

I am slowly writing a book on how to apply memory techniques to chess. Its provisional title is *The Chess Memory Palace*.

This is the draft Chapter 2: *Essential Memory Techniques*.

In January I shared Chapter 1 and the Appendix under the title *Picture Notation, A Mnemonic System for Chess*. They are available at <https://johnnden.org/picturenotation>.

I intend the rest of the book to cover (a) how to create a branching memory palace, (b) an example opening repertoire for White in the Schliemann Defence, (c) an example opening repertoire for Black in the Ruy Lopez Exchange, (d) how to memorise endgames, and (e) final thoughts such as how to use picture notation in other languages, and the importance of memory for chess.

Please ignore the broken references to other chapters. These will be fixed in the final version.

John Holden, May 2022

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Chapter 2: Essential Memory Techniques

Take your time if it is all proving too difficult. Loosen up with some stretching exercises; flex your memory; touch the toes of your imagination with a few fantasies.

Eight-time World Memory Champion Dominic O'Brien

Okay, now if you are presented with picture notation, you can understand it and play the right move at the board. The next question is, how do you memorise the picture words?

In short, we will use our naturally great memory for stories and places. We will use our imagination to link each picture word pair to a location, in a miniature story. For example, we will visualise the picture words *heart* and *sponge* as “a *heart* using a *sponge* to clean the outside of an aeroplane”. We will be creative to make this little story as compelling as possible. We will then use a sequence of locations to create an ordered structure of memories. This is called a **memory palace**.

In Chapter ??, we will discuss how to choose picture words and how to design a memory palace. For now, I assume we have already been given the picture words and locations that we want to memorise.

What makes things memorable?

Before we construct our first memory palace, let's consider what makes something memorable.

First, it almost goes without saying, we remember things better when we pay attention. The reason we often mislay our keys or phone is because we were thinking about something else when we put them down. Simply making a conscious effort to notice where we place an object makes a big difference. So, pay attention! When you visualise¹ composite images, take the time to concentrate on the scene: the colours, sounds, smells, tastes, feelings, shapes, textures. This already goes a long way to creating a lasting memory.

Second, we remember things that grab our attention – and things that grab our attention tend to be surprising, funny, and, well, *in the way*. Typically, in any given situation, we have an aim, and we particularly notice the objects that help us achieve this aim (tools) or that get in the way (obstacles). If something sits unobtrusively to the side of the path, we are unlikely to see it at all, let alone remember it later. If the same object lies on the path itself, we are more likely to see it. If it jumps up and down and shouts, we cannot ignore it. When we memorise images in our memory palaces, we need fill our path with bold, exaggerated, movement-filled scenes.

Third, we find it easier to learn information when we already understand the context. You will remember a piece of trivia about a celebrity you know more easily than learning the same piece of trivia about a historical figure you have never heard of. When learning a language, it is easier to learn three new words by studying three example sentences, each of which introduces one new word at a time, rather than trying to learn all three words in a single model sentence. All recall is association, connecting one context with another, so it is easier to learn something when you already know half the story.

As humans, we are particularly good at remembering *places*. Even if you think you are bad at following maps (which is a different skill),

¹ Although I speak of “visualisation”, people have different internal experiences. Notably, several successful mnemonists report that *aphantasia* (being unable to form mental imagery) does *not* prevent them imagining scenes and building memory palaces. Memory techniques are used across cultures and through history, and are accessible to the vast majority of people, if not everyone.

you can find your way to work or the local shops without trouble. If you have ever listened to an audiobook while walking around, you may have noticed that you can remember your location when you listened to a particular chapter. The story in the chapter triggers your memory of the place, and imagining the place triggers your memory of the story.

When we store images in a memory palace, we are being deliberate about the associations we create. We are taking advantage of our natural memory for places by consciously linking the information we want to memorise (chess moves) with familiar places.

Picture words as characters

Now let's apply these principles. In this section we will practise paying attention and creating bold visualisations of individual picture words. In the next section we will associate two picture words together in a location.

