear to have been typical. Here I am discussing the Eastern cities about 800 years earlier.

6 E. Posner, *Archives in the Ancient World*, Cambridge, 1972, pp. 31-36.

7 Harden, p. 79.

8 *Ibid.*, p. 102.

8a The earliest example of writing that we have from Sumeria is of a temple accounting system; vid., e.g., H. Frankfort et. al., *Before Philosophy*, Harmondsworth, 1968, chap. V., passim.

9 On this problem, vid. E. Havelock, *Preface to Plato*, London, 1963, passim.

10 Vid. A. Snodgrass, *The Dark Age of Greece*, Edinburgh, 1979.

11 Vid. J. Chadwick, *The Mycenaean World*, Cambridge, 1976, passim.

12 Finley, p. 38.

13 But see Chadwick, pp. 64-66, for a more developed view of this problem.

- 14 C. G. Starr, *The Economic and Social Growth of Greece*, Oxford, 1977, p. 30.
- 15 These wise men were called *logoi*, a term later applied to those men who wrote histories. This transition in meaning is interesting because the legislative decisions of the wise men would be based on their lived, therefore historical, understanding of the operation of their society.
- 16 L. Mair, *Primitive Government*, Harmondsworth, 1964.
- 17 Vid., e.g., M. Gluckman, *Politics, Law and Ritual in Tribal Society*, London, 1965.
- 18 Mair, p. 61.
- 19 B. A. Van Gronigen, *In the Grip of the Past*, Leiden, 1953, passim.
- 20 M. Gluckman, *The Ideas in Barotse Jurisprudence*, Manchester, 1972, p. 10.
- 21 S. Moore, "Legal Liability," in M. Gluckman, ed., *The Allocation of Responsibility*, Manchester, 1972, p. 66.
- 22 M. Ostwald, *Nomos and the Beginnings of the Athenian Democracy*, Oxford, 1969, p. 21.
- 23 Ibid., p. 35.
- 24 G. Vlastos, "Equality and Justice in Early Greek Cosmologies," *Classical Philology*, 1947, vol. 42, p. 156.
- 25 Ostwald, p. 9.
- 26 Ibid. It should be pointed out that Ostwald goes on to say that he can see no link between *nomos* as order/behaviour and the idea of distribution.
- 27 E. A. Havelock, *The Greek Concept of Justice*, Cambridge, 1978.
- 28 Ibid., pp. 132-33.
- 29 Ibid., p. 135. A "justice" (in the *Iliad*) is something spoken aloud.
- 30 For this argument more fully developed, see *ibid.*, chap. II, "The Justice of Hesiod," passim. Havelock, *Greek Concept*, p. 217, makes the pertinent point that "when [Hesiod] personifies 'her' [Dike] as a goddess, has he not embarked on a route that will lead to the separation of justice as idea from the activity which achieves it?"
- 31 The close relationship between the individualising of society and the development and use of sanctions is brought out in M. Foucault, *Discipline and Punishment*, Harmondsworth, 1979.
- 32 In this context it is worth noting that the Sumerian law-codes for the most part talk of reparation for crimes against individuals, not punishment. Punishments such as mutilation or death were reserved for crimes against state institutions. It was only as an ideology of the state evolved in ancient Mesopotamia and individuals came to be seen as a part of the state, their protection as a responsibility of it, that punishment came to replace reparation.
- 33 But remember Malinowski's point in *Crime and Custom in Savage Society* (London, 1976) on the impossibility of distinguishing civil and criminal cases in savage societies.
- 34 In general, *vid.* Mair, chap. I.
- 35 In this point the variety of payment demanded depending on the status of the person *against* whom the transgression was committed, illustrated in the Sumerian law-codes, should be noted.

- 36 E. A. Hoebel, *The Law of Primitive Man*, Cambridge, 1954, pp. 87-89.
- 37 W. Goldschmidt, *Sebei Law*, Cambridge, 1967, p. 174.
- 38 Havelock, *Greek Concept*, p. 135.
- 39 *Ibid.*, p. 101.
- 40 W. Jaeger, *Paideia*, London, 1965, p. 103.
- 41 *Iliad*, trans. R. Lattimore, Chicago, 1951, book II, lines 204-6.
- 42 Jaeger, p. 103.
- 43 *Odyssey*, trans. E. V. Rieu, Harmondsworth, 1946, book IX.
- 44 M. Sahlins, *Stone Age Economics*, London, 1974.
- 45 Ostwald, p. 9
- 46 *Odyssey*, book IX.
- 47 It should also be noted that to the extent that the Cyclopes are human they are cannibals, for the Cyclops eats Odysseus' sailors. However, the eating of one's own kind is a characteristic which Hesiod places in the *nomos* of the beasts. Thus to the extent that the Cyclopes are human, they are not only not civilised but not human.
- 48 In this context of conceptual links between the social and the economic, it is worth citing M. Gagarin, "Dike in Archaic Greek Thought," *Classical Philology*, 69, (1974), p. 186. Gagarin suggests that Hesiod creates a concept of *dike* "legal process, law" which is based on the original judicial meaning of *dike* as a "settlement" in property disputes, and Hesiod (in *Works and Days*) pleads for an acceptance of *dike* as a necessary condition for economic prosperity.
- 49 On the similarities between Primitive Law and International Law, see M. Barkun, *Law Without Sanctions*, New Haven, 1968.
- 50 Chadwick, p. 70.
- 51 Starr, p. 30.
- 52 Chadwick, p. 77.
- 53 Quoted in V. Ehrenberg, *From Solon to Socrates*, London, 1937, p. 70.
- 54 Starr, p. 31.
- 55 *Ibid.*, p. 30. Here I use Starr's translation, which carries Aristotle's meaning better than the more usual translation "Man is a political animal."
- 56 Posner, p. 92.
- 57 *Ibid.*, quoted p. 114.
- 58 R. Bonner, *Lawyers and Litigants in Ancient Athens*; New York, 1927, p. 44.
- 59 Posner, p. 96.
- 60 *Ibid.*, p. 31.
- 61 *Vid.* R. W. Southern, *Western Society and the Church in the Middle Ages*, Harmondsworth, 1970.
- 62 H. Frankfort et al., *Before Philosophy*, Harmondsworth, 1949. p. 30.
- 63 Ostwald, p. 43.
- 64 *Vid.* M. Douglas, *Natural Symbols*, Harmondsworth, 1973, and bibliography. More particularly in the context of this paper: M. Gluckman, *Politics, Law and Ritual in Tribal Society*, London, 1965, chap. VIII, *passim*.
- 65 Frankfort, *Before Philosophy*.

- 66 H. Frankfort, *Kingship and the Gods*, Chicago, 1948.
- 67 J. Alden Mason, *The Ancient Civilizations of Peru*, Harmondsworth, 1969, p. 206.
- 68 K. Wittfogel, *Oriental Despotism*, New Haven, 1957, p. 50.
- 69 *Iliad*, book II, lines 100-108.
- 70 I. Gelb, *A Study of Writing*, Chicago, 1963, p. 62.
- 71 For a detailed examination, vid. Sahlins; also Polanyi, ed.
- 72 Vid., e.g., gs. Dow, "Minoan Literacy," *American Journal of Archeology*, pp. 108-29, on Mycenaean control of Crete through a palace-centered economy utilising Minoan Linear B.
- 73 Bohannan's italics.
- 74 P. Bohannan, "The Differing Realms of Law," in L. Nader, ed., *American Anthropologist*, 67, no. 6, part 2 (1965), p. 37.
- 75 The Ashanti kingdom has often been cited as an exception. Hoebel, p. 211, suggests that they did not have writing but I. M. Lewis in *Islam in Tropical Africa* (Oxford, 1966), points out the intimate links between Muslim traders who wrote Arabic and the Ashanti kings.
- 76 In Ostwald, p. 65.
- 77 A. R. Burn, *The Lyric Age of Greece*, London, 1967, p. 81.
- 78 Xenophon, *State of the Lacedaemonians*.
- 79 At an analogous moment in Sumerian history Hammurabi in that legal code which has come to be called the Code of Hammurabi writes of giving his people "good governance" by setting forth truth and justice throughout the land. To be found in W. M. Neill and J. Sedlar, eds., *The Ancient Near East*, Oxford, 1968, p. 141.
- 80 Ehrenberg, p. 219.
- 81 Vid. G. Vlastos "Solonian Justice," *Classical Philology*, 41 (1946), pp. 65-83.
- 82 L. Versenyi, *Man's Measure*, Albany, 1974, p. 98.
- 83 H. Maine, *Ancient Law*, London, 1906.
- 84 A. Diamond, *Primitive Law*, London, 1935.
- 85 In Ostwald, p. 65.
- 86 *Ibid.*, pp. 16-19.
- 87 Andrewes, quoted in Ostwald, p. 63.
- 88 A. R. Burn, *The Lyric Age of Greece*, London, 1967, pp. 22-25; Bonner, p. 32.
- 89 *Ibid.*, p. 96.
- 90 On this problem, vid. A. R. W. Harrison, "Law-making at Athens at the End of the Fifth Century B.C." *Journal of Hellenic Studies*, 75 (1955), pp. 26-35.
- 91 E. R. Dodds, *The Greeks and the Irrational*, Berkeley, 1951, p. 179.
- 92 *Ibid.*
- 93 It should also be noted that the unusual concatenation involving writing, religion, and society in ancient Greece had a profound effect on the economic sphere of activity. Vid. K. Polanyi, "Aristotle Discovers the Economy," in Polanyi, ed.

In Defence of Conservatism in English Orthography

English orthography presents the reader with many different kinds of linguistic information beyond the simple sound of the word.

Evidence from a variety of psycholinguistic tasks shows that both adults and children can exploit this information and this could enable them to read more efficiently.

It is argued that a fast and effective writing system need not stay close to the phonemic detail of speech, and shorthand systems are given as further examples of this.

Some proposals for spelling reform are briefly evaluated in the light of this evidence.

The argument in this paper is that spelling systems that carry more than purely phonemic information are better suited to the requirements of fluent adult readers, and that different systems of spelling can induce different reading strategies in young readers, these reading strategies perhaps not being best adapted for fluent reading. Accordingly we can draw the conclusions that there are advantages to the use of current English orthography.

Consider first a problem that I want to argue has many parallels with the problem of designing writing systems, namely the problem of designing mathematical systems of notation. It is often the case that the gap between the way a mathematical idea is written down and the way it is spoken is quite large. For example: $\frac{1}{2}(x+2)^2 = 20$, which is spoken (in my dialect) as "half x plus two, all squared equals twenty." Note that although the symbol "2" appears four times, it is spoken in a different way on each occasion, and that some symbols (the brackets) affect not so much the way each element is spoken in isolation, but the way they are grouped together: $\frac{1}{2}(x+2)^2$ and $(\frac{1}{2}x+2)^2$ are spoken with a different rhythm. Now this notation undoubtedly poses problems for the learner, and any mathematics teacher will be able to tell

you of pupils who confuse $\frac{1}{2}(x+2)^2$ and $(\frac{1}{2}x+2)^2$, and, more fundamentally, even of some pupils who confuse “multiplying by 2” with “raising to the power 2.” Despite this state of affairs, there is no great pressure to reform algebraic notation comparable with the pressure to reform English orthography. This is because algebraic notation is a particularly successful way of expressing a variety of *concepts* (multiplication, division, raising to a power, etc.) and this is crucial when algebraic problems of any complexity are attempted: a notation that translated directly into words would leave most of the essential concepts more obscure. When “reforms” have occurred in mathematical notation (the replacement of Roman by Arabic numerals, the preference for Leibniz’s rather than Newton’s notation for the differential calculus), they have always been in the direction of making *thinking* easier, not necessarily of making *speaking* easier.

Consider now the case of alphabetic systems and the problems of reading and writing. Some recently invented orthographies are not strictly phonemic (Faroese orthography, invented by a linguist in the nineteenth century, contains morphemic information [O’Neil, 1972]) and, as we shall see later, even the best shorthand systems, which are the subject of quite frequent reforms, contain much that is not phonemic or phonetic. However, most alphabetic orthographies have begun by coding only phonemic information, yet in the course of time, largely because the rate of change of spelling is slower than the rate of change of speech, the spelling system has become related to the speech system only in a rather indirect way. Most notoriously this is the case with English spelling, where the writing of vowels is more closely related to the way these vowels were pronounced in pre-Tudor English, and where over the centuries many foreign words have been absorbed into the language, with their pronunciation being adjusted but their original spelling being retained.

We argue that just as systems of algebraic notation achieve distinct advantages through distancing themselves from the pronunciation of the propositions they express, so an alphabetic system that expresses linguistic information in an abstract way has advantages over a system that seeks to express only the phonemic form of language. In discussing the optimal design for a writing system, we need feel not more constrained by the observation that alphabets were originally designed to express sounds than a mathematician should worry that geometry was originally developed to measure the areas of fields.

In what ways can alphabets code linguistic information abstractly?

First note that even a phonemic system is itself an abstraction. In my homedialect, for example, /p/ of *pun* is pronounced with aspiration [p^hʌn], but the /p/ of *spun* is pronounced without aspiration [spʌn]. In writing both these sounds with the same letter *p*, a writing system is making an abstraction, deciding which distinct phonetic items should be classed together. The reason why such a convention is entirely acceptable is that it is entirely regular and hence predictable: all my word initial /p/s are aspirated, all /p/s in the consonant cluster /sp/ are unaspirated. So provided I have a writing system that marks word boundaries, I can always derive the pronunciation of /p/ by rule. This type of observation is given by linguists such as Chomsky and Halle (1968) the status of a fundamental principle: what can be derived by rule need not be marked in an orthography. For example, there exist pairs of words in English that differ only in the location of primary stress — *a súrvey* (noun), *to survéy* (verb) — but it is unnecessary to indicate stress in the orthography, according to Chomsky and Halle, because stress location in English is derivable by rule; similarly the vowel alternations in word pairs such as *divine-divinity*, *serene-serenity* are rule governed and need not be marked. While we lose information in failing to mark these distinctions in sound patterns, we gain by being able to have similar visual forms representing related ideas (the noun and verb forms of *survey*, obviously related ideas, are written the same; the related pair *divine-divinity* have more letters in common than they have sounds in common).

I want to emphasise that this paper is far from being a full endorsement of Chomsky and Halle's position. Much of their phonology, it seems to me, is highly implausible at a psychological level, and I am grateful to Valerie Yule (1978) for pointing out the large numbers of exceptions there are to their rules when we first look at the sort of high frequency words that a beginning reader is first exposed to. But I think Chomsky and Halle's essential insight — that an abstract writing system has the power to express important linguistic relations that are missing from a more directly phonemic spelling — should not be ignored by spelling reformers. I now give several examples where the conservatism of English orthography has produced features that could help a fluent reader.

1 *Word stress*. The location of primary stress in poly-syllabic words in English is not easily predicted, since it depends on several phonemic, morphemic, and syntactic factors, and stress is unmarked

Table I *Stress and spelling*: although words like *antenna* and *umbrella* have only one final consonant phonetically, their stress pattern is characteristic of words with two final consonants (*veranda*) not one final consonant (*domino*). Their spelling is giving an extra cue to their pronunciation.

SHORT PENULTIMATE VOWEL			LONG PENULTIMATE VOWEL
<i>Single final Consonant</i>	<i>Double final consonant</i>	<i>Two final consonants</i>	
domino	antenna	veranda	aroma
bungalow	umbrella	penumbra	tornado
anathema	armadillo	coriander	Minnesota
cinema	stiletto	pimento	arena
buffalo	abscissa	calypso	proviso

directly in English orthography. However, stress placement is rule-governed, and we have shown in a series of studies (Baker and Smith, 1976; Smith and Baker, 1976; Groat, 1979) that English speakers know quite a lot about these rules, to the extent that when subjects read aloud written nonsense words embedded in normal English sentences, the location of stress is affected by such factors as whether the final vowel in the word is tense, whether the word ends in two consonants, and whether the word is a noun or a verb. These skills are present even in seven-year-old children.

One feature of stress assignment is that it can sometimes be predicted more directly from the written form of the word than from the phonemic form. For example, three-syllable nouns with lax vowels take stress on the first syllable if the second vowel is immediately followed by one consonant (*cínema*, *cátapult*), but stress is placed on the second syllable if the second vowel is immediately followed by two consonants (*veránda*, *fiásco*). Some words are apparent exceptions to this rule: *umbrélla*, *regátta*, where only one consonant follows the second vowel in the spoken form of the word. These exceptions are neatly handled with reference to the written form of the word; *umbrella* has two 'visual' consonants following the second vowel, putting it in the same class as *veranda*. See Table I. Similarly, while two-syllable nouns with final lax vowels take stress on the first syllable (*témpest*, *búcket*) some exceptions such as *giráffe* and *grotésque*

can be accounted for with reference to an underlying three-syllable form, like *veránda*, from which the third syllable is deleted: although we do not hear this third syllable, its presence is still signaled in the written form by the silent final *e*. Our experiments have shown that readers do take account of double consonants and silent final *e*'s in pronouncing nonsense words, and we can conclude that such conventions will help a reader in handling unfamiliar words whose pronunciation he might be uncertain about.

2 *Effects of spelling system on reading strategies.* One issue which has received little attention in studies of spelling systems concerns the influence of the type of information contained in a spelling system on the way a child or adult carries out fluent reading. The novice reader has to move from a strategy of laboriously reading aloud all the words he comes across to a strategy of 'reading for meaning' which can be many times faster than natural speech and where any conversion of a word into its full spoken form might actually interfere with efficient reading. It seems to me there is a possibility that if, say, a child is brought up on a highly phonemic alphabet, his attitude to reading and his reading strategies might overemphasise the phonemic aspects of reading, to the detriment of the lexical and semantic aspects. In this respect, a more abstract system might encourage the child to look beyond simple grapheme-phoneme correspondences.

To be fair, I do not think that such effects, if they exist, will be very large, but given one of our major educational aims is to teach people to read fluently and with comprehension, I think in our research we should be paying more attention to the effects of teaching methods, spelling systems, reading materials, etc., on the reading abilities of children who should be achieving reasonable fluency (15-year-olds, say) rather than concentration only on the first few years of learning to read.

In our own research we have one small piece of evidence bearing on this. Groat (1979) looked at the use of stress assignment rules by two groups of seven-year-old children. One group had used traditional orthography throughout the schooling. The second group had been taught to read with the (more phonemic) initial teaching alphabet, but had recently transferred to traditional orthography. Groat found that the two groups performed in similar ways (in particular, both groups had a sophisticated appreciation of the complexities of English stress assignment rules), but in one respect i.t.a. children were different. Recall that, according to some linguists, words like *giraffe* and

grotesque have an underlying three-syllable form (like *veranda*) which leads to the final form of the word having stress on the second syllable when the third syllable is deleted. Now children taught with i.t.a. operate just in this fashion — a nonsense noun such as *gevespe* is quite likely to be treated either as a three-syllable word or as a two-syllable word with stress on the second syllable, whereas children taught only with traditional orthography appear to ignore the final *e* in *gevespe*, treating it as a normal two-syllable noun with stress on the first syllable (like *tempest*). Parallel effects are obtained for verbs; see Figure 1. So children taught with a more phonemic alphabet have a different strategy for analyzing the stress patterns of long words, though of course we do not know whether this habit persists into adult life or is, as I suspect, merely a temporary strategy in the transition from i.t.a. to traditional orthography.

3 *The three-letter rule.* Albrow (1972) has pointed out that content words in English must be spelt with at least three letters, thus there are many words with apparently redundant consonant doubling or silent final *e*'s (e.g., *inn, bee, bye, sow, two, ore*, contrast with *in, be, by, so, to, or*). I believe this has some significant implications for reading. Recent studies of eye-movements during reading have shown that word-length plays an important part in the way readers scan a text. For example, McConkie and Rayner (reported in Rayner, 1978) have developed an ingenious computer-controlled display of text which allows them to change the text while the subject is in the process of reading it. Performance is measured by fixation duration (how long the subject needs to spend looking at each part of the text: the longer the fixation, the less efficient the performance). Now if changes are made in the text more than 12 letters ahead of where the subject is currently looking, his performance is unaffected; if changes are made less than 8 letters ahead of where he is looking, his performance is disrupted; but, significantly, if changes are made between 8 and 12 letters ahead, performance is not disrupted if the changes preserve the shape, length, and initial and final letters. If a sentence reads

The cat is near the back.

