Only Connect

Some reasons for using the 'one fact, one card' method

Although I had been collecting information on small bits of paper from my days at school, it was only through Dr Brian Harrison at Oxford in 1960 that I was introduced both to a serious practitioner (Brian) and a formal description of the reasons for the method. He told me to read the account in the appendix to Beatrice Webb's *My Apprenticeship.*

Beatrice Webb wrote a description of the method which she and her husband developed in order to help them to write numerous detailed and ground-breaking works.[1] She pointed out that 'It is difficult to persuade the accomplished graduate of Oxford or Cambridge that an indispensable instrument in the technique of sociological enquiry - seeing that without it any of the methods of acquiring facts can seldom be used effectively - is the making of notes'.

The method of writing 'one fact on one card' which she described 'enables the scientific worker to break up his subject-matter, so as to isolate and examine at his leisure its various component parts, and to recombine them in new and experimental groupings in order to discover which sequences of events have a causal significance'.

The liberating effects of this shuffling of paper are well described. 'To put it paradoxically, by exercising your reason on the separate facts displayed, in an appropriate way, on hundreds, perhaps thousands, of separate pieces of paper, you may discover which of a series of hypotheses best explains the processes underlying the rise, growth, change or decay of a given social institution, or the character of the actions and reactions of different elements of a given social environment'.

Physical details are important. For instance, a standardized size of card, and placing the information in the same place on the card, makes it easier to move quickly through the materials. 'Thus, a carefully planned "display", and, above all, identity of arrangement, greatly facilitates the shuffling and reshuffling of the sheets, according as it is desired to bring the facts under review in an arrangement according to place, time or any other grouping'. For instance, 'By adopting our method of one sheet for one subject, one place and one date, all the sheets could be rapidly reshuffled in chronological order; and the whole of our material might have been surveyed and summarized exclusively from the standpoint of chronology'.

The result of this mechanical device was that it was possible to look at questions in numerous different ways: 'By the method of note-taking that I have described, it was practicable to sort out all our thousands of separate pieces of paper according to any, or successively according to all, of these categories or combination of categories...' It also, most importantly, provoked clashes and surprises. 'Not once, but frequently has the general impression with regard to the causal sequence of events, with which we had started our enquiry, or which had arisen spontaneously during the examination of documents, the taking of evidence or the observation of the working of an organization, been seriously modified, or completely reversed, when we have been simultaneously confronted by all the separate notes relating to the point at issue'.

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2. Beatrice Webb, *My Apprenticeship* (Cambridge, 1979) pp.426-433

Beatrice Webb stresses the surprising effects on creativity of this apparently simple strategy. 'I realise how difficult it is to convince students - especially those with a 'literary' rather than a 'scientific' training - that it is by just this use of such a mechanical device as the shuffling of sheets of notes, and just at this stage, that the process of investigation is often fertile in actual discoveries'. This is partly because 'Most students seem to assume that it is the previous stage of making observations and taking notes which is that of discovery.'

My own experience of film making shows that the editing stage, which is when one assembles the material into a new order (and is appropriately called *montage* in French), is as important as the filming or 'collecting' stage (*mise en scène*). Yet most people do not realize this when undertaking literary work.

Some case studies

The method is so central to all research that we need more detail on how it is actually used. So it is instructive to look at a few productive researchers and to see how they actually worked. This brings some surprises. For instance, as Stibic writes: 'We are surely not surprised to learn that Jules Verne gathered and systematically stored information in the fields of geography, natural science and technology in his well organized collection of 20,000 cards and excerpts. However, it is somewhat unexpected to find, upon visiting the country house of Jack London in Glen Ellen near San Francisco, 188 card-index boxes alongside the writing desk of this writer who had an image of sailor, trapper and adventurer'.[2]

Here I will briefly describe the working practices of four people whose work I admire and have learnt from. They are my first doctoral supervisor, the historian Sir Keith Thomas; the structural anthropologist Claude Levi-Strauss; the zoologist Charles Darwin and the sociologist C.Wright Mills. Each shows something about the process of how information is selected, re-ordered and then incorporated through making new connections.

