THE LOST TOOLS OF MEMORY

by Scott Welch, The River Academy

Note: This article has been prepared from an audio recording.

"There are, then, two kinds of memory: one natural, and the other the product of art. The natural memory is that memory which is imbedded in our minds, born simultaneously with thought. The artificial memory is that memory which is strengthened by a kind of training and system of discipline." –*Rhetorica ad Herennium*

"The only real difference between the middle-aged executive who has forgotten to phone someone he was supposed to phone and who has left his briefcase at the office, and the seven-year-old child who realizes on returning home that he's left at school his watch, his pocket-money, and his homework is that the seven-year-old does not collapse into depression, clutching his head and exclaiming, 'Oh God, I'm seven years old and my memory's going!'" – *Use Your Perfect Memory*, Tony Buzan

In this article, I will present some of the very practical memory techniques that we are using at the River Academy, in Wenatchee, WA.

The *Ad Herrenium* is a first century B.C. rhetoric manual written by Cicero that goes through the five faculties that every speaker should possess: invention, arrangement, style, memory, and delivery. Every year when I teach the *Ad Herrenium*, one of the things that I realize is that I do a great job of teaching invention, arrangement, and style. Then, every year I would skip the memory section. I just never did get it. It wasn't until a few years ago that I picked up the book *Moonwalking with Einstein* by Joshua Foer. A lot of the ideas in this article come from this book. It helped me realize that what's in this book was really in Cicero all along.

An iceberg is the best illustration for the problem we see with memorization. We teach all sorts of things. We have worksheets, pet projects, tests, and other important educational stuff. That is the entire iceberg. The problem is that if you ask kids about a week later what you asked them to memorize last week, the tip of the iceberg is about all they remember. And it's not that they haven't studied hard. Sometimes we think that if someone

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forgets something in a week it's because they crammed. Unfortunately, I think that's just a teacher's way of saying "I didn't help you." FACT: most students cram. So how do we help them? We tell them to cram over three days. We are not giving them a tool to help them memorize things. We tell them to memorize something and that there's going to be a test on Friday. We remind them not to cram and to break up the studying over a few days, then we send them home. But we still find that at the end of the year, or even at the end of about three weeks, most of what we taught them is completely gone from their mind. As classical, Christian educators we know that it is not our job to give them material just to stick in their head to pass a test at the end of the week. I find (and I've been doing this for fifteen years), that I still have trouble teaching tools. It is easy to fall back to that worksheet/test mentality.

FACT: Memorization, memorizing, is an essential tool of learning. We claim to teach tools. And I find that it's actually much harder to teach tools than it is to say that I teach tools. Ask most classical and Christian educators what tools they are teaching, and you will usually hear something like, "Well, grammar and all the logic and stuff that goes into it." I am here to tell you that memorization is an essential tool of learning. Teachers need to teach how to do it. Teachers need to dedicate classroom time to having students memorize things. Sending kids home Monday and telling them to memorize something for a test on Friday is not teaching them a tool of anything, other than to cram.