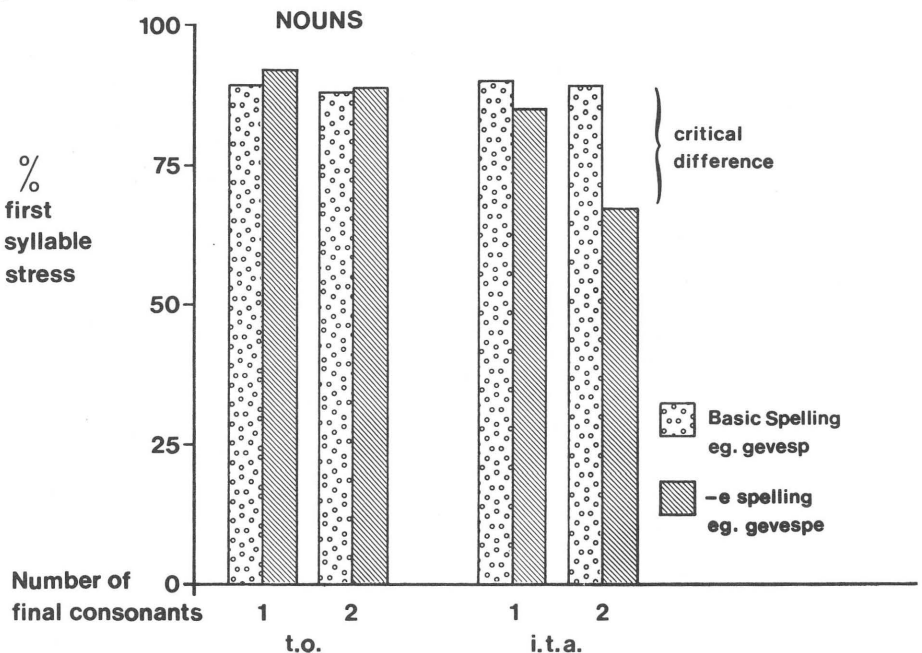
and the subject is looking at the word *is*, we could change *back* to *book* or *bank* without disrupting performance, but changing *back* to *sack* (initial letter change) or *back* to *brook* (length change) would disrupt performance. This means that information about word length

and shape is being processed by the skilled reader well ahead of actual word identification (words cannot be accurately identified when they are 8 to 12 letters from fixation). See Figure 2. Moreover studies by O'Regan (1979) have shown that readers are able to control their eye-movement patterns in such a way as to avoid what are normally uninformative parts of the text occupied by short function words. Accordingly, it seems that the skilled reader can be guided to the most informative parts of the text by peripheral cues to do with word shape and word length, and this process is facilitated by the three-letter rule which distinguishes two-letter function words from three-letter content words.

In this respect, note also that it is an advantage for an orthography to distinguish homophones by words of different shape or length (e.g., *threw, through; seen, scene*).

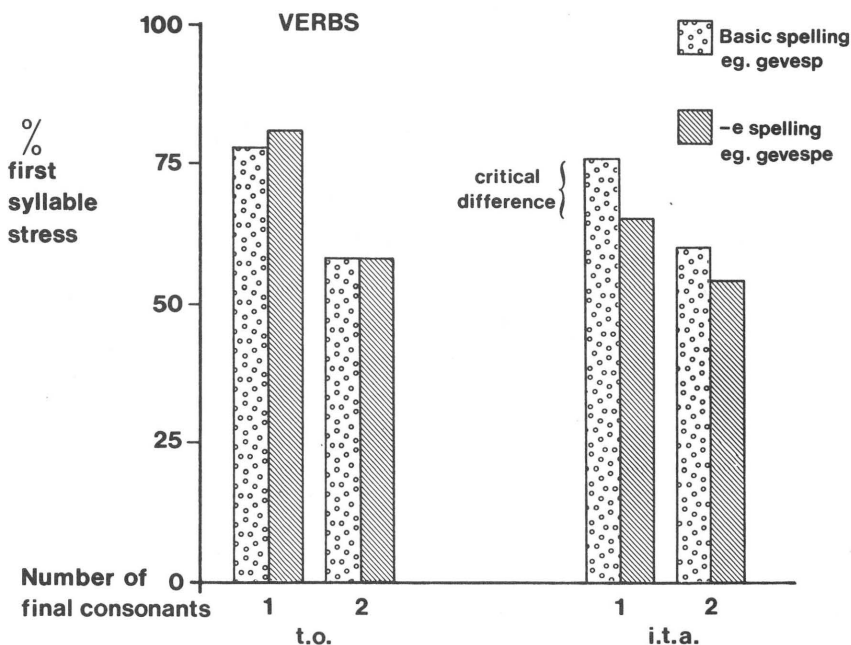
4 *Preservation of morphemic information.* It is a simple observation that syntactically organized text is easier to read than totally disor-

Figure 1A Stress assignment for 2-syllable nonsense nouns by seven-year-olds. "T.o." children were taught entirely with traditional orthography; "i.t.a." children were taught first with the initial teaching alphabet and then transferred to traditional orthography. The critical difference is that which would be expected if i.t.a. children treated the -e spelling (*gevespe*) as a 3-syllable word from which the final syllable is deleted late in the speech production process.



ganized text. It is not even necessary that the text makes sense: syntactic organization by itself helps reading, as Lewis Carroll was well aware (“ ‘Twas brillig, and the slithy toves did gyre and gimble in the wabe . . . ’ ”). Note that Carroll creates syntactic organization by the judicious use of function words (*the, did*) and the use of certain bound morphemes (*-y, -s*). Now I argue that those features of current orthography that help us to identify morphemes are making a significant contribution to the ease with which we can extract syntactic structure, and thus these features should be preserved. More formal evidence than Lewis Carroll is available, e.g., Epstein (1961) who showed that nonsense syntactically organized in the manner of Jabberwocky was easier to learn than unorganized nonsense. There are two ways that preservation of morphemes can help organization. First, it can help indicate whether a word consists of a single unbound morpheme or an unbound morpheme plus a bound morpheme (so we distinguish the homophones *band* and *banned, please* and *pleas*); second, morphemes that *sound* different in different environments, still *look* the same (e.g., *-s* in *cats* and *dogs, -ed* in *walked, climbed, floated*).

Figure 1B Stress assignment for 2-syllable nonsense verbs by seven-year-olds. The critical difference is that which would be expected if i.t.a. children treated the *-e* spelling of a 3-syllable word from which the final syllable is deleted late in the speech production process.



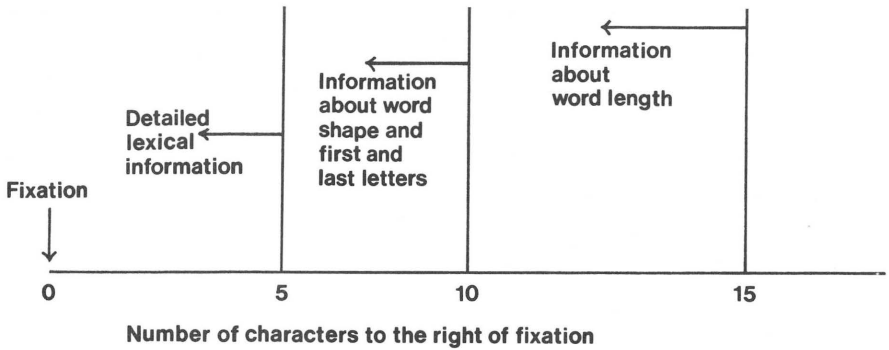


Figure 2 Schematic representation of information available to a reader to the right of fixation.

Evidence that a reader's information-seeking strategies are strongly influenced by certain bound morphemes and function words comes from work I have been doing using letter cancellation (Smith and Groat, 1979; Smith and Pattison, in preparation). Subjects (university students) are required to read a text while at the same time cancelling all the *e*'s that they notice in the text. Artificial though this technique may sound, it does not seem to disrupt reading greatly, and it has the merit of telling us exactly what parts of a text a subject notices in making a detailed analysis. Results show that the *e* in the definite article *the*, and the *e* in the bound morphemes *-ed* frequently fail to be cancelled, and this failure rate is strongly dependent on such variables as the difficulty and coherence of the text, and whether the subject had been instructed to attend to the meaning of the text or not. Moreover, there are large sequential effects whereby these sorts of *e* are especially likely to be missed in particular (syntactically defined) parts of the text. For these reasons we call the *e*'s in *the* and *-ed* syntactic *e*'s, in contrast with the other *e*'s, which we call lexical *e*'s and which show small sequential effects and little sensitivity to manipulation of text structure. This dissociation of syntactic and lexical *e*'s suggests to us that readers are using words in the text in two different ways: content words (containing lexical *e*'s) are read in much the same way as words in isolation, their meaning and, if necessary, their pronunciation being looked up in some central dictionary in the brain; but certain function words and bound morphemes (containing syntactic *e*'s) are not analysed in such detail, being used rather to guide the reader through the text, and for this purpose their invariant form is crucial.

5 *Semantic information in spelling.* Semantic information in the spelling of a word, over and above the morphemic information, can appear in English in four ways: (1) Many words are introduced into English from other languages with their non-English spellings retained: *spaghetti Pavlov* (the latter being a straight transliteration from the Russian alphabet). (2) Sometimes an English letter is used unconventionally to represent a non-English sound in a loan word: *Iraq, Qatar*. (3) A substantial number of words have been invented with non-English (usually Latin or Greek) components: *psychology, architecture, chromium, cholestrol*. (4) Sometimes particular misspellings have become accepted, presumably because they seemed particularly apposite: *ghastly, ghost, ghoul*.

These processes have some relevant implications for reading: we can guess that *spaghetti* comes from Italy because of its characteristic Italian spelling; the non-English spelling of *Pavlov* ('native' English words cannot end in a *v*) indicates his Slavonic origin; likewise the non-English *q* in *Iraq* and *Qatar* indicates an Arabic origin; the hard *ch* in *psychology, architecture*, etc., often indicates a recently invented word (based on Greek) and hence such spellings are likely to indicate words of scientific or technological origin; and *ghastly, ghost, ghoul* can be seen to be semantically related, thanks to a slip by William Caxton. Table II illustrates some of these points for double consonants.

To be honest, we do not know how important these semantic cues are for the reader and the speller: certainly educated adults, when asked about the meaning of an unfamiliar word will often use its spelling as a clue to its meaning, and certainly there is plenty of evidence in the psychological literature that the meanings of words can be assessed directly by the reader without recourse to the full phonemic form of the words, but I am inclined to think that the purely semantic information available directly from English spelling is present too sporadically to make a substantial contribution to normal reading. But this is no argument for removing all traces of such information from spelling, rather we should be looking to exploit and systematize such information as is present (it is, for example, unfortunate that *Tchaikovsky* and *Chekhov*, are not spelt in British English with the same initial letters, when a systematic transliteration of Russian to English would require this).

Table II Linguistic distinctions signalled by double consonants in English.

Graphemic After a lax vowel final *f* and *z* must be doubled: *buzz*, *jazz*, *stiff*, *muff*. Exceptions are foreign loan words (*fez*, *clef*).

Phonemic (a) Vowels written by a single letter may be long before single consonants, but not before double consonants; e.g., *biding*, *bidding*; *mating*, *matting*.

(b) Fricatives represented by a single letter that normally represents an unvoiced consonant (*f*, *s*) may sometimes be voiced, but if the letter is doubled the fricative is always unvoiced; e.g., *of*, *off*; *as*, *ass*.

Phonological Double consonants can signal a different stress pattern in the word (*umbrélla* v. *cínema*; *casséte* v. *ásset*).

Morphemic Single final *s* sometimes indicates a plural, double final *s* never indicates a plural (*bras* v. *brass*; *maples* v. *mapless*).

Lexical (a) Three-letter rule (Albrow, 1972): content words should contain three or more letters, thus two-phoneme content words often double the consonant (*add*, *ebb*, *inn*, *ill*, *egg*, etc.: contrast with *in*, *or*, *at*, *is*).

(b) Proper names that are homophonous with common nouns double the final consonant (*Kidd*, *Scott*, *Gunn*, *Benn*).

(c) Discrimination of other homophones: *mat*, *matt*; *canvas*, *canvass*.

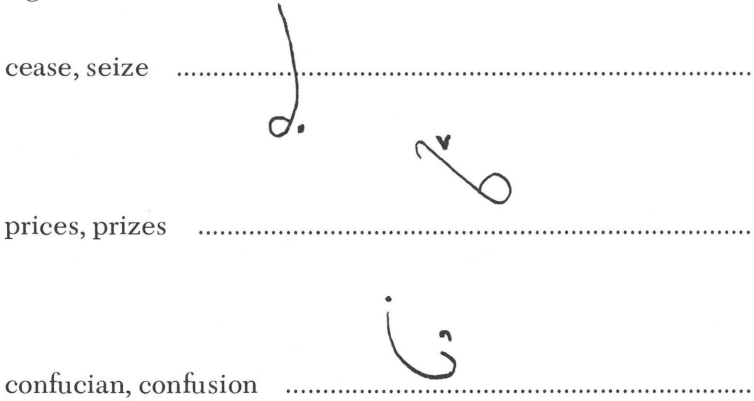
Etymological Words recently coined on the basis of Latin or Greek do not double final *s* (*focus*, *homunculus*, *mantis*, *ethos*); other words ending in /s/ usually have a double *s* (*mattress*, *cutlass*).

Shorthand Systems. Finally I want briefly to discuss shorthand systems. These systems provide further examples of writing systems that demonstrate the advantages of going beyond strictly graphemic-phonemic correspondences. Shorthand systems are interesting because they are reformed quite frequently, there are several systems competing for students, and there is a strong pressure for them to achieve a well-defined criterion, namely to permit rapid and error-free transcription of speech. In short, there are just the sort of pressures, largely missing from traditional orthographies, that should lead to the development of efficient systems.

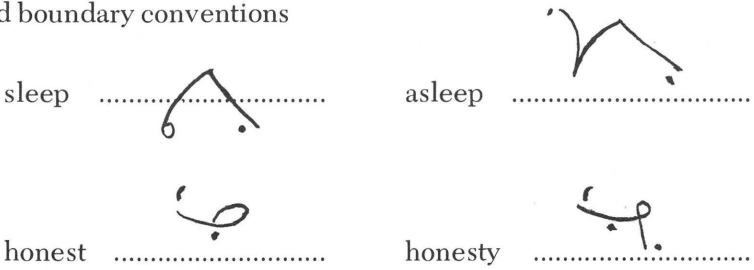
We have reviewed English shorthand systems recently (Smith and Pattison, 1980). Our conclusion is that their relation to speech is just as abstract as traditional orthography. For example, consider Pitman New Era, one of the fastest and one of the most phonemic systems. There exist in Pitman New Era, abstract phonological conventions like voicing neutralization (*ass* and *as*, *prices* and *prizes*, *Confucian* and *confusion*, would constitute pairs of homographs), rules that operate differently within a word and at the ends of words (*sleep* and *asleep*, *honest* and *honesty*, would be written in fundamentally different ways, because abbreviations for clusters such as *sl-* and *-st* are only available when these occur at the beginning or end of a word) and several abbreviatory devices ignore syllable structure (*spring* and *separate* would begin with an abbreviation for *spr-*, despite the fact that in one case *spr-* stands for a true consonant cluster and in the other case for two syllables from which the vowels have been deleted). See Figure 3. The moral is that rapid writing systems need not stay close to phonemic detail to be efficient. Psychological studies of shadowing (repeating back a message at the same time as listening to it) make much the same point (Marslen-Wilson, 1975): a wide range of linguistic information (morphemic, lexical, semantic) is computed by a listener with remarkable short latency), and there is no evidence that all information must be fully represented in phonemic form before we can start to understand it. Hence there is no reason why an efficient writing system should dwell exclusively on phonemic detail.

Conclusion. Let me first deal with one objection to the arguments I have been putting forward. It is unnecessary, it is claimed, to distinguish homophones (*know*, *no*), to preserve morphemes (*walked*, *climbed*, *floated*) or to have a three-letter rule to aid in discrimination of function and content words (*or*, *ore*) because context will almost always allow us to resolve any ambiguities. First, let me remark that the use of "context" is very much a two-edged weapon: we could equally well invoke context to justify all sorts of non-phonemic reforms, such as dropping nearly all the vowels as semitic orthographies do. Second, writing typically provides less context than speech: when I say, *The sun's rays meet* or *The sons raise meat*, it is likely that a gesture I make, or perhaps the rhythm of the sentence will give some hint to the meaning, and these contexts are absent on the printed page. Third, and most important, fluent reading is faster than speech, and needs all the help it can get to be efficient: one reason nobody

A Voicing neutralization



B Word boundary conventions



C Syllable structure lost

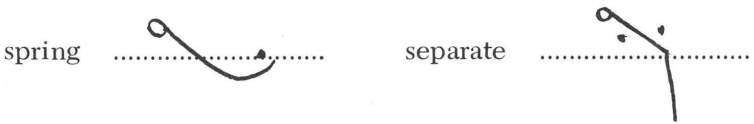


Figure 3 Illustrations of Pitman New Era shorthand outlines.

A Shows how neutralization of the voicing distinction can lead to pairs of distinct words being written in a single form.

B Shows how the operation of rules that are sensitive to the position in which a phoneme appears in a word can lead to related words being written in radically different ways (/s/ appears as a loop in *sleep* and a curved stroke in *asleep*).

C Shows that the consonant cluster *spr-* and the series of distinct consonants separated by vowels (*s-p-r*) receive identical representations.

pushes for vowel deletion as a spelling reform (think of all the space that would save) is that although intelligibility would scarcely be affected, the removal of useful supportive information would probably reduce the reading rate considerably. Let us put as much information into spelling as the reader can usefully handle.

Looking back over my arguments, what should I recommend about spelling reform? First, I would be against deleting the second *l* from *umbrella* or the *e* from *giraffe*, since they help with the correct assignment of stress; I would be against dropping the *h* from *spaghetti*, and against using *k* to stand for *ch* in *psychology* or for *q* in *Iraq*, since useful information is given. However with these examples I acknowledge my position is elitist: these conventions help good readers squeeze a little more information out of difficult or low frequency words. It seems to me an open empirical question whether these slight advantages outweigh the disadvantages for less able readers.

However, there are some reforms that I would much more confidently oppose, because they affect processes that are involved in some of the most central parts of reading. May I re-emphasise that efficient reading depends on much more than accurate phonemics, and that word shape, word length, and morphemic structure are important guides for rapid reading. With this perspective, I would be against destroying morphemic invariance (*-s*, *-ed*, etc.), against dropping redundant letters in three-letter content words (*add*, *axe*, *egg*, etc.) and against destroying different spellings for homophones (*gate*, *gait*). On the other hand, preserving the close visual similarity of *divine* and *divinity* is probably less important (the words will begin with the same letters and have roughly the same shape no matter how we spell the second vowel).

I return to my point that spelling should contain as much information as the reader and speller can usefully handle. It seems to me beyond dispute that much of this information should be phonemic, and that in the early stages of reading, the phonemic aspects of spelling need to be stressed. But if we want to develop an orthography that does justice to the richness of the English language and permits fluent and intelligent reading and writing, we should take great care to incorporate into any reformed orthography information that refers to deeper levels of linguistic knowledge.

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*Elizabeth Sakiey, Edward Fry, Albert Goss,
and Barry Loigman*

A Syllable Frequency Count

A frequency count of the syllables in an edited list of the 5,000 most common English words generated an unweighted list of the most common 322 syllables in 5,000 words and a list of 290 syllables weighted by the frequency of occurrence of words of which the syllables were constituents. The unweighted list contained 222 nonword-syllables and 100 word-syllables. The weighted list contained 190 word-syllables and 100 nonword-syllables. The latter 290 syllables account for 72 percent of the 5,890,868 syllable tokens in the 5,000 most common English words. These lists are seen as potential base data for the development of curriculum materials in reading, spelling, and other areas. They are also seen as potential base data for investigations and technologies in readability, computer translation, verbal learning, and language acquisition.

Certain aspects of basic knowledge about the syllable are updated and refined in this study. Historically, the syllable was one of the mainstays of the teaching of reading; it played a prominent role in the methodology of the 18th century *New England Primer*. At various times subsequently in the history of instruction the syllable has been featured in reading, spelling, and writing instruction. Syllables continue to merit some importance in those areas. They are more important, however, in dictionary use, speech correction, typography, computer translation, readability, verbal learning, and language research.

The purpose of this study was to develop a syllable rank-order list. The study attempts to answer the questions "What is the commonest syllable? What is the next commonest syllable?" etc.

These questions pose another question, "What does *common* mean?" In terms of this study, it means both an unweighted rank-order list and a weighted rank-order list. The lists are composed of

types and *tokens*. Types are separate or different syllables; tokens are the occurrences, or frequencies, of the types. Each occurrence of a type is a token. The unweighted list presents the number of occurrences of each different syllable in a list of the 5,000 most common words in an edited list based on the Carroll, Davies, and Richman, or *American Heritage* (1971), count. The weighted list reflects the frequency of occurrence of each syllable in the 5,000 words weighted by the number of times each of those words appeared in 5,088,721 running words. These two lists are then compared.