Many picture words are naturally compelling. It is not difficult to imagine a *shark* (f4), for example. But let's practise anyway, as a warm up.

Imagine a great white shark, perhaps the shark from the film *Jaws*. Imagine its strength as it powers its body through the water, the sound of the waves, its sharp white teeth. Imagine its gaping mouth and your fear (thrill?) as you watch it. What does it smell like? What does it feel like as it bites you?

It is not pleasant to be bitten by a shark! But this makes the point that your images should be vivid and compelling. The best will make you laugh or physically react. You don't always need to "break the fourth wall" and participate in your images, but you must always feel like they are right in front of you, not watched passively on a screen. Think theatre, not cinema.

Other picture words are a challenge. For example, the one-syllable picture word for e4 is *lore* (a body of knowledge). How can you visualise an abstract concept like *lore*? I imagine a book of lore. A book is not a memorable object either. It is small and rectangular and unremarkable. But one book from J. K. Rowling's *Harry Potter* series is very memorable:

Harry just had time to register its handsome green cover,

emblazoned with the golden title *The Monster Book of Monsters*, before it flipped onto its edge and scuttled sideways along the bed like some weird crab.

[...]

“Ouch!”

The book snapped shut on his hand and then flapped past him, still scuttling on its covers. Harry scrambled around, threw himself forward, and managed to flatten it. Uncle Vernon gave a loud, sleepy grunt in the room next door.

Hedwig and Errol watched interestedly as Harry clamped the struggling book tightly in his arms, hurried to his chest of drawers, and pulled out a belt, which he buckled tightly around it. *The Monster Book* shuddered angrily, but could no longer flap and snap, so Harry threw it down on the bed[...]

Note how many senses are used: the visually bright cover, the sound of the book scuttling and flapping, the pain as it snaps on Harry’s hand. And most important of all, the story of Harry hunting it around his room while trying not to wake his uncle. These all combine to make a very compelling description. When I visualise *lore*, I imagine *The Monster Book of Monsters*.

Another picture word where I take inspiration from *Harry Potter* is *brain* (d2). A brain is inherently more memorable than a book, as it is a more interesting shape and texture with some emotional significance already. But it never hurts to embellish your visualisation:

The scene seemed momentarily frozen. Harry, Ginny, and Neville and each of the Death Eaters turned in spite of themselves to watch the top of the tank as a brain burst from the green liquid like a leaping fish. For a moment it seemed suspended in midair, then it soared toward Ron, spinning as it came, and what looked like ribbons of moving images flew from it, unraveling like rolls of film[...]

This brain is not a passive object sitting in a jar! It is easy to imagine it taking action as the first picture word in a composite image.

Children’s TV is also a good source of images. This is because it expresses objects in simple and bold form, and anthropomorphises liberally. It is not unusual to see a talking *coach* (g6), *machine* (c6), or even dinner plates (*dish*, a6). You can turn pretty much anything into a character by adding limbs and a face.

As you build your memory palaces, your picture words will become recurring characters that you see again and again. This makes them easier to remember. The first time you memorise *lore*, it will take some effort to make a compelling image. The second time, it will be much quicker. Soon you will be creating images fluently.

Robust composite images

Pictures words are characters. Characters act in stories. We are going to place each picture word pair in a location, then craft a little one-scene story to memorise it. I call these stories **composite images**, because each one is composed of three elements: the first picture word, the second picture word, and the location.

Our third principle of memory is association. We create strong associations by imagining clear **interactions** between the first picture word, the second picture word, and the location. Making these interactions compelling is even more important than making the characters compelling, because this is how you move in your mind from the location, which you already know, to the picture words. You need to visualise three interactions: (1) the first picture word with the second picture word, (2) the first picture word with the location, and (3) the second picture word with the location. See Figure 1.

For example, let’s say you need to memorise a *tree* (first picture word) and *alpaca* (second picture word) in an aeroplane cockpit (location). Hopefully you are already imagining the tree and alpaca as vivid characters. The tree is an old, gnarly oak tree, waving its branches like arms and its roots like feet. Perhaps you are visualising an Ent from J. R. R. Tolkien’s *The Lord of the Rings*. The alpaca meanwhile is soft and fluffy with a big smile on its face.