Sir Keith Thomas

The historian Sir Keith Thomas has written two majestic works; *Religion and the Decline of Magic* and *Man and the Natural World*. In these he gives no clue as to the working methods which enabled him to connect so many facts and interpretations. In an article he briefly describes his method. Firstly he reads widely and deeply: 'my only method has been to read as widely as possible in the surviving sources for the period, to soak myself in the society I am studying until I get a feel for it...To achieve this knowledge I try to read everything and look at everything, recognizing that some basic assumptions or activities will only be revealed in the most incidental way.'[3]

Secondly, while he is reading, he tries to look out for material on a wide range of topics, not just his particular present concern. 'When reading a particular source, a sermon, say, or a deposition in a church court, I attempt to keep all my different preoccupations in mind and to be particularly alert to incidental revelations unconnected with the document's main purpose. For example, if a preacher, denouncing idleness, compares the futile life of a lazy man to a small child sailing paper boats on a muddy puddle of water, my interest is that here we have evidence that seventeenth century-children played with paper boats.'

What Keith Thomas does not explain fully is that he notes all relevant material onto sheets, in microscopic hand-writing. Each observation is given a precise, brief, reference

[2] Stibic, *Tools*, p.77
[3] Thomas, 'Ways of Doing Cultural History', p.78

to the source. These sheets are then snipped up with scissors so that the references and quotations become detached from their source order and become a pile of thin slivers of paper. 'I file this away, not on a database, because my habits were formed before the computer came in, but on a piece of paper which I put in an old envelope labelled "Children's Games". When the envelope starts to bulge, I tip it out and see what we have got. I then read more systematically so as to fill in the gaps, and after that I may write an article on children's games.'

Having seen a cupboard half filled with these slivers of papers, and the drawers of old envelopes, I can vouch for the hard work involved.

The final work stage is not described, but I think can be extrapolated from visions of early drafts of *Religion and the Decline of Magic* which Keith Thomas was kind enough to let me see and from my own use of a similar method. When he comes to write an article on 'Children's Games', he would pour out all the hundreds of separate slips and then let his mind play over them so that they began to take shape into sections and paragraphs. He then types out the argument of a paragraph, perhaps a few lines, and attaches the relevant thin pile of apt quotations to it with a paper clip. This is the first draft. In the second draft, the slips are incorporated.[4]

Claude Levi-Strauss

Let us now consider a part of the work of the French anthropologist Claude Levi-Strauss. In his several works on mythology he faced a problem of the classic sort. His 'authority' was structured in one way and he wanted to analyse it in another. His material came as a 'text', that is a myth, and he wanted to break it down and re-assemble it in another way. Although there may be an element of self-mockery in the account, this is what he says he did. 'How shall we proceed in order to identify and isolate these gross constituent units or mythemes?...The technique which has been applied so far by this writer consists in analysing each myth individually, breaking down its story into the shortest possible sentences, and writing each sentence on an index card bearing a number corresponding to the unfolding of the story. Practically each card will thus show that a certain function is, at a given time, linked to a given subject. Or, to put it otherwise, each gross constituent unit will consist of a **relation.**'[5]

This procedure allows him to connect things which have been separated by the narrative structure of the myth. 'Relations, pertaining to the same bundle may appear diachronically at remote intervals, but when we have succeeded in grouping them together we have reorganized... our myth according to a time referent of a new nature, corresponding to the prerequisite of the initial hypothesis...'

He recognizes that the huge number of slips generated by this method soon leads to technical problems which require some kind of computer solution. 'At this point it seems unfortunate that with the limited means at the disposal of French anthropological research no further advance can be made. It should be emphasized that the task of analysing mythological literature, which is extremely bulky, and of breaking it down into its constituent units, requires team work and technical help. A variant of average length requires several hundred cards to be properly analysed. To discover a suitable pattern of rows and columns for those cards, special devices are needed, consisting of vertical boards about six feet long and four and a half feet high, where cards can be pigeon-holed and moved at will. In order to build up three-dimensional models enabling one to compare the variants, several such boards are necessary, and this in turn requires a spacious workshop, a commodity particularly unavailable in Western Europe nowadays. Furthermore, as soon as the frame of reference becomes multi-dimensional (which

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[4] Keith Thomas kindly read this account of his methods and confirmed that it is a reasonable description.