BACKGROUND

The last major syllable count was done by Osburn (1954). He listed the 15 commonest initial, medial, and final syllables. Unfortunately, the bulk of his syllable count on the 9,000 polysyllabic words of the now-dated Rinsland (1945) list did not find its way into the professional literature and, for most practical purposes, is lost.

Three decades earlier Dewey counted phonic syllables (spoken syllables) in 100,000 printed words of adult material. He ranked the 220 most common of the 4,400 different syllables obtained (1923). Later he appended initial, medial, and final positions for these syllables (1950).

Dolch (1938) obtained 8,509 nonword syllables in 3,931 polysyllabic words found in 14,000 running words of elementary texts. There were 1,255 different syllables. His published alphabetical list of the 100 commonest syllables does not answer the question of which is the commonest syllable. The list of 100 syllables is all that is apparently available (Dolch, 1940). Additionally, the Dolch count, like the Dewey and Osburn counts, was an unweighted one.

DATA BASE

The Carroll et al. frequencies that served as the data base were generated by a computerized count of occurrences of different words in 5,088,721 running words. These words were in 10,043 five-hundred-word samples of reading materials used in grades three through nine in 22 different categories. This count yielded 86,741 different words or types. A type might not be a word because numerals such as "1905" and initializations such as "USA" are types. A token is the frequency of a word. For example, the type "the" occurred 373,123 times, or "the" had 373,123 tokens.

METHOD

The 86,741 different words (types) of the Carroll et al. count, together with their frequencies of occurrence, were on computer data tape deposited at the National Archives for Linguistics in Arlington, Virginia. Punched cards were generated from these tapes for 52,000 words that occurred more than once per five million.

The first phase was to edit the Carroll et al. list. They defined a word as a group of symbols with a space on either side. This facilitated selection, scoring, and counting by the computer. It also had the advantage of nonjudgmental objectivity. However, for the purposes of this study it had the obvious drawback of counting *nonwords* such as "&," "\$100," and "1945," and "USA" as words. Also, words which differed only in case of letters such as "Run," "run," and "RUN" were counted as three different words with three different frequencies of occurrence for each word.

Hand editing was necessary to eliminate nonalphabetic symbols and nonwords. Hand editing was also used to combine frequencies for different graphic forms of the same word, such as "Run" and "run," into one word. However, *inflected forms* of the word, such as "runs," "running," and "ran" were not combined; this would have omitted syllables such as "ed" and "ing."

After hand editing, 44,174 word cards remained. Of these words, the count was on the 5,000 most frequent. These words account for 4,513,777 occurrences or 89 percent of the word tokens in the 5,088,721 running words. These 5,000 high-frequency words are all the words that occur more than approximately 15 times per million running words.

The 5,000 most frequent words were then divided into *graphemic syllables*. Graphemic syllables refer to syllables whose boundaries were determined for graphic (written) use. The *American Heritage School Dictionary* (1977) was the authority for this syllabification.

Phonetic syllables are those syllables used in the phonetic or pronunciation part of a dictionary definition; they are said to be more akin to speech patterns. There is a lack of agreement among dictionaries on syllable boundaries, particularly for phonetic syllables.

The computer programs used were based on Fortran Sort-Merge and the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, and Brent, 1975).

RESULTS

Unweighted List

There were 9,358 graphemic syllables or syllable tokens in the 5,000 words, an average of about 1.9 syllables per word. These 9,358 syllables were comprised of 3,402 different syllables or syllable types. The different syllables may be divided into word-syllables and nonword-syllables. A word-syllable is one like "the" that is a simple word and may also be part of a larger word like "theater." A nonword-syllable is a syllable like "ing," which never occurs as a single word. Of the 3,402 different syllables, 1,982 or 58 percent are word-syllables and 1,420 or 42 percent are nonword-syllables.

The 322 most frequent graphemic syllables are presented in Table I. These are syllables that occurred in five or more of the 5,000 words. Of these syllables, 222 or 69 percent are nonword-syllables and 100 or 31 percent are word-syllables. The five most frequent syllables, "ing," "er," "a," "ly," and "ed," are all nonword-syllables. The syllables "a" and "ed" were not counted as words because "a" generally functions as a single vowel syllable, and "ed" is a word only when capitalized and used as a nickname. The first word-syllable, "in," has a rank of 10; the second word-syllable, "an," has a rank of 22.

The sum of the frequencies of the 222 nonword-syllables is 3,329 or 36 percent of the 9,358 syllable tokens in the 5,000 words. The sum of the frequencies of the 100 word-syllables is 1,496 or 16 percent of the syllable tokens. Thus, 322 syllables account for 52 percent of the 9,358 syllable tokens.

Weighted List

The rank, weighted frequency, and unweighted frequency of each of the 290 syllables with a weighted frequency of 3,000 or more are in Table II. Of these 290 syllables, 190 or 66 percent are word-syllables and 100 or 34 percent are nonword-syllables. The most frequent syllable of the unweighted list, "ing," drops to rank seven in the weighted list, and "er" drops from rank two to rank eight. Of the first 100 syllables, 72 are word-syllables.

When 3,402 syllable types in the 5,000 words are weighted for frequency of the words in which they appear, there are 5,890,868 syllable tokens. The common 190 word-syllables in Table II account for 3,260,280 or 55 percent of these tokens. The 100 nonword-syllables account for 977,456 or 17 percent of these tokens. All 290 syllables account for 4,237,736 or 72 percent of the 5,890,868 tokens.

TABLE I The 322 most common unweighted graphemic syllables in the English language ranked in order of frequency in the 5,000 most frequent words.

Rank	Syl.	F.	Rank	Syl.	F.	Rank	Syl.	F.
1	ing	230	40	der	25	80	pre	14
2	er	129		ma	23		tive	14
3	a	124		na	22		car	13
4	ly	119		si	22		ci	13
5	ed	114		un	22		mo	13
6	i	112	45	at	21	85	on	13
7	es	98		dis	21		ous	13
8	re	90		ca	20		pi	13
9	tion	83		cal	20		se	13
10	in	78		man	20		ten	13
	e	67	50	ap	19	90	tor	13
	con	64		po	19		ver	13
	y	63		sion	19		ber	12
	ter	60		vi	19		can	12
15	ex	58		el	18		dy	12
	al	56	55	est	18	95	et	12
	de	55		la	18		it	12
	com	51		lar	18		mu	12
	o	51		pa	18		no	12
20	di	46		ture	18		ple	12
	en	42	60	for	17	100	cu	11
	an	39		is	17		fac	11
	ty	39		mer	17		fer	11
	ry	37		pe	17		gen	11
25	u	36		ra	17		ic	11
	ti	35	65	so	16	105	land	11
	ri	32		ta	16		light	11
	be	30		as	15		ob	11
	per	29		col	15		of	11
30	to	29		fi	15		pos	11
	pro	28	70	ful	15	110	tain	11
	ac	26		ger	15		den	10
	ad	26		low	15		ings	10
	ar	26		ni	15		mag	10
35	ers	26		par	15		ments	10
	ment	26	75	son	15	115	set	10
	or	26		tle	15		some	10
	tions	26		day	14		sub	10
	ble	25		ny	14		sur	10
				pen	14		ters	10

TABLE I (Continued)

Rank	Syl.	F.	Rank	Syl.	F.	Rank	Syl.	F.
120	tu	10	160	my	8	200	ton	7
	af	9		nal	8		try	7
	au	9		ness	8		um	7
	cy	9		ning	8		ure	7
	fa	9		n't	8		way	7
125	im	9	165	nu	8	205	ate	6
	li	9		oc	8		bet	6
	lo	9		pres	8		bles	6
	men	9		sup	8		bod	6
	min	9		te	8		cap	6
130	mon	9	170	ted	8	210	cial	6
	op	9		tem	8		cir	6
	out	9		tin	8		cor	6
	rec	9		tri	8		coun	6
	ro	9		tro	8		cus	6
135	sen	9	175	up	8	215	dan	6
	side	9		va	8		dle	6
	tal	9		ven	8		ef	6
	tic	9		vis	8		end	6
	ties	9		am	8		ent	6
140	ward	9	180	bor	8	220	ered	6
	age	8		by	8		fin	6
	ba	8		cat	8		form	6
	but	8		cent	7		go	6
	cit	8		ev	7		har	6
145	cle	8	185	gan	7	225	ish	6
	co	8		gle	7		lands	6
	cov	8		head	7		let	6
	da	8		high	7		long	6
	dif	8		il	7		mat	6
150	ence	8	190	lu	7	230	meas	6
	ern	8		me	7		mem	6
	eve	8		nor	7		mul	6
	hap	8		part	7		ner	6
	ies	8		por	7		play	6
155	ket	8	195	read	7	235	ples	6
	lec	8		rep	7		ply	6
	main	8		su	7		port	6
	mar	8		tend	7		press	6
	mis	8		ther	7		sat	6

TABLE I (Continued)

Rank	Syl.	F.	Rank	Syl.	F.	Rank	Syl.	F.
240	sec	6	270	fix	5	300	round	5
	ser	6		gi	5		row	5
	south	6		grand	5		sa	5
	sun	6		great	5		sand	5
	the	6		heav	5		self	5
245	ting	6	275	ho	5	305	sent	5
	tra	6		hunt	5		ship	5
	tures	6		ion	5		sim	5
	val	6		its	5		sions	5
	var	6		jo	5		sis	5
250	vid	6	280	lat	5	310	sons	5
	wil	6		lead	5		stand	5
	win	6		lect	5		sug	5
	won	6		lent	5		tel	5
	work	6		less	5		tom	5
255	act	5	285	lin	5	315	tors	5
	ag	5		mal	5		tract	5
	air	5		mi	5		tray	5
	als	5		mil	5		us	5
	bat	5		moth	5		vel	5
260	bi	5	290	near	5	320	west	5
	cate	5		nel	5		where	5
	cen	5		net	5		writ	5
	char	5		new	5			
	come	5		one	5			
265	cul	5	295	point	5			
	ders	5		prac	5			
	east	5		ral	5			
	fect	5		rect	5			
	fish	5		ried	5			

This table contains all syllables that occurred five or more times in the 5,000 highest frequency English words. These 322 syllables comprise 52 percent of all the syllables (tokens) in the 5,000 words.

TABLE II The 290 most common syllables in the English language ranked in order of frequency in 5,088,721 running words.

Rank	Syl.	Frequencies		Rank	Syl.	Frequencies	
		Weighted ^b	Unwtd. ^a			Weighted ^b	Unwtd. ^a
1	the	374,747	6	40	tion	20,975	83
2	a	191,870	124		had	20,802	2
3	of	150,386	11		not	20,090	3
4	to	143,284	29		but	19,993	3
5	and	133,921	1		can	19,683	12
6	in	131,121	78	45	so	19,242	16
7	ing	71,958	230		re	18,799	90
8	er	64,846	129		some	18,558	10
9	is	64,816	17		what	18,301	3
10	i	59,077	112		o	18,094	51
	be	57,052	30	50	were	17,207	2
	you	50,999	1		oth	17,172	4
	it	50,254	12		all	17,042	1
	that	47,462	1		out	16,892	9
15	y	46,700	63		we	16,474	3
	on	46,634	13	55	ry	16,278	37
	he	46,532	3		your	16,214	2
	for	44,258	17		when	16,183	2
	was	41,685	2		there	15,692	2
20	ly	40,685	119		how	15,422	3
	an	40,572	39	60	said	15,309	1
	as	35,619	15		up	15,291	8
	are	35,502	1		de	14,977	55
	with	33,817	3		ver	14,953	13
25	ter	32,154	60		ex	14,710	58
	his	30,244	3	65	each	14,290	1
	at	27,710	21		en	14,158	42
	or	27,697	26		which	14,016	1
	they	27,627	1		do	13,744	3
30	al	27,231	56		she	13,657	1
	ed	26,367	114	70	their	13,258	1
	es	24,969	98		them	12,959	2
	this	23,316	1		if	12,912	1
	from	22,810	1		will	12,873	2
35	one	22,644	5		di	12,810	46
	have	22,444	2	75	him	12,542	2
	e	21,956	67		bout	12,507	1
	by	21,746	7		com	12,439	51
	man	21,081	20		ple	12,420	12
					u	12,248	36

TABLE II (Continued)

Rank	Syl.	Frequencies		Rank	Syl.	Frequencies	
		Weighted ^b	Unwtd. ^a			Weighted ^b	Unwtd. ^a
80	then	12,026	1	120	mer	7,726	17
	her	11,814	2		wa	7,699	3
	no	11,763	12		ten	7,661	13
	words	11,707	1		been	7,651	1
	these	11,611	1		who	7,608	1
85	con	11,598	64	125	ment	7,535	26
	way	11,406	7		use	7,529	3
	per	11,315	29		now	7,465	1
	would	11,191	1		ti	7,451	35
	low	10,801	15		pro	7,447	28
90	un	10,748	22	130	down	7,419	3
	like	10,644	4		find	7,313	2
	long	10,616	6		ar	7,285	26
	has	10,469	2		me	7,256	7
	two	10,144	1		ma	7,231	23
95	my	10,142	8	135	new	7,190	5
	more	10,130	2		lit	7,157	4
	go	10,055	6		made	7,157	2
	write	9,974	2		get	7,029	4
	der	9,844	25		ri	6,956	32
100	tle	9,636	15	140	thing	6,817	4
	could	9,464	2		eve	6,806	8
	ber	9,397	12		us	6,608	5
	did	9,276	3		sen	6,601	9
	ty	9,080	39		read	6,584	7
105	see	8,981	3	145	come	6,467	5
	num	8,955	4		came	6,418	2
	day	8,949	14		where	6,413	5
	time	8,643	3		ture	6,411	18
	most	8,372	3		look	6,286	2
110	make	8,340	1	150	back	6,252	4
	peo	8,281	3		side	6,228	9
	its	8,197	5		fer	6,211	11
	ble	8,159	25		dif	6,201	8
	than	8,057	2		round	6,168	5
115	af	7,934	9	155	pa	6,105	18
	ers	7,911	26		let	5,998	6
	may	7,836	3		tions	5,981	26
	word	7,804	1		just	5,939	2
	first	7,776	1		work	5,932	6

TABLE II (Continued)

Rank	Syl.	Frequencies		Rank	Syl.	Frequencies	
		Weighted ^b	Unwtd. ^a			Weighted ^b	Unwtd. ^a
160	know	5,926	2	200	ning	4,715	8
	our	5,922	2		cause	4,714	2
	ther	5,913	7		ways	4,685	3
	through	5,909	2		col	4,627	15
	try	5,898	7		am	4,621	7
165	fore	5,870	3	205	par	4,621	15
	called	5,789	1		dis	4,549	21
	great	5,737	5		small	4,509	3
	est	5,728	18		air	4,492	5
	fa	5,705	9		three	4,479	1
170	good	5,629	3	210	put	4,455	4
	used	5,611	1		say	4,442	2
	la	5,608	18		ern	4,409	8
	land	5,597	11		help	4,387	3
	part	5,551	7		self	4,380	5
175	car	5,491	13	215	ny	4,372	14
	el	5,474	18		times	4,361	2
	think	5,445	2		well	4,350	2
	n't	5,433	8		cit	4,331	8
	much	5,388	1		must	4,307	1
180	si	5,218	22	220	want	4,292	2
	set	5,217	10		big	4,254	3
	ent	5,187	6		take	4,252	2
	ven	5,098	8		po	4,247	19
	ev	5,096	7		such	4,223	1
185	too	5,074	1	225	cal	4,197	20
	men	5,064	9		here	4,192	1
	old	5,034	3		why	4,158	1
	same	5,024	1		tell	4,137	2
	ac	5,012	26		went	4,132	1
190	ca	5,008	20	230	line	4,131	4
	does	5,001	2		pen	4,121	14
	sound	4,964	2		mu	4,097	12
	fol	4,932	4		things	4,078	1
	right	4,931	2		moth	4,077	5
195	place	4,883	4	235	gain	4,065	2
	ful	4,867	15		end	4,027	6
	son	4,747	15		pic	4,017	4
	na	4,726	22		im	4,001	9
	tain	4,716	11		to	3,989	16

TABLE II (Continued)

Rank	Syl.	Frequencies		Rank	Syl.	Frequencies	
		Weighted ^b	Unwtd. ^a			Weighted ^b	Unwtd. ^a
240	years	3,975	1	265	home	3,370	1
	off	3,875	1		give	3,369	1
	name	3,864	2		tween	3,344	1
	high	3,861	7		own	3,313	3
	light	3,809	11		gan	3,285	7
245	head	3,795	7	270	bod	3,276	6
	coun	3,770	6		add	3,254	3
	mon	3,712	9		tence	3,252	2
	pe	3,698	17		ward	3,250	9
	near	3,677	5		hap	3,238	8
250	lar	3,654	18	275	nev	3,238	2
	por	3,595	7		ure	3,208	7
	fi	3,579	15		mem	3,206	6
	bers	3,563	3		mean	3,201	4
	sec	3,557	6		looked	3,197	1
255	ap	3,545	19	280	earth	3,177	2
	stud	3,491	4		ters	3,174	10
	found	3,477	2		cov	3,165	8
	should	3,470	1		ger	3,147	15
	ad	3,431	21		last	3,132	2
260	still	3,424	1	285	nit	3,095	3
	form	3,414	6		show	3,089	2
	need	3,412	2		might	3,077	2
	play	3,392	6		stand	3,058	5
	world	3,383	1		house	3,054	2
				290	got	3,051	3

a. *Unweighted* Frequency means number of occurrences in the 5,000 different words. This is the same as Table I count.

b. *Weighted* Frequency means number of occurrences per five million running words using words from the 5,000 word list. For example, the 189th syllable “ac” appeared in 26 different words of the 5,000 word list and these 26 words were used a total of 5,012 times in five million running words.

These 290 syllables account for 72 percent of all the syllables (tokens) in the 5,000 most common words.

DISCUSSION

A relatively small number of syllables account for a large proportion of our written language.

In the *weighted list*, a mere 290 word- and nonword-syllables account for 72 percent of the 5,890,868 syllable tokens in the 5,000 most common words weighted for their frequency. This reflects the J-curve distribution of the weighted frequencies in which a few types occur with high frequency and many types occur with moderate-to-low frequencies.

High-frequency whole words continue to be important. Of the 290 weighted syllables, 190 are word-syllables that account for 55 percent of the 5,890,868 tokens or more than half of all written English. This lends support to the efficacy of teaching a high frequency or basic sight vocabulary such as those developed by Dolch (1936) and Fry (1957), since both the Dolch and Fry list contain a high percentage of the same one-syllable words. For example, the basic word "let" is instantly recognized as a syllable when encountered in such words as "gauntlet," "inlet," and "lettuce." Furthermore, the 190 word-syllables presented in Table II make up about half of all written English since the 190 words make up 49 percent of the five million running words in the Carroll count.

Another finding of this study is that only 100 nonword-syllables of the weighted list account for an additional 17 percent of the 5,890,868 syllable tokens. Thus, the 100 syllables account for approximately another sixth of all written English.

These findings cannot be compared with those of earlier counts. Dolch and Osburn counted only polysyllabic words; Dewey used phonemic syllables, all of which were unweighted counts.

The *unweighted count* presented here provides a different orientation than the weighted count. When one looks at the unweighted list, in this analysis of 5,000 common words, the 222 nonword-syllables of Table I make up 36 percent of the total syllables, and 100 word-syllables make up 16 percent of the total. Thus, nonword-syllables assume greater importance on the unweighted list than on the weighted list.

Other researchers provide evidence that the syllable is a viable unit for at least some phases of literacy instruction. The objection to teaching syllables in addition to words and phonemes in reading stems from the belief that graphemic or written syllables have numerous

pronunciations. However, Sakiey and Martin (1980) have shown that 92 percent of the syllables found in basal readers in the primary grades have two or less pronunciations. Sixty-six percent had only one pronunciation. Savin and Bever (1970) demonstrated "that even for literate adults the syllable is a far more natural, more easily available perceptual unit than is the phoneme" (p. 322). Using both urban and suburban kindergarten-age children, Allen, Rozin, and Gleitman (1972) found that prereaders were more likely to recognize a meaningful word when segmented syllabically than when segmented phonemically.

Blending of two syllables was found to be easier than blending two phonemes (Brown, 1971) for children of ages 56 to 80 months. Children 4 to 6 years old had more difficulty analyzing words into phonemes than syllables (Lieberman, Shankweiler, Carter, and Fischer, 1972). Finally, tachistoscopic studies have shown that the syllable functions as a single perceptual unit (Spoehr and Smith, 1973).