Now you need to visualise the three interactions: (1) the tree with the alpaca, (2) the tree with the cockpit, and (3) the alpaca with the cockpit.

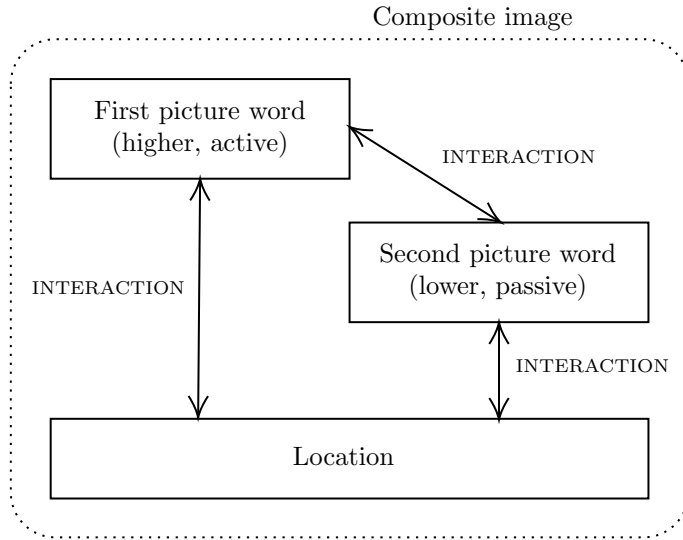


Figure 1: Robust composite images

- (1) Recall from Chapter ?? that the first picture word should be doing an action to the second picture word, or using the second picture word as a tool. The first picture word should also be positioned higher than the second picture word. In this case, I imagine the tree riding the alpaca. The tree roots are wrapping tightly round the alpaca's belly, and two of its branches are holding on to the alpaca's head, covering its eyes with leaves. The tree and alpaca are working as a team to reach all the controls.
- (2) The tree is reaching up with its other branches, pressing the buttons on the cockpit's ceiling. Some twigs are scratching the wind-screen glass.
- (3) Meanwhile the alpaca is using its hooves to press the pedals, with a sharp clacking sound, and its nose to push the throttle.

When you imagine entering the aeroplane cockpit, it should trigger your memory of the tree and alpaca. The tree is interacting with the

ceiling controls, the alpaca is interacting with the floor controls, and the tree is interacting with the alpaca.

In theory you would only need two interactions, not three. The location could remind you of the first picture word, which reminds you of the second picture word: so strictly speaking you don't need to link the second picture word with the location. However this would leave you vulnerable to any lapse in memory. After six months without review, under the pressure of a strong opponent and ticking clock, maybe you will forget one of the three interactions. But as long as you recall the location and two of the three interactions, you can triangulate to access both picture words. By visualising three interactions instead of two, you have added some redundancy, which makes the image robust in your memory.

In the same way, the more detail you put into each of the three interactions, the longer they will stick in your mind. The alpaca is pressing the pedals with its hooves *and* pushing the throttle with its nose. Each additional detail makes the image safer in your memory, and the less often you will need to review it (Chapter ??).

Practice

Enough talking, let's memorise a small repertoire. We will practice memorising Figure 2, which is a subsection of the Ruy Lopez Exchange repertoire in Figure ??. The **setting** will be an aeroplane.

You will notice that Figure 2 is a small flowchart. We begin at the plane entrance, and then choose one of two paths. Don't worry about the shape of the arrows. It is not significant that some are longer or curved; that is just to fit the flowchart neatly on the printed page.

By the way, you don't need a chessboard to memorise Figure 2. But, in case you are curious, Figure 2 picks up the repertoire in the position below, with White about to play *heart* (13.Rad1).

