44 An Exceptional Memory

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I have saved my favorite memorist for last. Aitken may have been less bizarre than S, less "eidetic" than Elizabeth, and less famous than Toscanini, but his talents were still "awesome," as the sportswriters say. Best of all, he inhabited a particularly "natural context," at least from my point of view. He was a professor!

Professor Alexander Craig Aitken, FRS (1895–1967) was a man of far-outstanding intellect. He was a brilliant mathematician (Whittaker and Bartlett, 1968) who had 'in large measure the kind of mystical insight into problems which characterized, for example, Isaac Newton' (Collar, 1967). He was a uniquely able mental calculator (Aitken, 1954; Hunter, 1962, 1965, 1966, 1968). He was an accomplished violinist. He was also legendary for his memory. The purpose of this paper is to give an account of his exceptional memory.

To say that a man has exceptional memory is like saying he has exceptional athletic or artistic ability: it only roughly delineates his prowess. Thus, exceptional memory can rightly be claimed for the Russian, Shereshevskii (Luria, 1969) [*see Selection 38*], the American, V.P. (Hunt and Love, 1972) [*see Selection 39*], and Aitken; yet each man has a different pattern of memorial talent integral with a different style of mental life. So, in what sense did Aitken have exceptional memory? Briefly, he was unusually erudite with a scholar's disposition to

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become absorbed by, and retentive of, things relating to his spheres of erudition. He could readily produce, out of his head, much detailed information and could rapidly learn new information that interested him. His memory was (and this was also his own view) exceptional in degree rather than in kind.

OVERVIEW OF AITKEN'S MEMORY

Aitken could produce a host of recondite facts about numbers, calculative methods, mathematics and mathematicians; play, on the violin, many pieces by heart; recall many musical compositions; securely identify many snatches of music heard or seen in written notation; quote extensively from English literature; and recite tracts of Latin and English verse. He could recall details of many events he had witnessed, so much so that committees often consulted him as an unofficial minute book. In daily affairs, he was conspicuously, but not officiously, precise about names, dates, locations. The following excerpt from his reminiscences about the First World War illustrates his characteristic precision and his recall of details that would elude most people (the platoon mentioned would comprise 39 men). On 14 July 1916, he was in France, lying in a dug-out trying to sleep.

> Sleep proved impossible; each time I closed my eyes I heard again, as though it were in the dug-out itself, the whistle of the falling mortar-bombs, and I saw Hughes, Robertson, Sergeant Bree, Harper, and the line of trees. But gradually, through and across these repercussions, I became aware of a conversation in low tones going on somewhere behind me, apparently between Captain Hargest and Mr Rae, and perhaps occasionally someone else—but I am not sure of this. However that may be, something was missing; a roll-book; the roll-book of Platoon 10, my old Platoon. Urgently required, it seemed; Batallion had rung up, requesting a list of the night's casualties and a full state of the Platoon. Apparently surnames were available, but the book was nowhere to be found. This being suddenly clear, I had no difficulty, having a well-trained memory now brought by stress into a condition almost of hypermnesia, in bringing the lost roll-book before me, almost, as it were, floating; I imagined it either taken away by Mr Johnston or perhaps in the pocket of Sergeant Bree in no-man's-land. Speaking from the matting I offered to dictate the details; full name, regimental number, and the rest; they were taken down, by whom I do not know (Aitken, 1963, pp. 107–108).

Many stories are told about the range, tenacity, rapidity and precision of Aitken's seemingly effortless memory. Two typical, and reliable, stories relate to the early 1920s.

> He taught me Classics at Otago Boys' High School and he used to amuse us at our lessons by demonstrating how he could associate line numbers in our Virgil with the words in the line or conversely could recite the words in any specified line (personal communication from Dr Harold Taylor, sometime Vice-Chancellor of Keele University).

As a young teacher, a single reading of the names and initials of a new class of 35 boys enabled him never to consult the lists again (Hudson, 1967).