Ruddell (1976) called for "A study of various decoding units . . . and the relationship between these units and early reading success" (p. 35). This is only one of the areas in which high-frequency syllable lists might be employed. They might be used in the development of curriculum materials for developmental and remedial reading as well as in spelling and typing instruction. Syllable frequency lists may also be useful in a wide variety of investigation and technologies of readability, spelling reform, verbal learning, language acquisition, and computer translation.

The unique contribution of this study is in providing a weighted syllable frequency count and in determining that a relatively small number of syllables make up a fairly substantial portion of all written language.

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Strategy and Tactics in the Design of Forms

This paper reviews research investigations which relate the design of a form to the difficulties people have in completing the form.

A distinction is drawn between researchable issues which will have relevance to many kinds of forms (e.g., asking form-fillers to delete what does not apply) and issues which are specific to particular kinds of form (e.g., the interpretation of terminology).

After suggesting that fruitful interactions could be developed between those asking strategic and those asking tactical questions, it is concluded that those who seek simple recipes for designing adequate forms have failed to understand the complexities of the problem.

There is probably no administrative procedure which does not require the use of at least one form.

Management Services Handbook
UK Civil Service Department, 1975

1. *Introduction*

Forms vary in their design and function. They are used by populations as diverse as laymen, professionals, and machines. Therefore few definitions of a form are likely to be useful for all purposes. Nevertheless there is some advantage in thinking of a form as being a structured question and answer dialogue, in which the questions are written and the kinds of answers permitted may be highly constrained. Such a description reminds us that technological advances, which may reduce the amount of paper in circulation, will not necessarily reduce the number of forms with which we wrestle. Whether the questions come from a line-printer or a visual display unit, whether the answers are given through a keyboard or by use of a light-pen, all the major ingredients of a form are likely to be there. There is no reason why the language of questions displayed on a television screen should be any

easier to comprehend than the language at present on printed forms. Indeed the risk is that the spatial constraints of some visual displays may mean introducing still more abbreviations and jargon terms. So there is undoubtedly a long term need for research into the various aspects of form design. What is it that makes a good form good?

One of the characteristics of forms, and one which makes it difficult to know how to tackle the problem of form design, is that there are so many different kinds of questions that can occur. This is illustrated in Figure 1, which shows a typical form issued by travel agents.

On this form there are questions requiring a free verbal response such as name and address. Such answers may be completely unconstrained as in 1a, or there may be horizontal lines provided as in 1b, or even boxes for separate characters as in 1c. Other questions may require the form-filler to make a selection among several alternatives (e.g., item 2). In item 2 the selections are denoted by ticks. Ticking can also be used to answer yes/no questions, but on this particular form the instruction is to delete as required (e.g., item 3). A different kind of question is shown by item 4. This is a small matrix where the answers are given with reference to information in both the row and the column headings of the matrix.

Figure 2 illustrates a form on which the answer to the multiple choice question was recorded as a code number. In Figure 2a the code is simply the number of the option selected. This can be a useful technique for saving space when the same set of options apply to several items (e.g., Figure 2b), and it is a form of responding that lends itself to direct computer compatibility since the written numbers can be replaced by a keypad that records the codes directly onto magnetic tape (e.g., the modified cassette recorder shown in 2c). However, when the sets of alternatives are not mutually exclusive (as for example in 2b where a vehicle may have several defects) the coding procedure may become much more complex. Such systems may require that the sets of options are translated into a single answer code. Wright, Aldrich, and Wilcox (1977) have shown that such complex coding systems may have the disadvantage of being error-prone.

In view of this diversity of kinds of questions and response constraint, if you were shown a form and asked to revise it, just where would you start? You might read it through and hope to spot some obvious pieces of nonsense, but could you do more than this? If you turned to the research literature where would you look? *Psychological*

REPORT OF ROAD ACCIDENT

VEHICLES INVOLVED

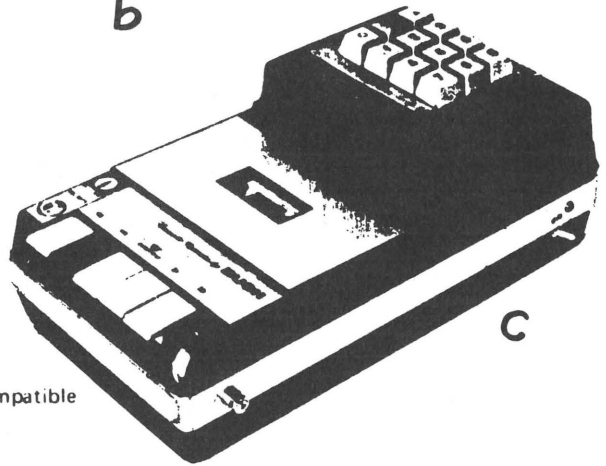
ATTENDANT CIRCUMSTANCES

JUNCTION DETAIL		
Roundabout	1	49
'T' or staggered junction	2	
'Y' junction	3	
Crossroads	4	
Multiple junction	5	
Other junction	6	
Using private drive or entrance	7	
Not at or within 20 yards of junction	8	
JUNCTION CONTROL		
Authorized person	1	50
Automatic traffic signal	2	
Stop sign	3	
'GiveWay' sign or marking	4	
Uncontrolled	5	
PEDESTRIAN CROSSING (If on or within 50 yds.)		
Manually controlled	1	51
Light-controlled at junction	2	
Light-controlled not at junction	3	
Uncontrolled	4	

REGISTRATION NUMBERS									
1st			2nd				
3rd			4th				
	1st	2nd	3rd	4th					
	7	8	9	10					
	(7)			(7)	(7)				
TYPE									
11-12									
MAKE									
15									
VEHICLE DEFECTS									
Load	12								
Tyres—report for process	11			12-0					
Brakes	0			1-6					
Lights, front	1								
Lights, rear	2								
Brake lights	3								
Trafficators	4			12-0					
Vision—glass wipers, washers	5			1-6					
V.E. report requested	6								
16									
17									
12-0									
1-6									

a

b



c

'Comquest'— a push-button computer-compatible questionnaire answering device

Figure 2 A form requiring coded answers to multiple choice questions. In (a) there is a single question/answer link; in (b) the same questions are asked of several items.

Abstracts has no entry under *forms*, at least not as such. If you found some research, could it be safely applied to the form you are revising? And if it could, would that be sufficient to ensure that your revised form would be adequate for its intended purpose? These are the sorts of issues that will be explored in greater detail in this paper. Such issues challenge the assumption tacitly accepted in many organisations that a clerk with certain high school grades must have the competence to design a form.

1.1 *The function of forms*

One of the difficulties inherent in the design of many forms is that they serve a variety of purposes. They elicit information from the form-filler; they transmit this information to some administrative processing system, or perhaps to several. For example, an invoice may have functions in both the accounts department and in the dispatching department, and perhaps in other sections of the organisation, too. Consequently there may be conflicting criteria which must be reconciled in the design of the form. The nature and severity of this conflict will vary with the specific form under consideration and with the specific organisation using the form. From the outset, therefore, it is evident that although some of the decisions about form design can be related to general guidelines that will be widely applicable, other decision which may be just as critical for the success of the form have to be taken with respect to local factors within the organisation itself. This sets the contrast which will be explored in the following discussion: the contrast between general objectives and specific decisions, between strategy and tactics in designing forms.

There may be many people concerned with different aspects of a form — its production, its distribution, its analysis, etc. But all forms have one common element. Somewhere there is a form-filler. For the most part the present discussion will concentrate on making things easier for the form-filler. The rationale for doing this is simple. If the data becomes inaccurate at the first stage of data completion, there may be relatively little point in proceeding to the other stages of data processing. However, this facet of the problem seems under-explored. There are a number of texts offering advice on data preparation for keypunch operators (e.g., Knox, 1965; Osteen, 1969), on printing techniques and on stock control (e.g., H.M.S.O., 1972), but relatively little advice exists on how to improve the form-filler's performance. There is some work on questionnaire design which can be related to

various aspects of forms (e.g., Moser and Kalton, 1971; Sinclair, 1975), but the kinds of questions found on questionnaires tend to overlap only partially with the kinds of questions to be found on forms. Questionnaires may require subjective estimates (Do you think academic journals are good value for money?). Because of this subjective element, many of the problems of questionnaires are associated with making sure that the answers are valid and reliable (Brigham, 1975). In contrast to the subjectivity of questionnaires, most forms require factual details (How many packets were delivered?). The answers to such questions are often cross-checked with other information such as how many packets were ordered, how many packets have been charged for on the invoice, etc. So although some of the work on questionnaire design will be equally applicable to forms (e.g., the discussion of typographic factors by Gray, 1975), forms also generate their own special problems.

1.2 *The cost effectiveness of good design*

It is not always easy to estimate the real costs of forms, particularly forms which serve functions in a variety of departments within an organisation. Nevertheless, it is possible to illustrate the magnitude of the potential savings which could come from improving the design of forms. In Britain the Civil Service Department has estimated the amount that forms cost the Government, or rather the tax payer. These estimates were published in 1975 in a management services handbook, *Forms Control*. In 1975 paper alone cost \$33 million. The administrative and labour costs were thought to be 20-25 times the cost of production. A rough figure of the costs for 1980 can be obtained by prorating these figures by 10% per annum. This figure of 10% is undoubtedly highly conservative. Not only has inflation been higher than this but the management services handbook reported that paper costs to Her Majesty's Stationery Office rose by 60% in the 18 months from April 1973. This extrapolation of the 1975 figures suggests that the 1980 cost of government forms will be at least \$265 million. Therefore, even a small improvement resulting in only a 1% increase in efficiency would save tax payers over \$2 million per annum. If the estimate that government forms are increasing at the rate of 400 per year is correct (Ryan, 1978) the savings may be much greater than this.

Nor should it be thought that the British are an exceptionally form-bound nation. Miller (1978) cites an Associated Press report that the United States government issues 9,800 different kinds of forms. Each

year more than 500 million of these forms are completed. Data on the error rates with some of these forms are not readily available, but the point to note is that even a 5% error rate, which in many organisations would be considered low, would mean that 25 million forms have mistakes on them. Dealing with such a large absolute number of errors can be expensive. If good design can reduce an error rate from 5% to 3%, this may sound trivial in percentage terms but it represents 10 million forms which do not have to be mailed back to the form-filler for correction and then re-processed when they are returned. It is the very large numbers in which forms are processed that is the strongest advocate for the cost effectiveness of good form design.

In addition to the more obvious financial benefits from improving forms, there are also less tangible effects. Removing some of the trivial frustrations that beset form-fillers, such as trying to provide an inch's worth of information in a half-inch space, will inevitably benefit the public image of the form-producing organisation. Alternatively it will benefit morale if the form is completed within the organisation. The number of bad examples available (Wright, 1975) suggests that this point is not fully appreciated in either the public or the private sectors.

2. Possible research strategies

The general issues in form design can be thought of as falling into one of three categories: the language on the form, the overall structure of the form, and the substructures within the form such as the questions themselves (the notes, the kinds of answers permitted, etc.). The available research does not distribute itself evenly across these three categories. There is an increasingly cohesive body of research addressing the problems of comprehension (see, for example, the recent review by Clark and Clark, 1977). Much of this has been concerned with relatively short passages of text, but although there have been studies of the language of questions and answers very little of it has actually used the kinds of material found on forms. Research on the overall structure of the form hardly exists at all. Some of the more general problems of legibility have relevance, but many of the interesting options available in form design have not yet been explored. Of the various elements occurring within a form only a few of these have been studied in any systematic way. Before considering the studies of these elements in detail, it may be helpful to illustrate what sort of research information is available in the other categories, namely studies of language and studies of overall structure.

2.1 *The language of forms*

Some of the psycholinguistic work on comprehension has been abstracted and related to forms by Wright and Barnard (1975). For the most part such research seems to have confirmed rather than added to the many guides which have long been available on how to write clear English (e.g., Graves and Hodge, 1943; Gowers, 1954). Nevertheless, the existence of advice does not mean that people are aware of it. Such a research summary was felt to be sufficiently useful by the Department of the Environment that in 1975 they circulated a synopsis of the main conclusions to all local authorities in England. One of the problems of designing the language on forms is that ambiguities may arise from a variety of quite different casual factors. The precise meaning of a familiar word may easily vary between individuals. Words like *income*, *dependant*, or *family* may be interpreted in different ways in different circumstances. Similarly, the writer tends to be aware only of the intended meaning of a sentence or question. The form designer who asked, "When did you leave school?" when he meant to ask, "How old were you when you left school?" probably had little idea how many form-fillers would "misunderstand" the question (Meneer, 1975).

Recently Wright (1979,1980) has outlined several procedures which can be introduced into the design process to improve the adequacy and effectiveness of the language on documents. These procedures will be considered in more detail in the discussion of tactical issues in form design. For the moment we can note that guidelines are available, research summaries are available, and ancilliary procedures are available to the designer for ensuring that the language on forms is clear and easily understood. The problem of why, in spite of this, forms are often difficult to understand is a question to which we must return later.

2.2 *Overall structure*

A second general issue about form design relates to the overall structure of the form, the sequencing of the information, and the relations among the various elements of the form. One domain where this variation in overall structures is easy to observe is the application form included within most travel agents' brochures. The content is usually very similar to that shown in Figure 1. So, too, is the variety among the kinds of question included on the form. Nevertheless, there are a number of differences in the way the information is presented. Some-

times the path through the form is indicated by explicitly numbering the questions. Sometimes there is a colour-coded distinction between the white spaces provided for answers and the coloured spaces which surround the text. The form shown in Figure 1 has neither of these characteristics, although it was printed in three colours: yellow, blue, and black. For once, the differential costs of providing colour are not at issue. Most travel brochures use coloured displays. The issue concerns only the way in which colour is being used on the form. Does it matter? How important is the appearance of a form and what effects do differences in appearance have on the form's usability?

At the moment it seems almost impossible to answer such questions. There have been some interesting proposals concerning the overall structure of a form, but relatively little systematic empirical work has been undertaken. Pioneering studies in this area are the reports by Jones (1968) and Wason (1968) who explored ways of helping the form-filler to by-pass irrelevant questions. For example, the third question on the form might ask form-fillers if they were over 65. Those answering "Yes" were instructed to jump straight to question seven, whereas those answering "No" continued with question four. Although both Wason and Jones reported success with such jumping procedures, there remain a variety of graphic options for indicating the path to be taken. Recently in the United Kingdom the city of Liverpool has considered alternative graphic displays for presenting such sequences on a welfare benefit form. One of their options used arrows (Figure 3a); the other relied on words. One let the jump points occur freely on the page, whereas the other restricted the jumps to one per page and located the jump point in the same spatial position on each page (Figure 3b). This is undoubtedly an interesting innovation in forms design, and one that is increasingly relevant to computer-controlled question and answer dialogues. At the moment, however, no firm conclusions are available about such novel approaches. So only one further point will be made about their use.

Both Jones and Wason showed how sequences of jump questions could be depicted in graphic form as a flow chart. Although flowchart diagrams have not often been used in the final version of a printed form, their construction during the design stage may well provide the designer with useful insights into the consequences of sequencing the information on the form in various ways. It enables the designer to see where the interdependencies are, where there are groups of questions that would all be relevant to a particular category of form-filler. For

9 Did you move into your home after last April 1st? Put down 'yes' or 'no'

Pay

10 Are you, or the people that you put down in box 1, self-employed?

Yes No go to 11

Put down how much net profit each self-employed person gets in an average week. Put down the name of each self-employed person on the left. Put down how much net profit he gets at the end of the line.

..... gets

..... gets

..... gets

When you send in this form, send in accounts with it to show the profits.

11 Do you, or the people that you put down in box 1, have a paid job?

Yes No go to 12

Put down the name of each person who has a job. Next to the name, put down the firm that he or she works for. And put down the address of each firm.

..... works for

For each person who has a job, you need to send in the last five pay-slips. If you cannot do this yet, send in the pay-slips when you can. If you do not wish to do this, ask the firms to fill in the pay chart that is at the end of this form.*

12 Do the people in box 1 do more paid work than you have put down so far?

Yes No go to 13

Put down who does this work and how much they get from it, before tax.

..... gets a week

..... gets a week

Dole and sick pay

13 Are you, or the people in box 1, off work and getting sick pay from a firm?

Yes No go to 14

Put down who gets this sick pay, and how much it is

..... gets a week

..... gets a week

*The pay chart has been omitted from this draft form. It will contain the questions on the present "Certificate of Earnings" form.

Pay

6 Does anybody in Box One do any sort of paid work, full-time or part-time?

Yes — go on to 7 No — go on to 9

7 Does anybody in Box One run their own business? If they don't, go on to 8. If they do, put down their names. When you send in this form, please also send in accounts for each person who runs his own business.

.....

.....

8 Does anybody in Box One have a paid job? If they don't, go on to 9. If they do, put down their names and their works numbers, and the names and addresses of their employers.

..... works for

at and his works number is

..... works for

at and her works number is

For each person who has a job, you must send in the last five pay slips.

Dole, sick pay

9 Is anybody in Box One getting dole or sick pay from the State, or invalidity benefit, or sick pay from an employer?

Yes — go on to 10 No — go on to 12

10 Is anybody in Box One on the dole or getting sick pay from the State or getting invalidity benefit? If they are not, go on to 11. If they are, put down who gets this money and how much it is.

..... gets £..... a week.

..... gets £..... a week.

Please put down the address of the office which pays this money —

.....

11 Is anybody in Box One getting sick pay from an employer? If they are not, go on to 12. If they are, put down who gets this sick pay, and how much it is.

..... gets £..... a week.

..... gets £..... a week.

Figure 3 Alternative ways of presenting sequences of questions which involve jump instructions.

example, on welfare benefit forms the questions which apply to young parents may have no relevance to pensioners. Adequately dealing with this overall structure of the form is certainly a major issue. Where should the notes be placed? What is the best location for the declaration and signature? Unfortunately, at the moment there are few researchers dealing with such issues.

Perhaps the only sizeable body of research data which relates to the overall composition of a form are studies of graphic options, such as those concerned with the legibility of print. Summaries of such studies exist in a number of places (e.g., Tinker, 1965; Spencer, 1969). These summaries provide useful guidelines on the desirability of using print sizes having between 8- and 12-point *x* height, the desirability of using upright rather than italic fonts, the desirability of using mixed upper- and lower-case text rather than having text printed entirely in capitals (Poulton, 1967, 1968), the desirability of using colour in particular ways and with specified contrast levels between print and background (usually a minimum contrast level of 60% is recommended — Poulton, 1969), the desirability of using unjustified setting which gives an equal spacing between words rather than justification of lines with variable spacing (Gregory and Poulton, 1970).

The whole issue of the way in which white space can be used to help the reader grasp the structure of a document is an interesting one which has been discussed by Hartley (1978). Although Hartley was mainly concerned with the design of instructional texts, his illustrations of how an “invisible” grid can provide coherence in the use of space may well be equally relevant in the design of forms.

A discussion of factors which might motivate a decision to use a single column array rather than dividing each page into two columns can be found in Hartley, Burnhill, and Fraser (1974) and Whalley and Fleming (1975). In both places the recommendation is to allow a single line of text to fill the width of the page. Tinker (1965) points out that greater inter-line spacing helps line lengths to be increased without loss of legibility. But none of these studies have been carried out with forms. It is not obvious that textual displays which help the reader deal with paragraphs of prose will be equally helpful in answering short yes/no questions. A double column which allows notes to be alongside questions may in some instances be much more useful to the form-filler than relegating all the notes to the back page. Similarly the decision to allocate one line per question sometimes results in large gaps between the text of the questions printed on the left

hand side of the page and the answer spaces provided on the right hand side of the page. The literature on graphic communication has relevance to many of the problems which arise when designing forms, but there are times when the available research seems not to have been taken far enough to meet more specific problems of form design.

2.3 *The elements within forms*

Although there are higher-order issues about the selection of a particular kind of question in the first place, it is also feasible to consider the various kinds of question found on forms in their own right. One can address research to issues concerning the language, layout, or response constraints of these different kinds of questions. Of course, such an approach has its hazards. Conclusions based on experimental studies where only one kind of question is examined may need qualification when generalizations are made to performance on a form consisting of a variety of different classes of question. Indeed important carry-over effects have been found operating even within a given class of question such as yes/no questions. Those who have filled in an application form for renewing a British driving license may remember that they were asked if they could read a number plate at 25 yards. If you wanted a licence you had to say "Yes," but the question followed other medical questions to which the answer had been "No." This context of responding "No, No, No," led many applicants to say their vision was defective. The question itself was not difficult to answer, but its location on the form produced response errors. These errors dropped considerably when the form was redesigned so that the question about eyesight was separated from the other health questions.