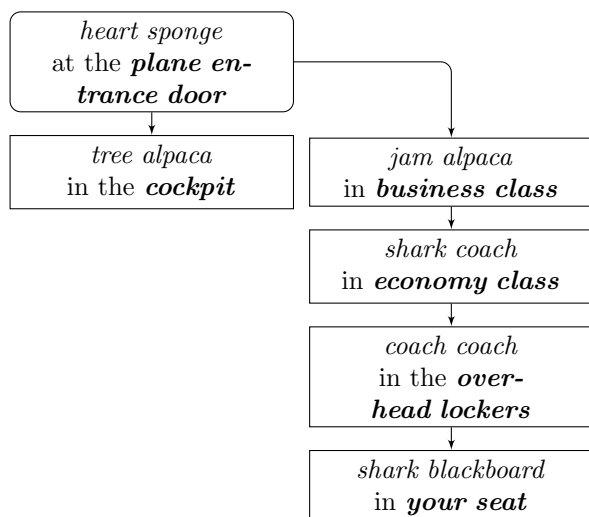
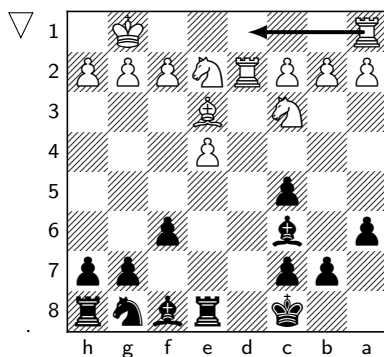


Figure 2: Mini repertoire, Black v Exchange variation, picture notation and locations

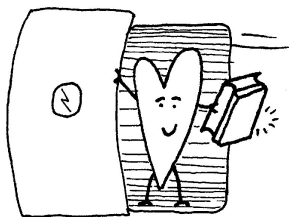


I am going to describe six composite images. Take your time. Imagine the stories in as much detail as you can. Don't worry about *memorising*, just let your creativity flow.

- The memory palace begins at the **plane entrance** with the

picture words *heart* and *sponge*. Instead of a flight attendant greeting you, the airline has tried to show a warm welcome by employing a heart. The anthropomorphic heart has little arms and legs; it stands in the doorway, beating rhythmically, holding onto the edge of the door. The heart is welcoming passengers aboard with a giant sponge. It uses the sponge to clean their faces and clothes, then turns to shining the outside of the plane until it sparkles. Unfortunately the heart is not very hygienic, some blood is pumping out onto the sponge and getting wiped onto the plane. The heart greets you as you walk on by sponging down your face. You feel the roughness of the sponge rub the skin on your nose.

In this case the sponge was the second (passive) picture word and I find its texture memorable, so I didn't actively turn it into a character. If it were the first picture word, I would make more of an effort to anthropomorphise it; perhaps turning it into a sea sponge with little eyes, or even replacing it with a children's TV character who likes cleaning things.



After entering, you can turn left to the cockpit or right to the main body of the plane. First let's go left.

- Entering the ***cockpit***... can you remember what you see? Re-read the previous section if you need to.

Now instead of turning left, let's go back to the entrance (after passing the heart and sponge) and turn right instead. You are going to (1) walk through business class and (2) economy class, then (3) put your luggage into the overhead lockers, and finally (4) sit down in your seat. This sequence of four locations completes the aeroplane memory palace. I have drawn a map of the aeroplane in Figure 3.

- You enter ***business class***. One of the executives has tried to show off her wealth by bringing aboard expensive *jam* and her pet *alpaca*. For a moment, the jam jar is balancing on the alpaca's back... until it wobbles and tips and empties itself all