[5] Levi-Strauss, 'The Structural Study of Myth', p.211

occurs at an early stage, as has been shown above) the board system has to be replaced by perforated cards, which in turn require IBM equipment...'[6]

Presumably what he is referring to is the primitive holerith cards of the 1960's, when he wrote the article. But this is leading in the direction of cross-tabulation and coding, which is what one wants to avoid. The whole approach would be different now with small and powerful computers, as I explain in the paper on 'Paper Cards to Computers'.

Charles Darwin

It is not surprising, in view of his achievements, that considerable attention should have been paid to Darwin's working methods. Darwin describes how he kept 'from thirty to forty large portfolios, in cabinets with labelled shelves, into which I can at once put a detached reference or memorandum. I have bought many books, and at their ends I make an index of all the facts that concern my work; or, if the book is not my own, write out a separate abstract, and of such abstracts I have a large drawer full. Before beginning on any subject I look to all the short indexes and make a general and classified index, and by taking the one or more proper portfolios I have all the information collected during my life ready for use.'[7]

A more detailed account is given in a study of Darwin's marginalia by De Gregario and others.[8] We are told firstly of the way in which he read. 'During the basic reading, intensive or otherwise, the margin is scored and peppered with comments. At the end of the reading, he would now list out the location of his more important comments and margin-scores on an inside cover (usually the back cover), occasionally adding brief mnemonic notes.' This conforms with his own description - though we should add that he also noted onto separate sheets if the book was not his own.

We then come to the stage when he is going to write. 'The book will now probably lie fallow - maybe even for a number of years - until the lucky moment arrives. At this stage, the list of locations is re-examined, and a new, shorter, list made on a separate sheet of paper of the most important locations, now with details in the form of long-hand notes about the information to be gleaned at those locations...We have the feeling that he hardly ever reread the book itself...'. This is a gloss on the passage above in which Darwin explains how he makes a condensed index.

We are now at the stage of writing. 'The vital slips containing the vital gems at this point reach the prime of their working lives: we imagine those relevant to the publication in progress now collected in a heap (...or pile) on the writing table, being finally reviewed. (some marked for quotation, others not) on the slips or at original locations. The set of slips, together with CD's own notes and drafts, combine for a while into "Portfolios of working notes" for the writing of the publication in question. Once the publication has been pieced together, "slips all put in proper places" in other words they are stuck for any future reference usually inside the back cover of the now fully-harvested book. A slip may take part in this "cycle" a number of times - its important underlying content, as we shall see later, being the broad theoretical themes invoked by the data recorded on it'.

The authors then try to penetrate deeper into the way Darwin's mind actually worked: 'a summary of our hypothesis about CD's main mode of "processing" scientific reading matter: the margins, end-notes and the slips of various different paper types constitute physically discrete strata or layers, corresponding more or less closely to different bouts of attention. Insofar as these bouts imply an accumulation across different "layers" of time, the metaphor of geological deposition seems quite reasonable.' They continue, 'In

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[6] Levi-Strauss, 'The Structural Study of Myth', pp.228-9
[7] *Life and Letters of Darwin* , vol.i,, p.82
[8] *Charles Darwin's Marginalia*, vol. 1, pp.xii-xiii

fact the "layers" concept begins to unlock the inner nature of CD's mode of working with sources: and, indeed, we should ideally look upon the whole great corpus of marks and comments not piecemeal, but as a *single* complex laminate - fused layers not only of time and attention, as we have seen, but also of types of *response* to the source material, and also layers of *themes* reflecting CD's lifelong theoretical preoccupations'.

In the account of how my own 'topics' database grew over time (Paper Cards to Computers), I have found it useful to think in similar terms, of geological or archaeological strata. In creative work, using a metaphor also used in the analysis of Coleridge's poetry, one digs down through these layers and interconnects what one finds.