This example illustrates that research which focuses on the individual elements within a form may need to be applied with care in the design of a specific form. Nevertheless, there are a considerable number of components within a form, such as the instructions to the form-filler, the explanatory notes, the various kinds of questions, and the constraints which may be imposed on the way the questions are answered. Without some empirical evidence which can help to narrow the range of options for consideration by the designer, there would seem to be just too many possible combinations of factors for it to be clear even where one might start when designing a form. The next section reviews some of the research that has explored performance with various kinds of question, and in particular examines the effects of the way answers are recorded by the form-filler.

3. *Performance with various classes of question*

Figure 4 outlines a simple taxonomy of the various classes of question which can occur on forms. For each kind of question, Figure 4 indicates some of the ways in which the answers may be recorded by the form-filler. Recently some new data has become available which indicates how critical this factor of recording the answer can be (Wright, Aldrich, and Wilcox, 1977). Form-fillers may understand the question, know the answer, but still make mistakes if they are asked, instructed, or constrained to respond in certain ways. This provides the motivation for examining the effects of response constraints on a variety of questions.

3.1 *Free response questions*

In recent years there has been an increasing tendency to ask form-fillers to write answers in spaces that are segmented in such a way that a uniform area is allocated to each letter. Figure 5 illustrates one example of such a spatial arrangement. There are a number of variations on this theme. It is sometimes thought that constraining the way people write by use of such character separators will increase the legibility of what is written. Research by Barnard and Wright (1976) has shown that this is not the case. They had people copy lists of names into the three types of response box shown in Figure 6. They

Figure 4 Simple taxonomy of the response options within the various classes of questions found on forms.

<i>Classes of question</i>	<i>Some of the responses which may be made by form-fillers</i>
<i>Yes/No</i>	writing YES or NO in full ticking a box circling one of the options deleting one of the options
<i>Free response</i>	writing in empty space writing on horizontal lines writing numerical information within columns writing alphanumerics in character separated spaces
<i>Multiple choice</i>	marking the answer selected (e.g., tick or circle) writing the code number of the answer deleting answers not selected
<i>Sentence frame</i>	filling in gaps selecting from alternatives given
<i>Matrix</i>	ticking cells writing verbal information writing numerical information writing code letters or numbers

Many questions can be raised about the generality of these findings. Are they critically dependent on the physical dimension of the boxes? Would things be different if the boxes were in colour? We do not know the answer to such questions. But until such time as we do, it is obviously safest to proceed with caution. It seems certain that some of the problems which form-fillers encounter would not change with minor variations in the display. For example, people often had difficulties correcting any mistakes made when writing in character segmented spaces. If a word has been misspelt or a letter omitted, it is far from clear how such a mistake can be rectified. When writing on open tramlines people simply cross out the word and write it again or use caret marks to indicate missing letters. Form-fillers who tried rewriting words within the segmented formats found that they ran out of spaces. This led some of them to start writing two letters in a single box while others decided it was simplest to overflow into the margins. Such problems are likely to be more numerous with forms completed by the general public than with forms completed by specialised target

Figure 7 Summary of the relative legibility of answers written in the three kinds of answer space.

In the same time to read:

Q	U	E	S	T	I	O	N	:	H	O	W	T	O	S	A	V	E	
T	I	M	E	,	R	E	D	U	C	E	M	I	S	T	A	K	E	S
C	U	T	C	O	S	T	S	A	N	D	A	V	X	X	X	X	X	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

You could have read:

Q	U	E	S	T	I	O	N	:	H	O	W	T	O	S	A	V	E	
T	I	M	E	,	R	E	D	U	C	E	M	I	S	T	A	K	E	S
C	U	T	C	O	S	T	S	A	N	D	A	V	O	I	D			
F	R	U	S	T	R	A	T	I	O	N	?	A	N	S	X	X	X	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Or you would have had time to read:

Q	U	E	S	T	I	O	N	:	H	O	W	T	O	S	A	V	E	
T	I	M	E	,	R	E	D	U	C	E	M	I	S	T	A	K	E	S
C	U	T	C	O	S	T	S	A	N	D	A	V	O	I	D			
F	R	U	S	T	R	A	T	I	O	N	?	A	N	S	W	E	R	:
D	E	S	I	G	N	B	E	T	T	E	R	F	O	R	M	S		

populations who can perhaps be trained in error-correction procedures. But why not relax the response constraints and use a simpler answer procedure? The decision about what information to include or leave out from a field of predetermined length, is a buck that cannot safely be passed from the system analyst to the man in the street.

To summarize the findings of Barnard and Wright: the assumption that such response constraints will slow writers down appears to be true, the assumption that slowing writers down makes their writing more legible appears to be false. So if the people in the computer section are insisting that they need answers written in character segmented spaces, ask them for evidence that this is not going to make life harder for the operator in the data processing section who has to read and key-in the information which has been provided as an answer. The available research suggests that the use of character separators could easily slow things down by as much as 16%. This implies that seven hours work by a data processor working on forms without separators would take eight hours if separators had been included on the form. Poor form design can be expensive.

3.2 *Yes/no questions*

Response constraints are an important factor not only in answering open-ended questions but also in multiple choice and yes/no questions. On the travel agents' form shown in Figure 1 the form-filler was asked to respond to yes/no questions by deleting what did not apply. Psycholinguistic studies have shown that negative elements can be a source of difficulty in understanding statements (Wason, 1965) or following instructions (Jones, 1966). Barnard, Wright, and Wilcox (1979) examined performance with such negative instructions when filling in a form. They contrasted negative instructions such as *delete* with affirmative instructions to respond by circling or underlining the word that did apply. They found that for both yes/no questions (Are you married?) and for questions that had alternatives given in a sentence frame (I am single/married) performance was better when people were given affirmative instructions rather than negative instructions. These results are summarized in Figure 8. Barnard et al. went on to show that administrators checking the form for mistakes also found it easier when the form-filler had been given affirmative instructions. The implications for form-design seem very straightforward. Allow people to select the items that apply to them.

Another issue that can be raised about the response to yes/no questions concerns where the question should be located on the page in relation to the yes/no options. When the response is made by putting a tick in a box, it is possible to consider the use of electronic sensing devices to read the data directly into the computer. However, one constraint that often accompanies the use of such sensing devices is that the boxes may need to be aligned vertically so that the answers can be easily scanned by the electronic reader. In an ongoing study, Philip Barnard and I have been comparing some alternative ways of spatially relating yes/no answer boxes to questions. So far we have data from two rather different measures. We have the time taken to complete a particular version of the form. We also have people's guesstimates of how long the different versions will take. The data available so far are summarized in Figure 9, where these two measures have been prorated to a common base line for ease of comparison.

Figure 8 The relatively slower performance when deleting the answer that does not apply, shown for three kinds of question.

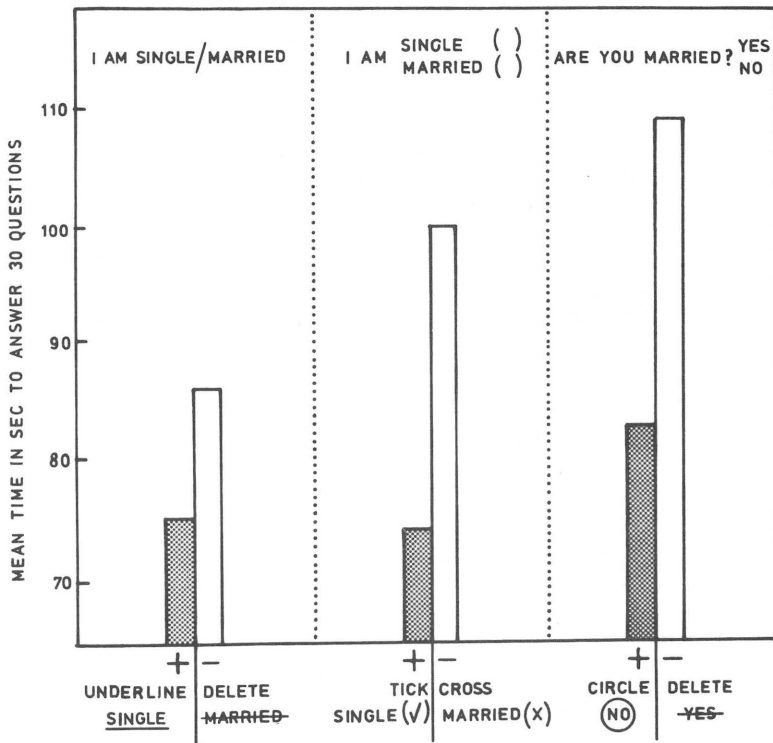
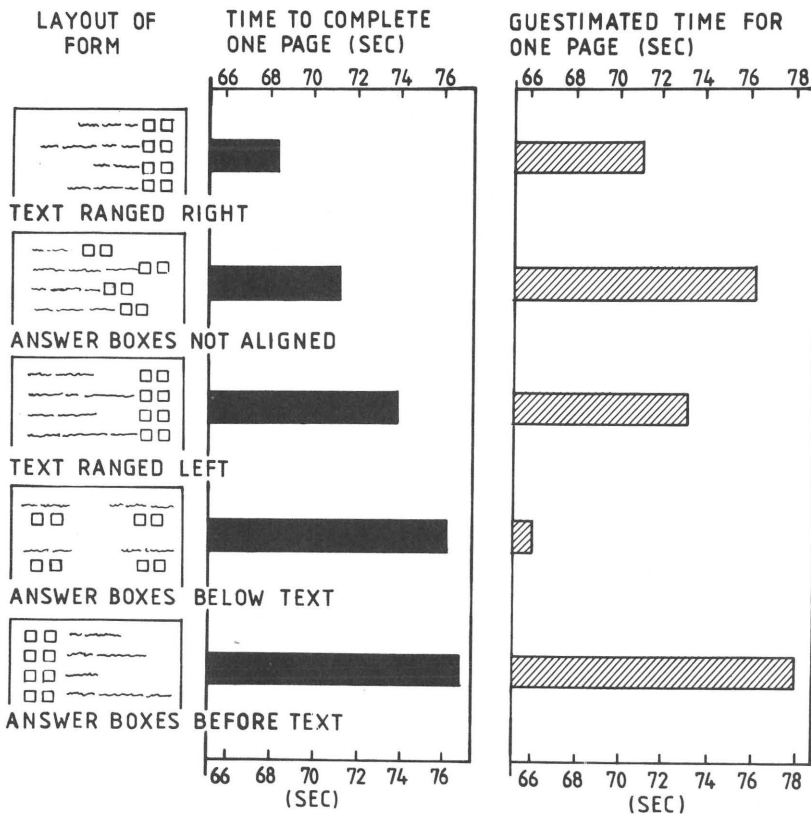


Figure 9 suggests that one of the critical factors in determining the actual time to complete the form was the distance between the end of the question and the yes/no answer boxes. Where this distance was short the form was completed faster. However, people's guesstimates suggest a rather different picture. There was a clear preference among people for the double column layout where the boxes were located underneath each question. When the response boxes followed the question mark immediately, with no attempt to vertically align the answers, the page appeared more cluttered than did some of the alternatives. This may be one reason why people guesstimated that this layout would be fairly slow to complete, although it was in fact among the fastest on the performance measures.

At the moment it is not clear why there is this mismatch between people's performance and their preferences. Nevertheless, in the context of form design it is important to consider what the consequences

Figure 9 The actual time taken to answer 24 yes/no questions varies with the page layout. People's guesses about relative completion times show a different rank ordering.



might be of people thinking that the form is going to be more difficult to complete, just on the basis of the appearance of it. Does this increase the likelihood of them putting it behind the clock and waiting until they receive a reminder from the organisation concerned? Gray (1975) has emphasized the part that typographic factors may play in motivating a form-filler. So although in some contexts it may be appropriate to consider that subjective judgments are an unreliable index of performance, and an index which is particularly prone to experimental artifacts (Poulton, 1976), nevertheless it is possible that in the present instance these two measures capture two different facets of the form-filler's performance. Obviously information about another important aspect of the form can be obtained by considering what effect these different spatial arrangements have on the performance of the clerical staff who process the completed form. The different facets are being emphasized here in order to urge caution in basing recommendations for the design of forms on the results of single experiments. Forms are complex multi-user documents and raise researchable design questions across a very broad front. The integration of the available research information has then to be undertaken in relation to the nexus of user requirements for a specific form.

3.3 *Multiple-choice questions*

The previous section considered performance on questions having binary response options. Multiple-choice questions often involve a larger range of options. Sometimes the form-filler is asked to indicate his selection by ticking or deleting among the options. On other occasions the form-filler may be instructed to code the answers in some way.

Research indicates that care needs to be taken in devising such codes. A study by Wright, Aldrich, and Wilcox (1977) showed that coding systems could lead to an increased error rate among less able respondents. This increase was not caused by difficulty in using the coding system as such. These people made few errors when using the code to answer simple questions such as, "Which of the following are trees? pebble, oak, stick, cedar, willow." Nor did these people have great difficulty answering more complicated questions such as, "Which of the following countries is south of the equator and begins and ends with the same letter?" At least they had no difficulty as long as they were able to respond by using a simple ticking and crossing system. The errors arose when the more complicated response proce-

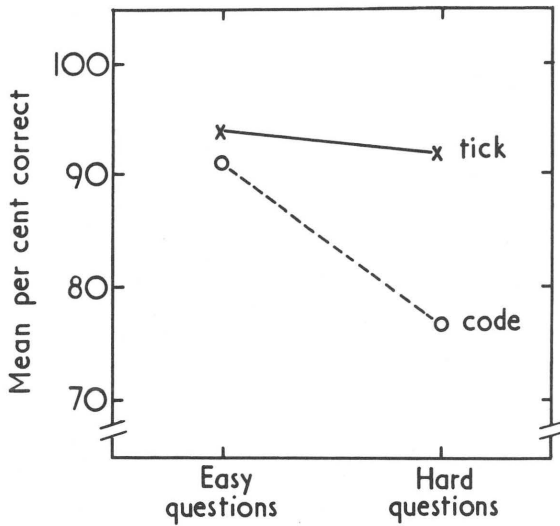


Figure 10 The effects of recording answers via a difficult coding system show up as the questions become harder.

ture of using a coding system was paired with the more difficult questions. A summary of some of the findings from this study is given in Figure 10 which shows that accuracy dropped by 15% — these are errors which could have been avoided by giving people a simpler method of recording their answers.

The coding system in the Wright et al. study was undoubtedly a complicated one to use. It had been based on the system being used by the University of London Examination Board, whereby candidates enter their answers on a card which is suitable for an optical mark reader. Nevertheless, similar findings have been obtained with much simpler coding schemes. For example, Wright and Barnard (1978) asked people to write down a mnemonically related code letter if an item had a particular attribute (e.g., write C if communist). This was again compared with instructions which asked the form-filler to tick if the attribute was present. Performance was better with the simple ticking response than with the code. So the accuracy of the data collected on a form is clearly not just a question of the language used in the question, nor the layout of the information on the page. Some of the difficulties that form-fillers have will arise from the way they are constrained to respond. The fewer these response constraints and the simpler the response to be made, the greater the accuracy of the data collected.

Particulars of your household

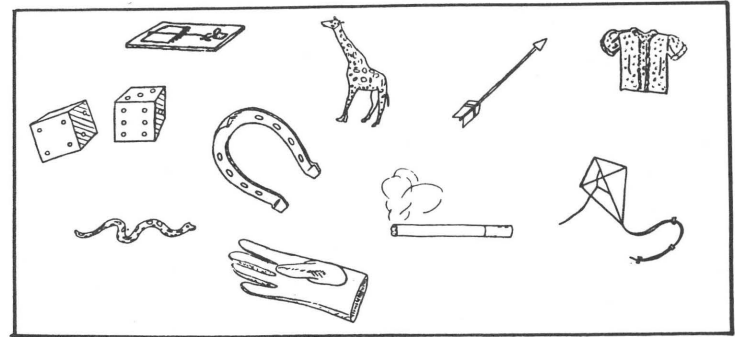
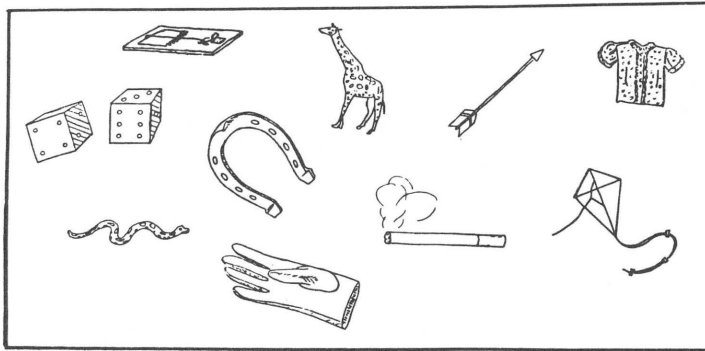
4 Full name of each person living with you—non-dependants should be included only if you are the householder (see note C). BLOCK CAPITALS PLEASE— <i>first names followed by surname</i>	See Section 5 below	State relationship to you or write "No relation"	Date of birth if under 21	Give name of school if attending. Write <i>D</i> if dependant (see note D), <i>P</i> if of pensionable age (see note E), <i>SB</i> if receiving supplementary benefit

5 Please write the following letters where they apply in the space after the names of the members of your household above: *B* if registered as blind; *H* if registered handicapped person; and *E* if an expectant mother.

Figure 11 A common use of a matrix array to ask for information about members of the household.

3.4 Matrix questions

Wright and Barnard (1978) also examined alternative arrangements of questions presented in rectangular configurations, where information from row and column headings must be combined. Typically questions in the column headings of a matrix apply to the items listed on the left hand side of each row of the matrix (Figure 11). The example shown in Figure 11 has a number of different elements. Not only does it require a coded response, it also requires the form-filler to remember six different codes and their meanings. Understanding the questions involves referring to information given in notes elsewhere on the form. Wright and Barnard examined the effects of some of these factors. They devised an experimental procedure in which the members of a household were replaced by the items shown in a picture at the top of the form (Figure 12a and 12b). This enabled the experimenters to monitor how accurately the questions were being answered. They found that with their closest simulations of the genuine question they had a 25% error rate. Modifying the presentation so that each question had a separate column for the response (Figure 12b) reduced the errors to 13%. No further improvement in performance came from incorporating the notes directly into the question instead of printing them at the foot of the page, but the error rate fell to 8% when the row and column information was interchanged (Figure 13).



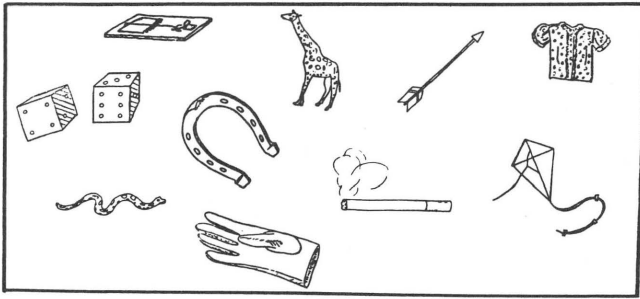
Name of each item shown above	Write J if living in jungle (note A). Write R if recreational (note B). Write W if worn (note C). Write S if spotted (note D). Write M if metallic (note E). Write D if dangerous (note F).

Name of each item shown above	Write J if living in jungle (note A).
	Write R if recreational (note B).
	Write W if worn (note C).
	Write S if spotted (note D).
	Write M if metallic (note E).
Write D if dangerous (note F).	

- A Include wild animals living at the edges of jungles, as well as those living deep in the jungle.
- B Exclude anything that might be used for work (e. g., woodwork is both a hobby and a job).
- C Include items worn either by man or animal.
- D The term spotted is used here to include a wide range of patterning; i. e., anything that usually has spots or blotches, or anything shown as having them in the picture above.
- E Include items even if only a small part of the item is metal.
- F Dangerous means likely to cause injury unless care is taken.

- A Include wild animals living at the edges of jungles, as well as those living deep in the jungle.
- B Exclude anything that might be used for work (e. g., woodwork is both a hobby and a job).
- C Include items worn either by man or animal.
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- E Include items even if only a small part of the item is metal.
- F Dangerous means likely to cause injury unless care is taken.

Figure 12 (a) An experimental simulation of the form illustrated in Figure 11. (b) An alternative way of presenting the same questions.



Name of each item shown above									
Write J if found in jungle. Include wild animals living at the edges of jungles, as well as those living deep in the jungle.									
Write R if recreational. Exclude anything that might be used for work (e. g., woodwork is both a hobby and a job).									
Write W if worn. Include items worn either by man or animal.									
Write S if spotted. The term spotted is used here to include a wide range of patterning; i. e., anything that usually has spots or blotches or anything shown as having them in the picture above.									
Write M if metallic. Include items even if only a small part of the item is metal.									
Write D if dangerous. Dangerous means likely to cause injury unless care is taken.									