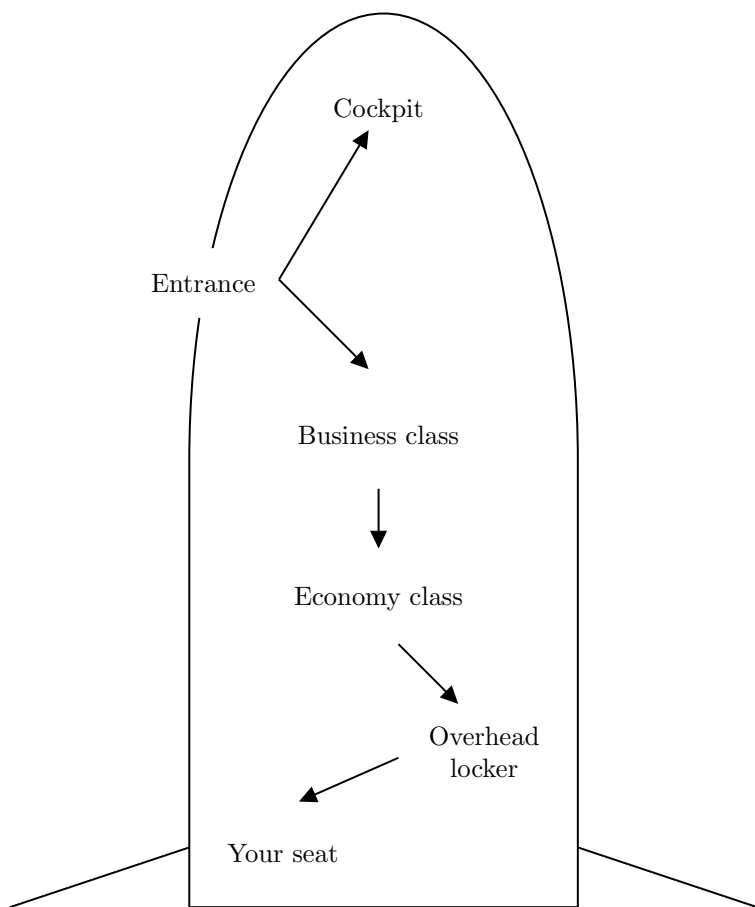
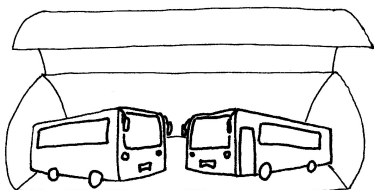


Figure 3: Map of aeroplane memory palace

over the alpaca. The alpaca's soft white fur becomes sticky and clumpy as the sweet-smelling jam trickles down its flanks. The jar itself falls to the floor with a crash and breaks into shards of glass. The alpaca careers wildly around the small space, treading on handbags and rubbing jam onto the seats and onto the shocked executives' fancy suits. You try to rush past to get to economy class, but can't help brushing the alpaca and getting jam on your shirt.

- You pull aside the curtain and enter *economy class*. This location is just as chaotic. A *shark* evidently did not want to wait for its in-flight meal; it has taken control of a toy *coach* and is driving it up and down the aisle, snapping at passengers' legs. The shark holds the steering wheel with its pectoral fins and flaps with its tail. Heavily weighed down, the coach engine roars and its tyres leave a track behind them.
- Tiptoeing gingerly around the shark and coach, you open the *overhead locker* to deposit your luggage. Ouch! Your hand is caught between two toy coaches. (Picture words: *coach* and *coach*.) They are repeatedly reversing, revving their engines, then charging into each other like rutting stags. It seems two children have packed toy coaches in their hand luggage, but the coaches are territorial and don't like sharing the locker. Their headlights and registration plates are contorted into angry faces, they lock their windscreen wipers like antlers, and their windcreens begin to crack from the repeated impacts. Exhaust belches out of the locker, making you cough.



Note that when a composite image contains two of the same picture word, you don't need to worry about one being active and one being passive. The coaches can fight as equals.

Note also my attempt to explain the image. Why are the coaches there? This gives the il-

lusion of understanding. We remember things better when we understand them.

- At last it is time to sit in ***your seat***. But what is this? A *shark* is sitting there already. Perhaps it sat in the wrong seat because it can't read its ticket. It is learning to read by writing with chalk on a *blackboard* that has replaced the in-flight entertainment screen. The shark is straining against its seatbelt, leaning forward with a look of intense concentration on its face, balancing the chalk between its fins, scratching the chalk across the blackboard. You have no patience for more delays, so you unbuckle the shark and wrestle it out of your seat. It fights back by bonking you on the head with the blackboard.