His memory, however, had limits. He did not have "total recall" if, by this, is meant some mythical ability to recall absolutely anything he had ever experienced; nor was he always able to recall, on the instant, things he could recall on other occasions. To illustrate, in 1960–1961 he attempted to recall some words and numbers he had learnt, under experimental conditions, in 1932 (see below): he recalled a lot, but by no means all, and made remarks such as 'The others are not recoverable although in an extreme state, such as insomnia, they might come back' and 'I felt this must be wrong, hence I decided to do what I often do, to "wait for illumination," and not to hurry the process.' His knowledge, though great, was not encyclopaedic, e.g., he knew little about sports, and even with regard to music, where he knew a great deal, he remarked that the musical knowledge of Professor Tovey, of Edinburgh University, made him 'feel like a prattling child.' (Examples of Tovey's extraordinary musical memory are given by Grierson, 1952.) Finally, he did have a memory span. Sutherland (1937) reports assessing Aitken's memory span in 1932 by asking him to repeat back sequences of items presented at a rate of two items per second. With auditory presentation of sequences of random letters, the span was 10: with auditory presentation of random digits, 13: and with visual presentation of random digits, 15.

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DISCERNMENT OF MULTIPLE PROPERTIES

Aitken's memory was intimately linked with his ability to discern multiple properties that were interwoven into distinctive patterns. His discernment could work rapidly to produce an unusually rich, densely structured gestalt of properties; and so many things, that would seem chaotic to a bystander, were, to him, embodiments of multiple properties that meshed into an interesting, memorable pattern.

The ease with which he learnt and remembered anything, and indeed whether he learnt and remembered it at all, depended squarely on the meaning and interest it had for him. Thus, whenever something interested him deeply, he was typically able, later, to recall many details of it despite his having had not the slightest conscious intention of committing anything to memory. Again, if he were given material that, for him, had little meaning (say, a random string of digits), he typically pronounced it 'uninteresting' or even 'repellent.' If asked to

commit such material to memory, he might oblige if he thought some psychological value might emerge from the exercise, but usually remarked that the exercise was 'unnatural' and 'went against the grain.' (Throughout this paper, all words bounded by single quotation marks are Aitken's, unless otherwise specified.) If he did undertake 'unnatural' memorizing, he adopted a characteristic approach as follows.

When given material that was 'not too repellent' and asked to memorize it, he did not, as might be expected, go tense in concentration. He went noticeably still and relaxed. When asked about this curious behavior, he explained that he was using a subterfuge ("assimilation by interest") on which, he discovered years ago, he could rely. He was relaxing by way of preparing to find interest in the material or 'to let the properties of the material reveal themselves.' He felt best able to secure memorization by refraining from deliberate interpretation and organization; rather, he cleared his mind and relinquished the job to his vast cognitive system, allowing it to work largely autonomously and in whatever way came most naturally. He commented as follows.

I discovered that the further I proceeded, the more I needed *relaxation*, not concentration as ordinarily understood. One must be relaxed, yet possessed, in order to to this well. Sometimes one enters a bookshop and there, displayed on the stalls, are various interesting books. One selects, dips, reads, becomes intent, until the stage is reached when all surroundings are forgotten. Afterwards, one leaves the shop and enters the street again, blinking at the light and at the people as if one had come out of an anaesthetic. And so it is here. The one requisite is that a live interest in the subject should fix an undeviating attention. ... Interest is the thing. Interest focuses the attention. At first one might have to concentrate, but as soon as possible one should relax. Very few people do that. Unfortunately, it is not taught at school where knowledge is acquired by rote, by learning by heart, sometimes against the grain. The thing to do is to learn by heart, not because one has to, but because one loves the thing and is interested in it. Then one has moved away from concentration to relaxation.

PSYCHOBIOGRAPHY

Aitken's mnemic activities were inextricably part of a larger configuration including all his psychological processes, e.g., his general knowledge, preferred pursuits, emotional and intellectual attitudes to the world and to himself: his memory was nondetachable from his entire psycholphysical make-up, from 'the participation of the whole personality.' Of his personality, it might fairly be said that he was, above all, a reflective man who sought to comprehend events by discerning their

inward patterns. With his talents, this mild-mannered man might well have made more of a worldly splash, but it would have 'gone against the grain' to pursue, say, political power or success in business. It was supremely consistent that he found his eventual professional calling in a field of scholarship devoted to uncovering deep mathematical patterns.

"Interest in meaning" was a *leitmotiv* of his psychobiography. Starting in his mid-teens and continuing into his late-twenties, he was enthralled by number, music, poetry and his own intellectual capabilities. These were the years, involving 'a kind of mental Yoga,' in which he became demonstrably exceptional through attempting to penetrate the inwardness of numerical relations, the architecture of poetry and music, the system of his own mental skills, the interconnectedness of phenomena at large. Almost certainly, he was interested, at this time, in testing his mental powers to the limit, e.g., discovering how much Milton he could recite verbatim or how fast he could calculate. Almost certainly, too, he enjoyed demonstrating his prowess to others. But it is equally certain that, in later adult years, he rarely memorized anything merely for the sake of memorizing it. He would deliberately memorize what he thought might be useful to have readily available in his head, e.g., the names of his students. More often, things got memorized as an unintended by-product of his penetrating interest in them.