Figure 13 The effect of interchanging the row and column information of Figure 12b.

Figure 14 Summary of studies carried out on the effects of response constraints for various kinds of question.

Question style	Form-filler's response				
	Verbal	Mark		Code	
		+ve	-ve	simple	complex
Free response	a,b,c	—	—	—	—
Yes/No		d	d		?
Multiple choice	—	d,e	d		f
Matrix		g		g	
Sentence frame		d	d		

- (a) Barnard and Wright, 1976
- (b) Barnard, Wright and Wilcox, 1978
- (c) Wing, 1979
- (d) Barnard, Wright and Wilcox, 1979

- (e) Hartley, Davis and Burnhill, 1977
- (f) Wright, Aldrich and Wilcox, 1977
- (g) Wright and Barnard, 1978

The authors suggest that the reason why it was beneficial to interchange the row and column information was because most people worked along each row in turn, no matter whether the questions were in columns or rows. The advantage of having the questions in the rows was that the precise meaning of the question could be worked out just once and then applied to each item in the column headings. With the more conventional arrangements, people may have forgotten the precise meaning of the first question by the time they returned to it on the second row. Nevertheless, they may have felt that the question was sufficiently familiar for them not to bother reading the notes again. Consequently errors were made.

Undoubtedly questions can be raised about the validity of these experiments. Whether such questions generate a 25% error rate when they occur on real-life forms is not known. But for our present purposes it is sufficient to note that two-thirds of the errors could be eliminated just by physically re-arranging the information. Again the emphasis is not simply on the fact that people make mistakes when filling in forms. The important point is that the frequency of these mistakes can be reduced by improvements to the design of the form. Such improvements would certainly be cost-effective. They would also be likely to have a beneficial effect on the public image of the body issuing the form.

3.5 *Further research*

If an organisation were to consider funding a large scale research program relating to the design of forms, would it be appropriate to plan more research of the kind summarised above? Certainly it is possible to draw up a simple taxonomy of the classes of question to be found on forms. Figure 14 does just this. It illustrates those cells which have been considered in research studies and highlights where further information is needed to fill in the empty cells.

But is the information of Figure 14 all that the form designer really needs? Perhaps a similar taxonomy could be devised for the notes on a form and also the language of the question. But what about the motivational impact of the look of the form? Can such matters be dealt with as general issues or will there be interactions with the specific content on a form? The next section considers some of the problems in form design that require specific rather than general solutions.

4. *The inadequacy of some cook-books for form design*

The findings from research on response factors, which have been outlined in the previous section, could be summarized in a list or in a table such as that of Figure 14. One might imagine that eventually a collection of such summaries could be compiled and that this could provide something analogous to a cook-book of recipes for form designers. For example, there might be a table that assisted in selecting among different kinds of questions. Once this choice had been made there might be other tables dealing with factors relating to the language, layout, and response constraints for this kind of question. Certainly some systematisation of research on forms would be useful, but in itself this is probably not sufficient to ensure that forms are trouble-free. There are at least two reasons for doubting that any cook-books could ever be fully adequate. One of these reasons concerns the nature of the information available in the literature. The other concerns additional information that designers need which will never be available from the literature. Let us consider each of these reasons in turn.

4.1 *The research literature needs interpretation*

One of the problems facing the designer of a form when he consults the research literature is that the studies reported will differ in a number of ways from the specific communication problem to hand. For example, the people taking part in the experimental study, often undergraduates, may not be typical of the people who will be completing the form. Similarly there may be important differences in the kinds of written information used in experiments (where materials are often designed to enable various factors to be kept under the control of the experimenter) and the kinds of written information found on forms. Even the reading purposes of the people taking part in experiments may be critically different from the way form-fillers read forms. In laboratory experiments the reader is often trying to remember what he reads so that it can be recalled later, or so that questions can be answered, or inferences drawn. In contrast, much of the information on forms is responded to immediately, either because it is an instruction that must be followed (*Write answers in black ink*) or is a direct question (*Are you self employed?*) So the designer needs to exercise caution when applying research findings. It will not necessarily be the case that because version X was better than version Y in the laboratory, the same will be true on a particular form.

Indeed, apart from the obvious differences that there may be between the experimental and the practical tasks, there is one other factor which emphasizes the role of the designer as interpreter. Even where there appears to be a consensus among the research findings, almost all the general principles which emerge will have exceptions. Welford (1978) has suggested that it is of more practical use to have a simple rule which is approximately true than to have a complicated rule which is precisely true. If this is the case then an appreciation of when exceptions are likely to occur is also necessary. In the guidelines they proposed, based on psycholinguistic research, Wright and Barnard (1975) tried illustrating some of the exceptions to the rules of thumb they were proposing. There are times when negatives and passives are the most appropriate way of expressing an idea. The guidelines draw attention to the possibility that the writer is using difficult sentence constructions outside this area of appropriateness.

A quite different reason why the research literature needs interpretation is that the experimental findings must be integrated with decisions about the cost effectiveness of various design options. This may mean choosing an option that was not the best in the performance task, if that option requires more paper or a more expensive printing process. The performance differences themselves are likely to have been expressed either in speed or in errors. These may each have a very different impact on the design decision depending on what kind of form it is, the way in which it will be processed, etc. One important point must be borne in mind when considering the cost implications of performance differences reported in the research literature. Differences found in the laboratory may be multiplied in practical situations. This can happen because of the very large numbers in which forms are processed. Consider, for example, the difference in time taken to answer a yes/no question affirmatively (circling what does apply) rather than negatively (deleting what does not apply). The difference was roughly one second per question in the data reported earlier. This may appear to be a trivial difference, given the time taken to fill in a form. Indeed if there is only one yes/no question on the form then it probably is a difference of no practical consequence. But when a form contains many such questions and when the form is being completed within an organisation where time costs money (rather than at home where the form-filler's time may appear to be more expendable), then the difference of 31% in the time taken for the two kinds of response may be fairly expensive. If a 50-item form is com-

pleted frequently (say, once a week) and is completed by many employees (say, 500), then the loss of 1 second per item becomes a loss of 361 man-hours per year, or nearly ten man-weeks. The performance differences in the research literature appear small because of the units of measurement used in experimental studies. It is for the designer to estimate the practical significance of these differences in the light of other information about how the form will be used.

One further point to be borne in mind when design decisions are made in favour of suboptimal versions is that although a single suboptimal factor on its own may not be critical, a number of them together may be disastrous (see the discussion by Reynolds, 1978). This was evident in the earlier discussion of the effects of using a complicated coding procedure for recording answers. The coding procedure had only a slight effect on accuracy when the questions were easy, but a much bigger effect when the questions were difficult. Similarly the effects observed in the laboratory may appear small because of the high motivation of the people taking part in the experiment and because the "working conditions" are relatively free from distractions. The difficulty of using the harder version may be considerably increased if the working conditions deteriorate. Wright and Fox (1972) compared performance with numerical conversion tables in a quiet, clerical task and in a simulated shopping task where goods had to be located, evaluated, and collected. The relative differences among the tables were the same in both tasks but the absolute magnitude of the difference was much greater in the shopping task.

One final point to be considered is that the consequences of errors on forms may sometimes be far-reaching. If the error on the form is spotted during some subsequent data-processing stage, then this may simply entail the inconvenience and cost of returning the form to the form-filler for correction. Yet the hidden costs of errors that go undetected may be more serious. For example, much government forecasting is done on the basis of information received through forms. This is a fact which leads many small businesses to protest (Carvel, 1978). If the raw data is inaccurate, there is no reason for being optimistic about the forecasts themselves. Nor does there seem to be any reason for assuming that errors in form-filling will be random. Indeed the evidence presented earlier has shown that the design of a form systematically influences the way people deal with it. Consequently, most people will tend to make the same sorts of mistakes. On occasion, form-fillers may even take concerted decisions about which "mis-

takes" to make when they are having difficulties selecting among the options provided on a form. By way of a cautionary tale, the author was told by some form-fillers that when dealing with a particular Home Office form their favourite "don't know" category was one particular item in the set of multiple alternatives provided for that question. The form served as an input for Government statistics. When the national press reported that there was an increase in the occurrence of this particular item it seemed a fair guess that this could just have been an increase in the form-filler's uncertainties. So why not include a "don't know" item among the alternatives available? This was suggested to one senior official within the organisation. The response to this suggestion was along the lines of, "Our people are trained to discriminate among these alternatives. There is no need for a 'don't know' category." As in many other areas of design there is an appeal made to training the form-filler as a substitute for designing an easily completed form. All ergonomists and human factors researchers will recognise the argument.

In summary, one of the reasons why a cook-book of research *findings* is inadequate for the designer is because details of the materials and procedure of the experiment are vital to an intelligent interpretation of the results. Another reason is that there are a number of financial implications attached to whatever decision the designer makes. A meaningful evaluation of the costs requires information about how the form will be used, by what kinds of people, in what sorts of environments, etc. This takes us to the second reason why this cook-book approach is inadequate. The designer will need some information that could never be included in a cook-book.

4.2 *Design decisions about content and pretesting*

There are at least three separable classes of information that designers may need. These relate to the text, the reader, and the multiple functions that the form may serve. The problems of the text are partly problems of content. That is to say, there are issues about whether the question should be there at all. Legg and Brion (1976) carried out a survey of local government forms. They found that forms often contained questions relating to outdated legislation. This means that some local authorities were continuing to ask questions to which they no longer wanted to know the answer. A related constraint on the content of a form is whether the data can be meaningfully analysed (Brigham, 1975). Sometimes the temptation is to attempt too fine a

level of data collection, with the consequence that the analyst is overwhelmed by data. The computer will have no trouble with a 500 x 500 matrix, but whoever is trying to interpret the data may have trouble seeing the woods for the trees. So someone within any form-producing organisation should be asking, "Is your question really necessary?" Even assuming that it is, there is still need to consider whether a form is the best way of getting an answer. For some kinds of information a telephone call may be much quicker, or a personal visit may be much more informative.

The designer's problems with the text are only partly problems of deciding on the content. There are also problems of ambiguities which may be lurking in that content. We have already mentioned that it can be very difficult for a writer to appreciate that the words on a page may have a meaning which differs from that he intended. In recognition of this, the Department of the Environment sent a circular letter to all local authorities advising them to pilot their forms with consumers (Woof, 1976). The Department of Health and Social Security might have found such advice useful when they tried evaluating a new benefit scheme using a form which contained the instruction "Complete section B if you are claiming free school meals." Some form-fillers thought this meant if they were already receiving free school meals; others thought it meant if they were using the form to claim free school meals. So it was a mixture of people who chose to fill in section B. A similar ambiguity arose in two other places on the form.

Some kinds of "pretesting" can be carried out before the text of the form is ever drafted. The designer needs certain information about the form-fillers; for example, about how well they understand particular terms. Administrators may have a well established idea of the difference between a rent allowance and a rent rebate, but this distinction is probably lost on most of the general public. The form-filler's conceptual structures may also be important, the way they conceive things as being related or unrelated. An example of this can be found in a study by Barnard, Morton, Long, and Ottley (1977). They found that people located information in a list more easily when the sub-groupings in the list reflect semantic categories (e.g., fish, flowers, fruit, as separate groupings) rather than when there was a single alphabetic listing of all the items. By extension, the designer who has to make decisions about the grouping of items on a form might find it helpful to know, say, whether sources of income such as rent from

lodgers are more easily remembered when answering questions about household details than when answering questions about "income."

The importance of the reader's preconceptions is not confined to issues of content. People also have presuppositions about the way information is presented. One striking illustration of this occurred in December 1977 when an academic journal decided to change the way it presented the information in a summary table of books that had been reviewed during the year. The table consisted of three columns headed Title, Author, and Reviewer. The innovation consisted of alphabeticising the information within each column. Code letters followed each entry in the table to guide the reader from title to author or reviewer, since these were no longer all on the same line. The table was prefaced with a key explaining the new organisation and the use of the codes. Some informal observations of readers using the table showed that they ignored both the explanatory key and the code. They were happy to assume that they knew how such a table was organised. They assumed quite mistakenly that the information on a single horizontal row was related. In an experimental study of this table a group of readers were persuaded to spend time reading the key and deciding how the table was organised before they used it (Wright and Threlfall, 1980). In spite of studying the instructions there were many mistakes made. People sometimes forgot the explanation they had read and reverted to their expectations about how the information would be arranged. Probably many similar instances occur with forms, where people make mistakes not because the instructions are unclear but because the reader is expecting to be told to do something else.

At a more general level any details about the audience for a form will be useful to the designer. Different design decisions may be appropriate if the form is being prepared for a professional group who have their own conventions about jargon and format, than will be appropriate if the form is being designed for completion by people who have received little education, or who have no specific knowledge of the subject matter of the form. Such details about a form's readership will not be found in the sort of cook-book outlined above.

A third category of additional information that the designer will need is information about the way the form is used. This includes knowing the circumstances in which it is completed. If, in an industrial context, the form is filled in by a checker walking around the plant with a clipboard, the designer needs to know this because it has implications for the physical size of the form; it has implications for

the response to be made — the form-filler may find it much easier to tick boxes than to give written answers requiring more complex motor co-ordination. Similarly the requirements of those who subsequently process the completed form must be taken into account. This includes the administrators who check that the form is correct. Such checking procedures may generate the need for structural compatibility between information on the form and material already in the administrative system (price catalogues, personal record files, etc.). It is also necessary to consider the requirements involved in whatever data analysis may be carried out on the form. Such requirements may be the preferences of the data processing department or they may be the limitations of a piece of hardware if electronic data capture is planned. None of this additional information will be available in a cook-book summarizing the findings from strategic research on design factors. Other procedures will be necessary for obtaining this additional information.

4.3 *A procedural approach to form design*

Elsewhere the suggestion has been put forward that the production of written information can be subjected to checks which are analogous to the quality control checks which apply to the production of other items (Wright, 1979). Many of the checks suggested are empirical but the kinds of data collected and the techniques for collecting them span the range of behavioural research methodologies. They include observational field studies, survey procedures, in-depth interviews, and laboratory comparisons. Different techniques are best suited to obtaining different kinds of information about the text, the form-filler, and the other users of the form. This will be illustrated below, but there is also useful information to be gained from non-research techniques. Macdonald-Ross and Waller (1975) have shown how a consideration of alternatives and the criticism of sensitive, informed opinion can be an extremely valuable resource in improving the comprehensibility of written information.

There is only space here to sketch in some of the sorts of information that may be yielded by the four research techniques mentioned. Observational studies will indicate how the form is used, by all its various users. This research may show how the form is first encountered, which may have implications for its label or heading. If the form has to be requested across a post-office counter, it is unlikely to help matters if it is called "A widow's industrial death benefit" or even "An

invalidity benefit." These phrases are too much of a mouthful. Observational studies are perhaps more easily conducted for forms that are used internally by a business organisation than for forms which are completed privately at home. These "domestic" forms might be better approached through the research techniques of either surveys or interviews.

Surveys can also yield information that is relevant to the content of the form. For example, they can help to determine whether specific terms will be understood by the intended readership. It is important to remember that classificatory analysis has relevance to things as well as people. Survey techniques can be applied to administrative files, to other forms, etc. For some kinds of forms, particularly at the stage where they are being revised, a survey of the clerical records showing what went wrong can be a very useful source of information. It can show where the effort in the revision needs to be concentrated. Surveys of other forms can draw the designer's attention to options about class of question or presentation style that might not otherwise be appreciated. However, one risk in such a procedure is that it may promote "in-breeding." There may be a tendency to select a way of asking questions because it is widely used rather than because that way is particularly helpful.

Surveys of administrative records appear to be an under-used resource in form design. For example, recently the Department of Health and Social Security had the splendid idea of introducing a multi-benefit claim form, whereby a single form could be used to claim several benefits. They set up a number of research projects to investigate the feasibility of such a scheme. One of the research projects might have included a survey of administrative records to find out which sets of benefits were claimed by what sort of applicants. This would have indicated which items to include on the multi-benefit form. For example, there must be very few pensioners who claim for Free School Meals. No such study was undertaken. Consequently the sub-set of benefits which were actually included on the form may limit the generality of the conclusions that can be drawn from the research. To some applicants the trial multi-benefit form may have appeared to be just a complex way of obtaining a free wig from the National Health Service (Anon., 1977). This underscores the point made earlier that the actual *design* of a form is often seen as a trivial non-issue by organisations who depend very heavily on the information produced by forms.

A third research technique is the in-depth interview. This has two very important potential benefits for form design. Such interviews can isolate concepts on forms which are difficult for the form-filler to grasp. They can also highlight factors which are relevant to decisions about sequencing the information on the form. One important aspect of completing forms both in industrial contexts and in business organisations may be the logistic availability of different kinds of information needed to answer the questions on the form. Often the sequencing on a form represents a convenient structure for the administrator, or reflects some presumed logical sequence. This is not always the most convenient for the person completing the form. Sophisticated computer analysis is being increasingly brought to bear on the data from forms. There is correspondingly less need for administrative constraints to influence the sequencing of the information. The numbers to be added up no longer need to be on successive rows if the adding is done by computer. They can be located to facilitate data collection rather than data analysis.

The use of in-depth interview techniques to explore conceptual problems is well illustrated in the work of Peel (1978). In Peel's study people were taken through a step by step analysis of how their supplementary benefit was worked out. Many problems were highlighted by this technique. For example, one concerned the difficulties people had in understanding that the benefit fulfilled a "topping-up" function. It raised a person's income to a statutory level, and so varied in amount as a function of individual financial circumstances. Many claimants, who were familiar with other welfare benefits which were given as fixed sums of money, seemed to have difficulty understanding the function of the supplementary benefit allowance. Once conceptual difficulties have been identified, laboratory-based experimental comparisons can be used to find a way round the difficulty.

A fourth research technique provides a comparison of the effects of intervening in some way, perhaps changing the language or the layout of the form. This technique can be used vicariously if the relevant comparisons are available in the research literature. On the other hand specific comparisons may need to be made between the alternatives under consideration. For example, there are a number of different ways of asking people to select multiple choice options. Requiring the form-filler to use a code number to indicate the option chosen may enable the completed form to serve as an input document for the key-punch operators in the data processing department. This elimi-

nates the need for any clerical coding of the answers. But such a system can only be cost-effective if the form-fillers respond accurately. As was outlined in section 3, increasing the complexity of the way the answer is recorded very often increases the error rate. It therefore becomes an empirical question as to whether the apparent saving is a genuine economy.

These four research methodologies can be used in determining the content of a form, determining the way the information on the form is presented, and determining whether the draft version of the form meets certain levels of adequacy. Certainly there is an increasing recognition of the need to trouble-shoot a draft form (Woof, 1976). Various trouble-shooting techniques have been outlined by Wright (1979). Readability formulae may be useful in some circumstances (see the discussion by Klare, 1976, and Rothkopf, 1976) but tend to require lengthier passages of continuous prose than are usually found on forms. For some kinds of forms it may be possible to have them completed by people from the appropriate audience for the form. This may often be the case for forms used within an organisation. For other kinds of forms, particularly where it may be difficult to check the accuracy of completion, then it may be possible to have someone complete the form as if on behalf of another person. The relevant details of this other person can be provided as a "case history." In such case histories the amount of detail, both relevant and irrelevant, needs to be typical of that which the form-filler would normally have available. There is little point in providing a sequence of "answers" which the form-filler simply has to copy onto the form.

One of the advantages of this case history technique is that it can be a very precise way of locating trouble spots. Furthermore the case histories can be designed so that they probe on behalf of a range of potential users (pensioners, widows, the disabled, etc.). This makes them a very efficient way of examining the adequacy of the form for a wide range of potential form-fillers. Alternative techniques, such as asking readers if they understood the form or even asking them specific questions about the information on the form, are less satisfactory for several reasons. On the one hand people are reluctant to admit that they do not understand what they are reading. Often they feel this somehow reflects their incompetence rather than the writer's shortcomings. On the other hand people can sometimes answer questions accurately by repeating appropriate phrases from the text, without necessarily understanding what is actually meant by their answer.

It is, of course, the case that when trouble spots are found on a form, then the draft must not only be revised but also retested. Often the first few pretesting and revision stages can be conducted quite informally. If a dozen volunteers within the form-producing organisation are willing to complete the form from "case history" data, this is often adequate to indicate whether there are any serious misunderstandings. Only after such informal testing is it worth the greater investment of effort to obtain large samples and valid estimates of the error rates that might be found with the form in practice.

This brief outline of the way different research techniques can be recruited to provide information about the design of a form is intended to be illustrative rather than exhaustive. The important point to note is that this kind of data collection is providing qualitatively very different information from that provided in the research literature. For successful form design it would seem that both kinds of research, the strategic and the tactical, are necessary. Neither on its own can be sufficient.