...and that's it! You have finished learning your first memory palace. Close the book, take a pencil and paper, and try to draw out the flowchart. Make sure your picture words are in pairs and laid out in sequence. If you like, sketch the images as well – you don't have to show anyone! Take your time to walk through the whole aeroplane and visualise the composite images afresh. Feel free to add your own details and change the stories to your liking, as long as you preserve the picture words in the right order.

Learning from mistakes

How did you do? Many people are surprised at how much they achieve on the first try. Memory palaces build on our natural memory for places and stories, so it doesn't take much practice before you can achieve amazing things. If you remembered all 12 picture words, congratulations! If you forgot some, don't worry: this is the most interesting part, where you learn how your own memory works.

Don't think of mistakes as random errors where you need to "try harder" or had a "naturally bad memory". Ask yourself, what caused the problem? Mistakes come for one of five reasons.

- (1) You missed a location entirely. For example, maybe you jumped straight from the entrance to economy class, and forgot about

walking through business class. The solution is to make the memory palace structure clearer in your mind. Watch a video online of someone boarding an aeroplane, or just visualise it again carefully. If necessary, you can redesign this part of your memory palace to make it more intuitive to you. (See Chapter ?? on memory palace architecture.)

- (2) You could recall only one of the picture words in a location. For example, maybe you arrived at your seat, saw the shark, but couldn't remember what it was doing. This means you forgot two interactions: the shark with the blackboard, and the blackboard with the seat. Concentrate on rebuilding both interactions. Perhaps the entertainment screen smashes to reveal a blackboard underneath. Visualise the shark leaning forward and scratching away at the blackboard with chalk. If you repeatedly struggle to recall a picture word, you might need to create a new story that is more memorable to you. Make it dramatic, funny, or even grotesque.
- (3) You couldn't remember either of the picture words in a location; the location was empty. For example, maybe you imagined passing the curtain into economy class, but couldn't remember anything that happened there. This again means you have lost two interactions: between the location and the two picture words. In this case, the solution is to make sure the location has a clear "hook" (or two) – something for the picture words to interact with. For the economy class location, I use the floor (which connects to the tyre tracks of the coach) and the passengers (which connect to the biting shark and the wildly-driven coach).
- (4) You couldn't remember the order of the two picture words within a composite image. For example, how do you know whether the order is *heart sponge* or *sponge heart*? The solution is to ensure you have a clear active and passive relationship between the two picture words, and that the first picture word is positioned higher in the scene. The heart is using the sponge to clean the plane and passengers. It is a tall heart, leaning down to reach your face.
- (5) You could recall an object, but you didn't know what picture word it represented. For example, perhaps you could visualise the tree

riding something animal-shaped and furry, but you didn't know if this was an *alpaca* or a *llama*. One solution is to adjust the picture to be more specific, for example giving the alpaca straight, pointed ears. However the better solution is just to remind yourself of the right answer and continue building memory palaces. In Chapter ?? we will discuss choice of picture words and the importance of being consistent. Simply put, I often use the picture word *alpaca* in my memory palaces. I never use *llama*. (I use *lemur* as my two-syllable picture word for e3 instead.) So I never worry about what the alpaca-like animal is: it must be an *alpaca*, because *llama* is not an option.

If this worries you, remember that the board itself will (in)validate your picture words. *Alpaca* is a sensible move in the position, 14...Ne7. *Llama* is impossible: no black piece can move to e3. It is rare for an incorrect picture word to be a sensible move.

When you forget a composite image, try not to get frustrated with yourself. Identify why you forgot it, then fix the problem. Like most things, this gets easier with practice.

Reflection

This chapter has taught you creative memorisation. These techniques are sufficient to memorise every composite image in the book.

At this point, you may think this is a lot of effort, and wonder whether it is easier to drill opening moves the traditional way! Let me reassure you that memory techniques are worth the trouble. Memory palaces can be expanded with virtually no limits, and the time investment scales almost linearly, unlike learning new facts through pure repetition. It takes a long time to write all this out, but your mind can process images much faster than words.