C.Wright Mills

The sociologist C. Wright Mills, again in an appendix to one of his books, *The Sociological Imagination* provides a lucid descriptions of how he worked.[9] He describes how 'After making my crude outline I examined my entire file, not only those parts of it that obviously bore on my topic, but also those which seemed to have no relevance whatsoever. Imagination is often successfully invited by putting together hitherto isolated items, by finding unsuspected connexions. I made new units in the file for this particular range of problems, which, of course, led to new arrangements of other parts of the file.'

What happens is that 'As you rearrange a filing system, you often find that you are, as it were, loosening your imagination. Apparently this occurs by means of your attempt to combine various ideas and notes on different topics. It is a sort of logic of combination, and "chance" sometimes plays a curiously large part in it. In a relaxed way, you try to engage your intellectual resources, as exemplified in the file, with the new themes.'

Into the original files go all sorts of things, made possible by a flexible storage system which '... encourages you to capture "fringe thoughts": various ideas which may be by-products of everyday life, snatches of conversation overheard on the street, or, for that matter dreams. Once noted, these may lead to more systematic thinking, as well as lend intellectual relevance to more directed experience'. These files contain 'ideas, personal notes, excerpts from books, bibliographical items, and outlines of projects'. This constitutes an ever enriched resource. 'Then as you pursue your work you will notice that no one project ever dominates it, or sets the master categories in which it is arranged. In fact, the use of the file encourages expansion of the categories which you use in your thinking'.

Even the actual method of note-taking forces you to think about what you are doing. 'Merely to name an item of experience often invites you to explain it; the mere taking of a note from a book is often a prod to reflection'. The file is 'a continually growing store of facts and ideas, from the most vague to the most finished'. When one comes to write, it is really a development from these files: 'the idea and the plan came out of my files, for all projects with me begin and end with them, and books are simply organized released from the continuous work that goes into them'.

The files lead to those unexpected associations and connections which we have seen are the essence of true discovery. In intellectual work, '...there is an unexpected quality about it, perhaps because its essence is the combination of ideas that no one expected were combinable - say a mess of ideas from German philosophy and British economics'. The unexpectedness comes from the method of proceeding - the mind has broken apart and is now able to re-combine elements. 'On the most concrete level, the rearranging of the file, as I have already said, is one way to invite imagination. You simply dump out

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[9] Wright Mills, *The Sociological Imagination*, (Penguin, 1970) pp.217-245.

heretofore disconnected folders, mixing up their contents, and then re-sort them. You try to do it in a more or less relaxed way'. The classifications created by the original materials can be broken. 'Many of the general notions you come upon, as you think about them, will be cast into types. A new classification is the usual beginning of fruitful developments'.

Thus the researcher, 'Rather than rest content with existing classifications, in particular, common-sense ones, you will search for their common denominators and for differentiating factors within and between them. Good types require that the criteria of classification be explicit and systematic. To make them so you must develop the habit of cross-classification'.

Mills realizes that linking things, connecting, or as he calls it 'cross-classification' is the key to discovery. 'For a working sociologist, cross-classification is what diagramming a sentence is for a diligent grammarian. In many ways, cross-classification is the very grammar of the sociological imagination'.

What he has described has much overlap with the other descriptions. You extract, abstract, cross-relate, and re-integrate into new patterns. 'After you decide on some "release", you will try to use your entire file, your browsing in libraries, your conversation, your selections of people - all for this topic or theme. You are trying to build a little world containing all the key elements which enter into the work at hand, to put each in its place in a systematic way, continually to readjust this framework around developments in each part of it'.

Conclusion

Other scholars whose work depended on their practical filing systems could be cited, for example the historian Lord Acton or anthropologist Sir George Frazer. Yet very few of them have written about the humble practical aspects of how information is actually broken down, what the difficulties of classification are, the ways to file and retrieve information, and what happens when there are too many cards.

In the companion piece to this on 'Paper Cards to Computers' I draw on my own personal experience of setting up a large database of 'facts' over a period of forty years in order to show some of the underside of research which is not normally revealed.