5. *Communication between strategists and tacticians*

From the preceding discussion it might seem feasible to picture the strategic researcher pursuing "general issues" in some remote corner of an ivory tower, while the tactical researcher wrestles with the problems of interpreting these research findings as well as collecting all sorts of other information that may be needed. Such a picture has some elements of truth in it. Typically those conducting strategic research tend to be psychologists whereas the tactical decision makers tend to be graphic designers. Communication between the two professional groups tends not to be frequent. Even when an exchange of information does occur it may be a rather one-sided affair, with psychologists putting forward their research findings and designers insisting that the available research literature offers little guidance for the solution of the practical problems to hand (Macdonald-Ross, 1978).

This lack of communication between the two approaches to the design of forms has several disadvantages. There are at least three hazards which may arise when the selection of general issues for research is left entirely in the hands of the academics. One hazard is that the issue may be of no relevance to anyone other than the researcher, who may find the issue of interest solely because it appears to discriminate among models of underlying cognitive processes.

COMPONENTS OF THE DESIGN PROCESS

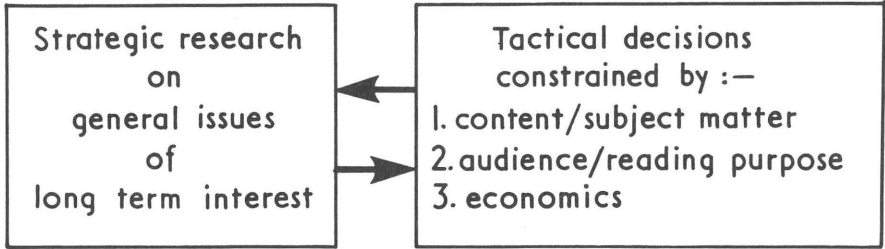


Figure 15 A synopsis of the relation between strategy and tactics in the design of forms.

These models may have no obvious relevance to the design of forms. A second hazard is that the researcher may not fully explore the boundary conditions which often limit the generality of the experimental findings. Such boundary conditions may include different target populations and various kinds of subject matter. Take as an example the studies discussed earlier showing that handwriting is less legible when people write in space character formats. In the earlier discussion it was suggested that the kinds of errors people made would not be affected by the colour or the size of the character separators. But the results came from data provided by the general public. Would the conclusions apply to programmers trained to write in these formats? Perhaps these response constraints are a device useful for writing programs but nothing else; perhaps even this advantage only applies to some programming languages. Clearly it can be a very real problem to know just how safely the research findings from an exploration of a general issue can be applied to the design of a specific form.

The third hazard in allowing, or even encouraging, the isolated growth of research on general issues is the problem of disseminating the results. Many of the studies outlined earlier have been reported in academic journals. These are not read by the working designer. So it can be little wonder if the results of such research do not seem to be implemented. The lack of contact between the strategist and the tactician can be detrimental to both endeavours.

Figure 15 illustrates an alternative approach. It emphasizes intercommunication between the two types of investigation. The specification of the issues on which research data is needed can start with the tacticians, since they are the people who know what problems actually recur, as distinct from what problems potentially might

occur. If it is the people who are trying to solve practical problems who help specify the research issues then they are likely to be interested in the outcome of that research. Therefore, at one level the problem of communicating research findings is circumvented, although of course the wider issue of making the information universally available still remains.

5.1 *Is communication possible between strategist and tactician?*

A rather different problem that militates against the dissemination of research findings has been raised by Macdonald-Ross and Waller (1976) who suggested that the professional training received by researchers and by graphic designers generates a particular kind of communication gap. To some extent the two groups do not speak each other's language and so have difficulty establishing a common ground for discussing issues. The solution proposed by Waller (1977-1978) is that of a "bilingual" intermediary. Waller labels this person a "transformer" with a role akin to that of a producer in some other communication medium such as film or radio. The function of such a person is to co-ordinate the many conflicting demands that arise during the production of written information, to develop techniques for finding compromise solutions, to cultivate a sensitivity to the distinction between preferred and necessary ways of presenting information.

The concept of such an intermediary can be found elsewhere. Varella (1977) uses the term "social technologist" in a similar way. Varella's emphasis tends to be on the intermediary's ability to integrate diverse research findings. In contrast, the present emphasis is on finding the centre of gravity of the conflicting demands that might arise during the process of designing a form.

It is perhaps an empirical question as to whether such intermediaries are necessary. Is it really true that researchers and designers can find no basis on which to communicate? The pessimists can point to the proceedings of interdisciplinary conferences (e.g., Kolers, Wrolstad, and Bouma, 1979) where sectional interests seem prominent and contact across boundaries seems rare. But, of course, there are counter-examples (e.g., Kolers, Wrolstad, and Bouma, 1980). Optimists can look at the outcome of collaboration between psychologists and designers. For example the team of Hartley and Burnhill have addressed the issue of the use of white space in presenting text as a means of helping the reader grasp the structure of the written information (Hartley and Burnhill, 1977b).

A related case for the need for greater interaction between pure and applied researchers has been made by Wright (1978). Pure research benefits from being set within the context of needing to explain the powerful determinants of performance discovered by applied researchers. Similarly, although differently located along the pure-applied dimension, strategic research stands to benefit from needing to respond to the issues raised by tacticians. There is a risk that such benefits might be lost if communication were only through a third party.

As the earlier discussion has shown, it would be inappropriate to conceive of the tacticians as being simply the providers of research questions and assimilators of research findings. They, too, have an active research part to play. There has already been discussion of the need for empirical information that is required to specify the content and presentation of the form. In addition the draft form will require troubleshooting. There needs to be some evaluation that the form reaches minimal standards of adequacy. It is such data collected by tactical researchers that provides the vital link, the nearly common ground, between the strategist and the tactician.

5.2 *The overlap of strategic and tactical research*

Figure 15 perpetrates a convenient fiction in characterizing strategic and tactical research by the graphic device of two separate boxes. A more accurate picture might have been an overlapping venn diagram. One man's tactics may be another man's strategy. The main difference between the two kinds of information is whether they have relevance beyond the immediate practical problem which prompted the collection of the information. This in some instances will depend as much on the practical problem as it does on the information obtained. For example, an organisation that has a continuing need to include questions about income on the forms it produces may find it strategically valuable to have information about how people conceptually interrelate their various sources of income. No such strategic need may exist in another organisation, although from time to time they may be concerned with questions about particular sources of income. Because of the different value that income information has to these two kinds or organisation, the research effort will vary and this will be reflected in the generality of the results obtained from the respective studies.

Another area of overlap of the strategic and tactical approaches has been discussed by Macdonald-Ross (1978). He has pointed out the

need for strategists to be concerned with explicating the skills of good tactical problem solvers. There can be little doubt that the forms designed by some people are far better than those designed by others. In an unpublished study Barnard and Wright asked people to evaluate forms from five local authorities. All forms were used to administer the same benefit scheme, nevertheless some were consistently found to be better than others (fuller details are given in Wright, 1982). Macdonald-Ross has emphasized the practical value of trying to operationalise the procedures by which a good craftsman arrives at particular solutions to design problems. As yet there is no research of this kind available in the research literature on form design, although it is an approach that has met with success in other problem solving contexts (Newall and Simon, 1972).

5.3 *Who does what?*

Perhaps it is now clearer what replies are appropriate when you are next shown a form and asked for "some quick comments." The preceding discussion has tried to indicate where the boundaries of a division of labour might fall when designing forms. Specifications of what to ask, and in some measure how to ask it (particularly issues about sequencing the information), can usefully come from empirical investigations by the organisation interested in the design of a particular form. Assistance in selecting which classes of question to use, which kinds of response to require, what sorts of language to avoid, perhaps even how to cope with the notes, may come from investigations undertaken outside the particular organisation producing the form. But the usefulness of such research might well depend on the flow of information between the tactical and the strategic researchers. Inevitably a final troubleshooting evaluation of the form will always be necessary. Here the onus again rests with those producing the form.

When discussing ways of ensuring that the language in a document is communicating effectively to the reader, a case was made by Wright (1980) that the ideal solution lay in the co-ordinated skills of a multi-disciplinary team. Applying this notion to the design of forms, such a team would consist of: subject matter experts who know about the specific content to be covered on the form; experts in typographic design who know about displaying printed information on the page; experts in behavioural research who know how to find and interpret the relevant research literature as well as knowing how to devise

whatever tactical investigations may be necessary; and writers who have the skill to communicate clearly and easily in writing. Obviously such teams are expensive to maintain. Nevertheless, for any organisation handling large numbers of forms it is simply an empirical question as to whether maintaining such a team would be cost-effective. This takes us back to our starting point and the benefits of good design. But at least by now it should be clearer why it is so unreasonable to expect a clerical officer to be able to sit at a desk and produce a trouble-free form. This may be a cheap production method but the maintenance costs are often excessive.

Among those who have recognized that clerical officers need some assistance to design better forms, there are people who hope that one day there might appear a do-it-yourself guide to form-design. Perhaps this hope is centered on the belief that strategic research might result in a set of simple, easily followed guidelines which would enable the secretary at her typewriter to produce a near perfect form. The preceding discussion has tried to show that such a cook-book is not merely a pipe dream, but it reflects a serious misunderstanding of the complexities of good form design. Organisations with a vested interest in the improvement of forms have two major requirements. They need both a design strategy and they need adequate tactical resources to implement that strategy.

This is the substance of a paper given at the NATO conference on Visual Presentation of Information, Netherlands, September 1978.

A revised version of the paper "Informed design for forms" will appear in R. Easterby and H. Zwaga (eds) *Visual Presentation of Information*. London: Wiley (1981).

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‘Beware of the Scribes’

*In an address to the Society for Italic Handwriting in London
the author describes his inherited affliction with Italic Fever —
his pursuit of the proper equipment,
his flaunting of his expertise,
and his concern for the perpetuation of a humanistic hand.*

It all started on one particular day in 1936 when we found my father trying to saw through the thick hide of a twelve-bore shotgun cartridge with a pen-knife. We had absolutely no warning. There had been no history of that sort of thing in the family . . . well, there *was* great-uncle Albert who might be called eccentric, but he suffered from no more than an excess of natural curiosity, which led him, when he first travelled on a newfangled ‘moving staircase’ in the London Underground, to see if he could stop the thing by clasping one of the lamp-standards alongside the escalator and hanging on to it for dear life. He couldn’t, and had to be rescued by the maintenance staff, an episode that was all the more spectacular since he was a bishop fully attired in apron and gaiters. But oddities such as this are far removed from the sinister tinkering with gunpowder and shot in which my father was discovered.

Of course, the truth eventually came out. He was suffering from a disease variously known as Johnston’s Disease, Cockerell’s Complaint or Italic Fever. In lay terms, he was in the early but already incurable stages of Good Handwriting. It can’t be said that there was much history of *that* in the family. From the odd letters that hung about tables and desks in our house when I was a child, I gleaned that my male forbears corresponded in a spindly code consisting largely of wavy lines of varying length which offered a rough indication of the shapes which the words would have formed had there been any actual letters to form them.

By contrast, the females tended to write, as they spoke, in an extravagant Edwardian style full of explosive stresses and ejaculations, like the barking of large, friendly dogs. ‘*Beloved* Hermione — I am *simply devastated* to learn of your *Quite Ghastly* motoring accident — *too awful*, and what a *Perfect Swine* of a man to suggest that it was *your fault!* You are to *drop everything* and come and stay *at once*, you *Poor Darling* etc etc . . .” It’s not difficult to visualise the resulting page in which ascenders, descenders, cross-strokes, commas and thick underlinings overlapped each other in an orgy of angular confusion, like the twigs, boughs and trunks of a storm-stricken forest.

It was as a contributor to this cheerful cacographic anarchy that my father suddenly decided to do something about it. Up to that point — I was about fifteen years old — I don’t think I had been aware of the existence of italic handwriting. Indeed, the first inkling that I had of loftier realms beyond the simple requirements of legible, ‘joined-up’ writing was at my private school where, for offences which didn’t call for violent reprisals, we had to copy out repetitive precepts from a copperplate copybook: ‘Work hard, play hard’, ‘Xenophon was a Greek’, ‘use your toothbrush daily’, ‘hack no furniture’. I suppose I should have suspected, from the irrelevant intrusion of Xenophon the Greek with his awkward capitals and profusion of *o*’s and *e*’s, that I was being got at beyond the call of mere house-training and oral hygiene. But this was a time of innocence.

Under the influence of my father’s new-found enthusiasm, that innocence soon disappeared. A strange assortment of impedimenta invaded the house, including a small, round glass pot full of the buckshot so hazardously acquired, in which he used to agitate his Mitchell nibs in order to clean them. He went off and joined this Society of fellow-sufferers, whose *Bulletins* plopped through the letter-box with a certain regularity. This was unusual for him since he was not a particularly gregarious or ‘clubbable’ man. When he died, I appropriated from his desk most of the equipment which he had amassed — including the pot of pellets, plus a now much-valued copy of Edward Johnston’s *Writing & Illuminating, & Lettering* and a great stack of the earliest journals of the Society. Within weeks I had gone down with an even more virulent strain of the affliction. But it is a big step from becoming an enthusiastic fan to addressing a gathering of experts.

However, I have since gained some experience from a career as a jazz musician, on which I now propose to draw. As you know, the

technique of jazz involves variation on a theme, going by way of improvisation whether the thought takes you. Only by this method, I thought, would it be possible for me, perhaps by accident, to hit a note or strike a chord which is not over-familiar to you. Alongside my work in music I have also dabbled in journalism, enough to know just what to do when a theme or a title is required. The index of the *Oxford Book of Quotations* was discouraging about the word 'pen', which occurs almost exclusively in a figurative or literary sense. 'Ink' was even less promising, and with 'nib' I drew a blank.

But a glance at the first entry under 'scribe' and my troubles seemed to be over, temporarily at least. 'Beware of the scribes . . .' I was as elated as my father must have been when, as a schoolboy, he was similarly studying the index of a school hymnal, when he discovered the hymn 'My God, what boots it to repent?' listed as 'My God, what boots'. *Beware of the scribes!* Debarred by sheer ignorance and a just humility from adopting a didactic or informative line, I would be provocative instead.

It was a grave mistake. When I began to pursue the idea of going forward from those words into a little benign questioning of the role of the scribe in the modern world, I found my notes gradually changing from detached observation into what can only be described as a confessional. I started by following up the quotation, which occurs in St. Mark, 'Beware of the scribes, which love to go in long clothing, and love salutations in the market-place, and the chief seats in the synagogue, and the uppermost rooms at feasts; which devour widows' houses and for a pretence make long prayers'. A nasty, priggish lot, to be sure, but worse is to come from St. Matthew a few entries on. 'Woe unto you, scribes and Pharisees, hypocrites! For ye pay tithe of mint and anise and cummin, and have omitted the weightier matters of the law, judgment, mercy and faith: ye blind guides, which strain at a gnat, and swallow a camel'. Good heavens, I thought, what sort of company is this into which I have strayed? And this led me on to some stringent searching into my own character since *Italic Fever* struck.

If scripture classes fifty years ago ever explained to me the close historical connection between the scribes and Pharisees, the knowledge has since escaped me. But the message comes down that the former shared with the latter the grateful conviction that they were not 'as other men are'. It would not require a hypersensitive observer of human behaviour to realize that those words are certainly true in modern times. A quick riffle through the Society's JOURNALS over the

years reveals eccentricities that make my father's hazardous interference with the twelve-bore cartridges seem positively mundane. 'This letter', wrote a correspondent in 1956, 'is being written with a converted Osmiroid pen fitted with a nib consisting of a piece of polythene from a cycle feeding-bottle tube, a section of an old table-tennis ball and half a paper-clip'. A year or two later, another philanthropist is sharing with the world the discovery that stationers' ink can be improved by the addition of sugar, one quarter of a tea-spoon to one elevenpenny bottle, to be stirred with anything suitable that comes to hand — perhaps what remains of the cycle feeding-bottle tube. Immediately, an even better recipe arrives from across the Atlantic: washing ammonia and a few drops of detergent diluted in a wine-glass of water and added in minute quantities to Higgins' 'Eternal' or Pelikan 'Fount' ink. Many years later we — for by then I had joined the ranks — are still at it, subverting the efforts of Messrs Platignum and Osmiroid with scissors and oil-stone, and neglecting all else — the oil crisis, racial problems, pollution — in the continuing pursuit of a free-flowing, non-smelling, pure black ink.

But it can hardly have been mild and rather amiable peculiarities such as these that put the scribes of old so firmly beyond the reach of the Kingdom of Heaven. I began, in a spirit of curiosity not altogether untainted by smug confidence, to examine my own motives and activities since I began taking my writing in hand. My earliest findings were not altogether displeasing. Having never been greatly excited by technological change, I had become in the area of epistolatory communication a positive Luddite, leaving my typewriter to atrophy in its case while I chipped away at quills and garden cane and performed delicate surgical operations on my Osmiroids. If occasionally I made a fool of myself, it was in a good cause. I am thinking particularly of the time that I asked my local butcher if he could supply me with turkey feathers. 'Oh no, Sir,' he said, 'we never see them — they're bundled up and sold off at the factory'. Imagine that, I thought, looking around at the thirty or forty unclad turkey carcasses that festooned the shop and visualizing the massive, clandestine calligraphic activity that must be going on unknown to us. Then he added "Toothpicks, I think".

Pursuing the process of self-analysis, I was by no means upset to realize that calligraphy had turned me into a trouble-maker, a flutter of authority, if not an actual law-breaker. Indeed, I am prepared to incite those of you who do not already subscribe to the practice to

reject, with the anger and contempt which it deserves, the imputation of illegibility contained in the words 'Enter in BLOCK CAPITALS'. Who do they think we are? I resolutely ignore the instruction and write name, address and nationality in my normal cursive longhand. And I am here to tell you that they haven't caught up with me yet! Ah, they know what I'm up to all right! You may have noticed lately that they have begun to print a row of little horse-boxes on the forms, one for each capital, to put a stop to my joined-up writing. I am making at the moment a study of decorative Gothic capitals, those ornate monuments to illegibility inside which, as Cyril Connolly almost said, a lithe and functional Roman capital is screaming to be let out. That'll fix them!

By the same token, I ignore the demands of prescribed business practice and write all my business letters by hand. For no more than the cost of about 60 boxes of carbon-paper one can now buy a desk-copier that solves the problem of filing and back reference and, in the process, preserves facsimiles of one's masterpieces for posterity. There are sound commercial justifications for this practice, too. I have been told, for instance, that my envelopes directed to the B.B.C. reach their destination more quickly through being instantly recognisable amongst the identical type-written rectangles that go through the postal pool. It's nice to know that all the expenditure of time and materials has a practical effect, for I am now in the mood to confess that it still takes me five minutes or more and no less than six envelopes to return a single contract to the Corporation.

You are, I can sense it, beginning to realize that all is not well. For the last two paragraphs have revealed symptoms more disturbing than a mere robust independence of spirit. Arrogance, self-satisfaction, vanity, exhibitionism, megalomania, paranoia — they are all there, either emergent or rampant, to suggest that embracing Rome, in the calligraphic sense, did not automatically make me a better person. Indeed, it was at this point in my soul-searching that I began to suspect that it was Dr Jekyll who, true to the tradition of his calling, wrote in a spidery, formless and illegible scrawl, while the elegant, cultured and insidious Italic belonged to Mr Hyde. My unease grew when I came to consider that item which has been, these last few years, the hub of what, until now, I have always thought to be a harmless hobby — my Handwriting Collection.

The word 'collection' itself has certain unsettling implications. For is not the whole point of a collection that the objects collected, be they

stamps, oil-paintings or bus-tickets, should have a rarity value, either now or in the future. What would be the point of putting together examples of fine handwriting if one did not secretly believe that the art is moribund if not virtually extinct? And yet such a defeatist attitude is surely enough to have one drummed out of the S.I.H. for desertion.

I can wriggle out of that charge by pleading that my collection is no mere gathering up of dead leaves but a living thing that grows year by year as I add new entries. But this takes us into still deeper waters, since it involves the wider principle of communication and personal relationships. I believe strongly in the virtues of letter-writing as the ideal medium of substantial communication. To me, one of the most dreadful deathbed utterances — and I use the word ‘dreadful’ in its literal sense — is Dr Samuel Johnson’s ‘An odd thought strikes me — we shall receive no letters in the grave.’ On paper, the most profound ideas and sentiments can be set down and then fashioned, honed and polished so as to avert shock, embarrassment or misunderstanding. Likewise, intemperate outbursts scribbled in haste remain for a time at least in a state of suspension, susceptible to amelioration or retraction before any harm is done.