The purpose of *The Chess Memory Palace* is to apply memory techniques to chess, not to dive deeply into memory techniques themselves. If you would like to know more, I have suggested further reading in the *Notes* at the back of the book.

Now you know how to convert picture notation into chess moves, and you know how to memorise a sequence of composite images in a

memory palace. It is time to become a memory palace architect.

Notes

Chapter 2

1. “*Take your time*”: Dominic O’Brien (1993) *How to Develop a Perfect Memory*. Pavilion Books, chapter 16. O’Brien re-invented the method of loci in 1987, placing images representing playing cards around the city of Khartoum. He went on to become World Memory Champion eight times.

In chapter 20 O’Brien applies his general DOMINIC memory system to chess. Picture notation is specific to chess, so it is a more efficient mnemonic system for this purpose. It requires about half as many images to represent the same sequence of moves, and the picture words are transferable between people, enabling collaboration. As far as I know, encoding data using syllables, and the candidate piece system, are both original to this book.

2. *place an object*: Five-time USA Memory Champion Nelson Dellis also suggests making an action with your body as you put your keys down. When you search for your keys, you should remember the action, and therefore the location. Nelson Dellis (2018) *Remember it!* Abrams Image, page 57.
3. *surprising, funny*: The classic text in the art of memory is the ancient *Rhetorica ad Herennium*, written by an unknown author in ~86-82 BC. “Now nature herself teaches us what we should do. When we see in every day life things that are petty, ordinary, and banal, we generally fail to remember them, because the mind is

not being stirred by anything novel or marvellous. But if we see or hear something exceptionally base, dishonourable, unusual, great, unbelievable, or ridiculous, that we are likely to remember for a long time.” *Ad C. Herennium libri IV*, as quoted in Frances Yates (2014) *The Art Of Memory*. The Bodley Head, page 25 (original work published 1966)

4. *used across cultures*: An excellent survey can be found in Lynne Kelly (2016) *The Memory Code*. Allen & Unwin. Different (non-literate) cultures use different techniques but they all share common themes, such as location-based mnemonics, storytelling, and memorable characters, often mixing practical knowledge with memorable mythology.

Kelly, incidentally, reports having aphantasia, yet has built memory palaces and adapted memory techniques from indigenous cultures with success.

5. *we have an aim*: Jordan Peterson (2017) *Maps of Meaning 06: Story and Metastory part 2* [Lecture]
6. *if not everyone*: Of course, given neurodiversity, it is impossible to give advice that applies to literally everyone. My main point is to encourage you to not give up on memory techniques without first trying them: they will work for almost all readers.
7. *unobtrusively to the side of the path*: The remarkable mnemonist Solomon Shereshevsky, active in Russia in the 1920s, rarely forgot anything; his few mistakes came from oddities of perception, when the object he was memorising blended in with its background. “Now take the word *blimp*. That’s something gray, so it blended in with the gray of the pavement[.] *Banner*, of course, means the Red Banner. But, you know, the building which houses the Moscow City Soviet of Workers’ Deputies is also red, and since I’d put the banner close to one of the walls of the building I just walked on without seeing it.” Alexander Luria (1968) *The Mind of a Mnemonist: A Little Book about a Vast Memory* (translated by Lynn Solotaroff). Basic Books, page 36