[*Descriptions of several experiments with Aitken are omitted here. His digit span was about 15. In 1960 he was able—with some effort—to recall all of a 25-word list he had memorized in 1932, and more than half of a list of 16 3-digit numbers from the same year.*]

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A comparison between Aitken and the "average" adult shows that his accomplishments of memory are, at every turn, stronger than average. He has a longer memory span, a more retentive grip on things he has learnt and, overall, a larger and more finely articulated cognitive system. At the same time, nothing about Aitken violates what we know about the "normal" design features of memory. It is normal, for example, that high-level learning and remembering depends on interest and, crucially, on the process of comprehending material in terms of patterns of multiple properties. Even his subterfuge of "assimilation by interest" is within the experience of many highly intelligent people. For example, when experienced actors deliberately set out to master a new role, they do not focus on the task of memorization as such but, rather, on studying the role with a view to discerning a network of meanings in it: this pursuit of meaning has the effect of securing memorization as a by-product (Smirnov, 1973, chapter 3).

Now, compare the present account of Aitken with Luria's (1969) account of S. V. Shereshevskii (hereafter called "S."). The comparison shows how different is the exceptional memory of a scholar and a mnemonist.

S. was an outstanding professional mnemonist, that is, someone who memorizes haphazard strings of items. He used the classical mnemonist's technique of imagining richly vivid, concrete mental-pictures, which he arranged in a chain of pairs. If given the 25-word list mentioned above, he might take an imaginary walk along a street that has a vivid succession of landmarks. He would represent the first word by a distinctively imaged picture which he would "locate" on the first landmark; the second word would be another mental picture "located" on the second landmark, and so on. During a single, and not too rapid, presentation of the word list, he would progressively devise such a chain of images that was extremely rich in perception-like properties. This would result in accurate, durable memorization. Even years afterwards, he would be able to recapitulate the chain of images, and, so, recall the list of words in either forward or backward sequence. Contrast this procedure with the way Aitken memorized the list, not by a strict chain, but by a kind of overall melody.

The chief similarity between Aitken and S. is that each comprehends materials in terms of a multiplicity of unconventional properties, knits these properties into fairly unconventional patterns, and durably retains these patterns so as to be able to reconstruct the original materials. The chief difference is the *kind* of property involved and the *kind* of pattern woven. Characteristically, S.'s kind of property is perception-like, i.e., particular sensory qualities and particular imaged objects: his kind of pattern is the chain, i.e., short-run links between successively encountered items. Characteristically, Aitken's kind of property is conceptual: his kind of pattern is the panorama or map, i.e., long-run groupings of items into overlapping multilayered configurations.

The following comparison illustrates the different kind of property by which the two men comprehend materials. First, remarks made by S. in 1936. "Even numbers remind me of images. Take the number 1. This is a proud, well-built man; 2 is a high-spirited woman; 3 is a gloomy person (why, I don't know); 6 a man with a swollen foot; 7 a man with a mustache; 8 a very stout woman—a sack within a sack. As for the number 87, what I see is a fat woman and a man twirling his mustache" (Luria, 1969, p. 31). Now, remarks made by Aitken in 1932. Sutherland (1937) showed him a mixed series of written words and numbers, and asked him to report what each item called immediately to mind. Here is the response to "7." 'The line of poetry "They passed the pleiades and the planets seven"—mysteries in the minds of the

ancients—Sabbath or seventh day—religious observance of Sunday—7 in contrast with 13 and with 3 in superstition—7 as a recurring decimal ·142857 which, multiplied by 123456, gives the same numbers in cyclic order—a poem on numbers by Binyon, seen in a review lately—I could quote from it.'

In broad terms, then, Aitken comprehends materials in terms of rich conceptual maps; S. in terms of rich perceptual chains. These contrasting modes of comprehension show in the intellectual profiles of the two men. S.'s great distinction is in memorizing haphazard strings of items; Aitken's is in mathematical thinking. In an Olympic Games for Mental Prowess, S. would win the gold in the section for mnemonists, while Aitken would scarcely qualify for entry. But S. would not even be considered for entry to three sections where Aitken would shine, namely for theoretical mathematicians, mental calculators, and all-rounders.

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