But what role does calligraphy play in all this? That is a question which was put to me, with an expression of some amusement, by an Iraqi civil servant working for the British Council in Kuwait when he overheard me discussing my hobby at an embassy party. To help me understand his bewilderment at my carrying round several favourite square-edge-nibbed fountain pens in my breast pocket for everyday use — and, further than that, actually belonging to a society to encourage me in learning how to use them properly — he got me some books of instruction on Arabic writing. I even fashioned a reed pen when I got home with the appropriate slope so that I could learn the rudiments. As a corrective to those defects of character which I listed earlier, trying to learn Arabic beats sackcloth and ashes all ends up.

We in the western world, and especially the English-speaking world, may consider ourselves blessed or cursed, depending on one’s point of view, with a language the writing of which in the most informal circumstances is susceptible to style and beauty. But how far should this go? Clearly, it starts with the basic need for legibility. One would have considerable difficulty in getting across to a visitor from Mars that there are people in our civilization — and often people of high education — who, in the practice of a skill devised solely for the

transmission of intelligence, produce with hand and pen and ink a writing which is indecipherable not only to others but all too often to themselves. In this context, there is an apposite passage in the exchange of letters between my father and Rupert Hart-Davis in the late Fifties which are currently being published. My father opened the topic in a letter which began 'In a world where nearly all is dark, as Bishop Gore used to say, two things are luminously clear: viz that your letters are of first-class interest and quality, and that your handwriting is perfectly legible and, in fact, very pleasant to look on'. (There speaks the retired schoolmaster to the former pupil!) 'And the second is very important. Did you ever get a letter from Monty James? I once had a note from him inviting us to dinner. We *guessed* that the time was 8 and not 3, as it appeared to be, but all that we could tell about the day was that it was not Wednesday.' To this, Rupert Hart-Davis replied 'I never saw Monty James's writing, but doubt whether he could have been more illegible than Lady Colefax: the only hope of deciphering *her* invitations, someone said, was to pin them up on the wall and *run* past them.'

Legibility itself makes small demands. I receive frequent letters from musician friends in America which are written in capital letters throughout. They are perfectly legible and convey the required thoughts. Why should we demand more? 'Good handwriting is no more nor less than good manners' was a view put forward more than once by Sir Sidney Cockerell in early issues of the JOURNAL. I would neither wish nor dare to disagree with that. But against it I would put the doubts that I sometimes feel when practising my hobby too diligently at the expense of some long-suffering correspondent. I confess to a twinge of concern sometimes when I look at the allegedly cursive and informal winning entries in the annual handwriting competition. If indeed this is the style in which the writers carry on their everyday correspondence — and I admit that I often aspire to it myself — might not that in itself constitute a breach of good manners, like attending someone's wine and cheese party in white tie and tails? I suppose there may be other perfectly good reasons why certain people with whom I have attempted to establish a regular correspondence have shown reluctance to go along with the idea. But I have a nasty feeling that they may be of like mind with those acquaintances who, when a few years ago I wrote a column about eating out, gave up asking me out to dinner because, as some of them admitted afterwards, they thought that, privately if not out loud, I might criticize their food.

I would like to cite two admirable correctives to the tendency to over-indulge in 'fine writing' at inappropriate times. One can be found in the collected works of that great cartoonist, Saul Steinberg, who wielded a lethal pen at the expense of pretentiousness in man's creation, be that in ornate buildings, extravagant fashion or fussy decorative art. He often liked to produce a succession of variations on a theme, and once drew a series of splendid-looking documents complete with elaborate decoration, distinguished calligraphy and, to set them off, some impressive seals and ribbons. They represented caricatures of the sort of style, lay-out and, let's face it, pomposity to which we all occasionally aspire. And they contained not one word of intelligible language between them, demonstrating that if calligraphy or its appearance can be achieved without legibility, the reverse must also be true.

My second corrective is more down to earth, arising from an incident outside a theatre at which I had been playing. There were some people outside asking for autographs. I was in the phase when I deigned to carry about my person nothing less than a tried and tested fountain pen with italic nib. At that stage I seized upon every opportunity to practice my hand and, yes, show off a little in the process. As the modest queue came to an end, I noticed one small girl who had been through earlier still hovering nearby, autograph book in hand. 'Hullo,' I said, 'I've done your book, haven't I?' 'Yes,' chipped in her mother, 'but she'd rather have a signature.'

Of course, it is absolutely right and salutary that my efforts at calligraphy should be thus brought down to earth. I remember reading somewhere that the desirable outcome of establishing a disciplined italic style is that the hand is then so trained that even the proverbial scribbled note on the kitchen table 'Gone to the pictures — your dinner's in the oven' will have legibility and a sort of attractiveness. In my ruthless efforts to expand my father's handwriting collection, I am in the fortunate position of presenting a regular programme on the B.B.C. which attracts more letters per week than a private person might reasonably expect. It doesn't disappoint me that there is little material in them which can stand up to close proximity to the samples of Irene Wellington, Wilfrid Blunt, Aubrey West or those fellow-members and officers of the S.I.H. on whose writing I have pounced like a bird of prey. Indeed, I have been pleasantly surprised that, once in a while, some query about Louis Armstrong or Jelly Roll Morton has been couched in a really superb hand. But what I *have* missed are

those handwritings, 'perfectly legible and pleasant to look on', to use my father's words to Rupert Hart-Davis, which show no direct or obvious signs of Italic origin. And I wonder whether it could be that the protagonists of the Italic or Humanistic hand have unwittingly helped to create a gap between that which is manifestly excellent and highly-skilled on the one hand and sloppy, awkward, mean or immature on the other. In this, I am not, I hasten to say, aligning myself with a so-called graphologist with whom I recently shared a dressing-room in a T.V. studio and who, on asking to see an example of my handwriting, handed it back with the words 'Oh yes, this is semi-calligraphy — you've spoiled it.' It's not the alleged 'absence of character' that I grieve over — my collection is too full of varied, positive and extrovert italic samples for that. But I do sometimes feel the loss of those cheerful free-flowing, good-looking handwritings that seem to have gone to ground nowadays.

Am I saying that the humanistic hand sometimes lacks, not character, but humanity? Well, there was certainly, in the chaotic writing of my aunts and great-aunts which I described at the beginning, a certain zest, impetuosity, humour and *immediacy* which few of the careful, 'fine' handwritings possess.

In allowing myself to follow the path along which my thoughts have led me, I am encouraged by a letter which I found in an issue of the *S.I.H. Bulletin* in the early Sixties. In it, a correspondent wrote 'I have the impression that we would do well to give the word calligraphy a holiday. For the same reason, I have long thought that we over-emphasize the word Italic. I would even prefer our Society to be called the Good Handwriting Society . . .' The writer was A. S. Osley, whose contribution to the *JOURNAL* 20 years ago was less heroic than it is today.

So all these matters that I have touched on — I hope lightly — have been raised and argued over many times before, and will continue to provoke lively discussion. But now, as I approach the end, a strange thought strikes me. It is inspired by an article in a newspaper some days ago which described the equipment which the Post Office is currently developing to bring the whole matter of person-to-person communication into the new electronic age. I believe the headline ran 'Goodbye, Mr Postman'. The equipment in question will be an extension of the small home computer which, the ad-boys are telling us, has already become an indispensable adjunct to every well-ordered household. This is the machine that will stand in the corner of the

living-room next to, or perhaps incorporated in, the television set, and through which, without moving more than a finger, we shall be able to do our household accounts, operate the Hoover, order the groceries, walk the dog, clean the car, write novels — and communicate with distant friends and relations who are similarly endowed. There we'll be in front of the set, our little atrophied legs dangling over the edge of the sofa, while intimate messages from nearest and dearest or bank-manager flash on to the screen or are showered all over the carpets in 'print outs'.

Oh well, you may say, once we get used to it, it'll be no worse than the typewriter or news-type. Oh, but it will! Have you ever seen a computer's writing? I can tell you that it attacks the very heart of our written language, the Roman alphabet. The reason is that, at present, the computer cannot produce a curved line. Its letters and figures are based on the square, to the exclusion of the circle. The result is a writing which, without putting too fine a point on it, is arid, hideous and far from easy to read. As the newspaper said in announcing this great new leap forward, the only people who will not benefit from it are postmen and those who stubbornly cling to pen and paper as a method of communicating with their fellow men.

So the thought I leave you with is this. Sooner than we think, all the argument about writing systems, about ball-point versus straight-edge, copperplate versus Italic, swagger versus restraint, will indeed be so much straining at a gnat. Then will be the time for the scribes to redeem themselves, and for all who care for the feel of a pen between their fingers to write under the banner of the Society for . . . Handwriting.

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Résumés des Articles

Traduction: Fernand Baudin

La communication écrite et la notion de loi dans la Grèce antique *par Jon Stratton*

La notion de loi est trop souvent considérée comme une catégorie a-temporelle. De même, l'influence de l'écriture (en tant que moyen de communication) sur l'organisation des concepts et sur les structures sociales dans a cité n'ont guères été étudiés. L'auteur envisage ces deux concepts dans le contexte de la Grèce antique et montre comment les notions de "loi" et de "justice" sont nées de changements intervenus dans la structure de cette société. Non seulement l'influence de la communication écrite a provoqué les circonstances de ces changements mais elle a contribué à leur donner forme.

En faveur du conservatisme en matière d'orthographe *par Philip T. Smith*

L'orthographe anglaise offre bien d'autres informations linguistiques que celles qui concernent la formation des sons. Plusieurs expériences psycholinguistiques ont démontré que les lecteurs, les enfants et les adultes, pourraient en tirer un meilleur parti qu'ils ne le font. L'auteur fait observer qu'il n'est pas indispensable pour une méthode d'écriture rapide de s'attacher étroitement aux marques phonétiques: voyez les sténographies. Quelques propositions de réforme de l'orthographe sont examinées à la lumière de ces observations.

Quand on fait le compte des syllabes *par Elisabeth Sakiey, Edward Fry, Albert Goss et Barry Loigman*

On a fait le compte des syllabes dans une liste des 5 000 mots les plus utilisés en anglais. Ce qui a donné, d'une part, une liste non pondérée des 322 syllabes communes aux 5 000 mots; d'autre part, une liste de 290 syllabes pondérée selon la fréquence des mots contenant ces syllabes. La liste non pondérée contenait 222 syllabes et 100 mots monosyllabiques. La liste pondérée contenait 190 mots monosyllabiques et 100 syllabes. Ces 190 dernières entrent pour 72% dans les 5 890 868 enregistrements de syllabes pour les 5 000 mots les plus utilisés en anglais. Ces listes constituent des données brutes pour un matériel à l'usage de l'enseignement de la lecture, de l'orthographe, etc. Elles pourraient aussi servir de base de départ pour des recherches et des techniques en matière de lisibilité, de traduction par ordinateur, d'apprentissage de la parole et de la langue.

La stratégie et la tactique des formulaires *par Patricia Wright*

Il est question de recherches concernant la mise en page des formulaires et les difficultés qu'éprouvent les gens à les remplir. L'auteur fait la distinction entre deux types de recherches: celles dont les conclusions sont généralisables (par ex. les formulaires simples, où il n'y a qu'à supprimer des mentions inutiles) et celles qui ont rapport à des cas particuliers (ceux où il faut interpréter certains termes). L'auteur souligne qu'il y aurait intérêt à rapprocher les deux types de recherches: celles des formulaires à questions stratégiques et celles des formulaires à questions tactiques. Conclusion: ceux qui s'imaginent qu'il existe des recettes simples pour la mise en page des formulaires ne comprennent rien à la question.

"Prenez garde aux scribes" *par Humphrey Lyttelton*

Dans le texte d'une conférence qu'il a donnée à Londres, à la Society for Italic Handwriting l'auteur décrit les atteintes de l'Italic Fever (la fièvre italique) dont il est congénitalement affligé. Il relate ses aventures en quête du matériel approprié. Il relate ses aventures en quête du matériel approprié. il déploie sa virtuosité et se montre soucieux de perpétuer l'écriture des humanistes.

Kurzfassungen der Beiträge

Übersetzung: Dirk Wendt

Schrift und Gesetzes-Begriff im Griechenland der Antike *von Jon Stratton*

Der Begriff des Gesetzes wird zu häufig als ungeschichtlich behandelt; ebenso ist die Bedeutung des Schreibens (in seinem Gebrauch als Kommunikationsmittel) in ihrer Wirkung auf die begriffliche Ordnung und Sozialstruktur kaum analysiert worden. Diese beiden Probleme werden am Beispiel des alten Griechenland zusammengebracht, um zu zeigen, wie die begriffe "Gesetz" und "Recht" sich in Beziehung zu Veränderungen in der sozialen Struktur entwickelt haben. Die Wirkung des Schreibens auf die griechische Gesellschaft lies nicht nur die Situation entstehen, in der diese Veränderungen stattfanden, sondern half auch, diese Veränderungen selbst zu bewirken.

Zur Verteidigung des Konservativismus in der englischen Rechtschreibung von *Philip T. Smith*

Die englische Orthographie gibt dem Leser eine Menge linguistischer Information über den einfachen Wortklang hinaus. Daten aus einer Vielfalt psycholinguistischer Aufgaben zeigen, dass sowohl Erwachsene wie auch Kinder diese Information ausnutzen können, und dies könnte sie in die Lage versetzen, besser zu lesen. Es wird behauptet, dass ein schnelles und wirkungsvolles Schriftsystem nicht eng an den phonemischen Einzelmerkmalen der Sprache zu kleben braucht, und Stenographie-Systeme werden als weitere Beispiele dafür angeführt. Im Lichte dieser Erkenntnis werden einige Vorschläge zur Rechtschreibreform kurz bewertet.

Eine Silben-Häufigkeitszählung von *Elisabeth Sakiey, Edward Fry, Albert Goss und Barry Loigman*

Eine Häufigkeitszählung der Silben in einer redigierten Liste der 5000 geläufigsten englischen Wörter ergab eine ungewichtete von 290 Silben, die gewichtet waren mit der Häufigkeit des Auftretens von Wörtern, von denen diese Silben ein Bestandteil waren. Diese letzteren 290 Silben machen 72 Prozent der 5 890 868 Silbenzeichen aus, die in den 5000 häufigsten englischen Wörtern vorkommen. Diese Listen werden als mögliches Ausgangsmaterial für die Entwicklung von Lehrplan-Material für Lesen, Rechtschreibung und andere Gebiete betrachtet. Sie stellen ausserdem mögliche Ausgangsdaten für Untersuchungen und technische Entwicklungen im Bereich der Lesbarkeit, der Computer-Übersetzung, des verbalen Lernens und des Spracherwerbs dar.

Strategie und Taktik im Entwurf von Formblättern von *Patricia Wright*

In diesem Aufsatz werden Untersuchungen referiert, in denen Beziehungen zwischen dem Entwurf eines Formblattes und den Schwierigkeiten aufgestellt werden, die Leute haben, wenn sie diese Form vervollständigen sollen. Es wird unterschieden zwischen unterschiedlichen untersuchungswürdigen Problemen, die für viele Arten von Formblättern bedeutsam sind (wie beispielsweise die Aufgabe des Formblatt-Ausfüllers, nicht-Zutreffendes zu streichen), und anderen Problemen, die für besondere Arten von Formblättern spezifisch sind (wie beispielsweise die Erläuterung der Terminologie). Es wird nahegelegt, eine fruchtbare Interaktion zwischen denen, die strategische Fragen stellen und denen, die taktische Fragen stellen, zu entwickeln, und schliesslich gefunden, dass diejenigen, die einfache Rezepte zum Entwurf von Formblättern suchen, die Komplexität des Problems nicht erfasst haben.

Hütet Euch vor den Kopisten! von *Humphrey Lyttleton*

In einer Ansprache an die Society for Italic Handwriting in London beschreibt der Verfasser seinen angeborenen Kummer mit "Italic Fever" — sein Bemühen um angemesseneres Werkzeug, den Stolz auf seinen Sachverstand, und seine Sorge um die Bewahrung der humanistischen Handschrift.

Resumenes de los Artículos

Traducción: Ana Fisch

La escritura y el concepto de ley en la Grecia Antigua por *Jon Stratton*

El concepto de ley es muy a menudo tratado como una categoría no histórica; de la misma manera se ha analizado muy escasamente el impacto de la escritura (cuando es usada como un medio de comunicación) en el orden conceptual y en la estructura social de una sociedad. Estos dos problemas se juntan en el contexto de la Grecia Antigua para demostrar cómo se desarrollan los conceptos de "ley" y "justicia" en relación con cambios en la estructura social de esa sociedad. El impacto de la escritura en la sociedad griega no solo produjo la situación en la que estos cambios tuvieron lugar sino que también ayudó a formar esos cambios.

En defensa del conservatismo de la ortografía inglesa por *Philip T. Smith*

La ortografía inglesa presenta al lector muchos tipos diferentes de información lingüística más allá del simple sonido de la palabra. La evidencia de una variedad de tareas psicolingüísticas muestra que tanto adultos como niños pueden explotar esta información y esto les puede permitir leer más eficientemente. Se discute que un sistema de escritura rápido y eficaz no tiene necesidad de permanecer próximo al detalle fonémico del lenguaje, y se dan como ejemplos adicionales los sistemas de taquigrafía. Se evalúan brevemente algunas propuestas para una reforma del deletreo en vista de esta evidencia.

The Authors

Jon Stratton is a lecturer in the Department of Sociology at Essex University (Colchester CO4 3SQ, Essex, England). He is particularly interested in the relationship between literacy and society and wrote an unpublished doctoral thesis on literacy in late Roman and early medieval Europe. Dr. Stratton's "Law and the Ideology of Order: the Problem of Knowledge in Hobbes' *Leviathan*" will be published in *Proceedings of the Essex Conference on the Sociology of Literature*, 1980.

Philip Smith studied mathematics and psychology at Cambridge University and Oxford University. He has also worked at Harvard, Stanford, and Nijmegen. His main interests are in cognitive psychology. He has edited (with Robin Campbell) *Recent Advances in the Psychology of Language* (Plenum Press, 1978) and is an associate editor of *The British Journal of Mathematical and Statistical Psychology*. Dr. Smith has just taken up an appointment in psychology at Reading University (Whiteknights, Reading RG6 2AL, England).

Elizabeth Sakiey serves as assistant professor in the Reading/Speech Correction Department at Glassboro State College (Glassboro, NJ 08028). She also functions as a consultant to the Adult Education Resource Center for Southern New Jersey. Prior to teaching at the college level, Dr. Sakiey spent seven years as an elementary classroom teacher and reading specialist.

Cálculo de la frecuencia de sílabas por *Elizabeth Sakiey, Edward Fry, Albert Goss y Barry Loigman*

El cálculo de la frecuencia de sílabas en una lista editada de las 5,000 palabras inglesas mas comunes generaron una lista imparcial de las 322 sílabas mas comunes en 5,000 palabras y una lista parcial de 290 sílabas por la frecuencia de la recurrencia de palabras cuyas sílabas eran las componentes. La lista imparcial contenía 190 palabras-sílabas y 100 no palabras-sílabas. Las últimas 290 sílabas responden al 72 por ciento de las 5,890,868 sílabas de muestra en las 5,000 palabras inglesas mas comunes. Se ven estas listas como base de datos en potencia para el desarrollo de material para plan de estudios en escritura, deletreo y otros compos. También se las ve como base de datos en potencia para investigaciones y tecnologías en legibilidad, traducción de computadora, aprendizaje verbal y adquisición lenguaje.

Estrategia y táctica en el diseño de formas por *Patricia Wright*

Este artículo examina las investigaciones que relacionan el diseño de una forma con las dificultades que la gente tiene en completar la forma. Se traza una distinción entre cuestiones investigables que tendrán relevancia con muchas clases de formas (por ejemplo pidiendo a los que llenan formularios que tachen lo que no es aplicable) y cuestiones que son específicas a tipos particulares de formas (por ejemplo la interpretación de la terminología). Después de sugerir que se pueden desarrollar interacciones exitosas entre aquellos que hacen preguntas estratégicas y los que hacen preguntas tácticas se concluye que aquellos que buscan recetas simples para diseñar formas adecuadas no han logrado entender las complejidades del problema.

"Cuidado con los Escritas" por *Humphrey Lyttelton*

Al hablar dirigiéndose a la sociedad de letra itálica en Londres, el autor describe su heredada aflicción hacia la 'fiebre itálica' — su búsqueda del equipaje correcto, el alarde de su habilidad y su preocupación por la perpetuidad de una mano humanística.

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*My passport describes me as Musician,
Journalist & Broadcaster. As the first,
I play trumpet and have led a jazz group
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As the third, I have had my own Monday
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In my spare time I fiddle about with pens...*

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