8. *movement-filled*: Bonus points if you sing and/or act out your memory palace. At home, obviously, not at the board! It is instructive to watch Dr Tharaka Gunarathne teach TV presenter Anna Richardson to act out her memory palace, explaining that she is building “micro muscle memories” so that her body will help remember the stories (Jamie Isaacs & Alice Wheeler (Producers) (2021, July 15) Can I Improve My Memory? Series 1 Episode 2 [Television broadcast]. Channel 4). In a small way this echoes indigenous memory techniques, such as those of the Pueblo peoples or Aboriginal Australians, who encode important information in ceremonies, songs and dances (Lynne Kelly (2016) The Memory Code. Allen & Unwin, chapter 1).
9. *abstract concept*: Mnemonists have been connecting abstract concepts to concrete nouns for as long as memory techniques have been written about. The *Dialexeis* fragment (~400 BC) suggests “for courage [place the image] on Mars and Achilles; for metal-working, on Vulcan; for cowardice, on Epeus”. As quoted in Frances Yates (2014) The Art Of Memory. The Bodley Head, page 44 (original work published 1966)
10. “*Harry just had time*”: J. K. Rowling (1999) Harry Potter and the Prisoner of Azkaban. Bloomsbury, chapter 1
11. “*The scene seemed momentarily frozen*”: J. K. Rowling (2003) Harry Potter and the Order of the Phoenix. Bloomsbury, chapter 35
12. *anthropomorphises*: This is a memory technique widely used in non-literate cultures. For example, the properties of plants are remembered by casting the plants as characters in mythological stories. The Hanunóo, in the Philippines, were recorded in the mid-twentieth century as classifying 1625 plants from memory. Lynne Kelly (2016) The Memory Code. Allen & Unwin, chapter 1
13. *triangulate*: I heard this term from Canadian Memory Champion James Gerwing on Anthony Metivier’s Magnetic Memory Method Podcast, 2019 Canadian Memory Champion Reveals His Memory Secrets, 29 October 2019

14. *redundancy*: This term, and my understanding of additional details making the image safer, come from Joe Reddington (2021) *Advanced Memory Palaces*. Page 33
15. *in the same way*: The dual indicators of picture word order – active versus passive roles and higher versus lower position – are another form of redundancy. When designing rules to store data in a memory palace, there is a trade-off between writing strict rules with added redundancy, versus leaving room for creative images. There is also a trade-off between spending time visualising detailed images in the first place, versus spending time reviewing and rebuilding broken links later. In general, the more you want to memorise, and the longer the time period over which you want to retain the memories, the more you should come down on the first side of both of these trade-offs. *The Chess Memory Palace* method needs to work for large quantities of chess moves over a long playing career, hence I advise detailed images and lots of redundancy.
16. *each additional detail*: This is the opposite of speed memory techniques pursued by memory competitors. Competitors need to memorise images as quickly as possible, and forget the images again immediately after the contest, so they seek to *minimise* the detail in each image. “Some of them are more visual, [...] others are purely sound, others are purely some kind of vague ethereal motion[.] You strip all the fluff around what makes your image as loud as possible and keep it at the bare minimum to make it memorable at such a speed.” Anthony Metivier’s *Magnetic Memory Method Podcast*, Nelson Dellis *On Remember It And Visual Memory Techniques*, 27 September 2018
17. *pencil and paper*: “I soon understood why indigenous people will make sand paintings or draw in the earth, arrange leaves, or paint on bark, only to throw their creation away. The process is powerful and rewarding, intellectually and emotionally, and really enhances memorability of the knowledge.” Lynne Kelly (2016) *The Memory Code*. Allen & Unwin, chapter 3
18. *how your own memory works*: Incidentally, many of the techniques for building an effective memory palace also apply to mak-

ing everyday life more memorable. Themes such as paying attention to your senses, crafting unusual experiences, and setting up unique sensory triggers are all advised in Meik Wiking (2019) *The Art of Making Memories*, William Morrow. Grandmaster of Memory Ed Cooke is also insightful on this topic, read for example Ed Cooke (2020, March 29) How to expand subjective time during the lockdown and beyond. <https://ed.blog/2020/03/29/five-techniques-for-expanding-subjective-time-during-the-lockdown>

19. *mistakes as random errors*: A helpful blog post about correcting the root cause of errors, rather than writing them off as random accidents or generically “not practising enough”, is celandine13 (2012, April 29) Errors vs. Bugs and the End of Stupidity. Live-Journal. <https://celandine13.livejournal.com/33599.html>
20. *further reading*: Books about memory and mnemonics are fascinating. They involve psychology, creativity, perception, data structures, art, history, archaeology, anthropology... and all of it applicable to your own mental processes. At times it feels like living in a fantasy novel, reading ancient texts to uncover abilities you didn’t know you had. My top recommendation is Lynne Kelly (2019) *Memory Craft*, Allen & Unwin, which exemplifies this genre.