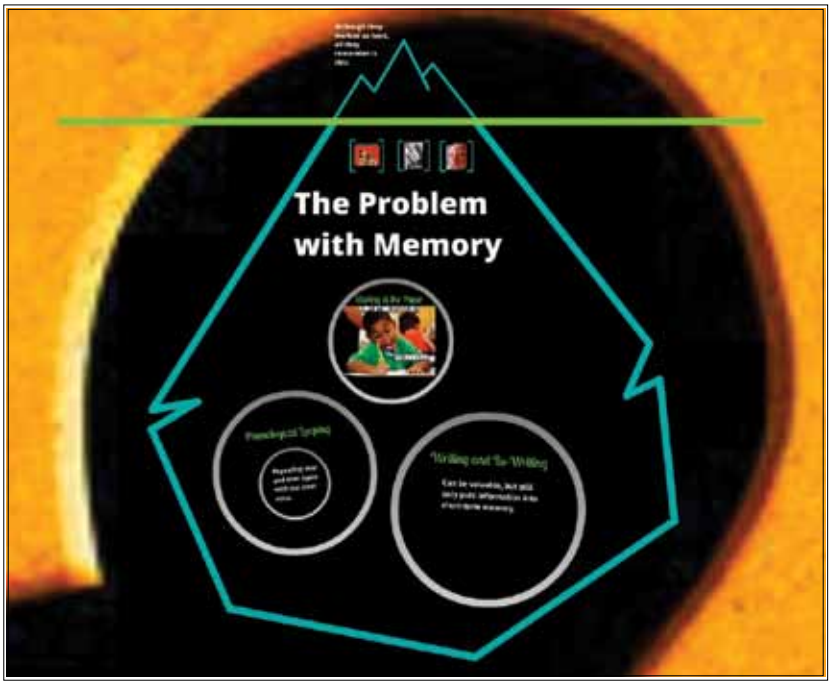
I teach logic and one of the things that I teach every year is the square of opposition. I feel that I do a pretty good job. Students all get good grades. At the end of the year I have a cumulative final. I take five days to review everything that we learned throughout the first two trimesters of our school year. When I say that we are going to talk about the square of opposition the puzzled looks, on even the smartest of my kids, is very disheartening. The look isn't "oh yeah, I remember those." The look is literally "what is that?" There are kids that look at me and I'm honestly worrying that they have never heard of the square of opposition before. Fortunately, after a couple minutes, they remember.

There are scientific explanations for why this happens. Those who study memory consider seven—plus or minus two—to be the magic number in memory. They find that all people (including students) tend to hold between five to nine items in memory over the long haul—that is , if you don't help students put it into some sort of long-term memory.

How do students tend to memorize something? Let's say that we haven't given them any tools whatsoever. Students were told, "Here's your list, have them done by Friday; there's going to be a test that's not multiple choice." So, how do students memorize? Well, one way is that they stare at the paper. I know this because I see students doing it. I'll say, "Johnny, what are you doing?" He says, "Well, I'm studying for the test." I don't think that there is a worse possible way to memorize anything than staring at a sheet of paper. It uses the least possible senses to memorize something. But that is one way that students tend to memorize if you give them no instruction.

Another way is called "phonological looping" which is just a creative way of saying that they repeat it over and over again in their head. That's phonological looping. Some teachers—I know that I have done this—say, " I want you to write it over and over again." That is a very good way to put something into short-term memory. It's not going into long-term memory; it's going into short-term memory, but it's creative and it sounds like we are teaching some sort of tool. But even if they do this, you are still dealing with the magic number seven.

What are some solutions? What are ways that we have tried to create tools in our school? We believe in the grammar stage. Grammar students are really good at memorizing. In the grammar stage we do a really good job teaching them how to memorize things. We



give them chants and songs; we give them lots of ways to memorize. In the secondary, I feel like we literally kick them off the boat into the water. Part of the reason is it isn't real cool to see a 16-year-old going: "A sentence, sentence, sentence, is complete, complete, complete . . ." They don't think it's cool, I don't think it's cool, so, they're not going to do it. Secondary students are not going to say chants. They might say them in their heads or sometimes they might jokingly say them in some type of ironic way. But they are not going to say things like that on their own.

One way of memorizing in the elementary is with rhyming funny sayings and chants. How about this one? "In 1492 . . . (Columbus sailed the ocean blue.") That was easy. This one is a little harder: "I before E . . . (except after C, or when sounded as 'a,' as in neighbor and weigh.") Good! Another one, "Thirty days hath September . . . (April, June, and November, All the rest have 31, Except for February.") See how easy those are? This is one from when I was in sixth grade. I don't know what kind of teacher I had but for some reason she was making us memorize some of the two-letter designations for the periodic table. My mom sat down with me and walked through this; these are two of them that I learned in sixth grade. "AU want some gold?" "Want some salt? NA!" But funny sayings, rhymes, those things are memorable. Obviously, we are still remembering some of them now. And we hear them coming down the halls in our schools. I have six kids; five of them are in our school. I can tell you a bunch of their chants. They come home chanting them. They are very helpful.

Chants are definitely helpful. In a way it's kind of out-loud, phonological looping. You are using more senses. You are using both your voice and your hearing. There are more senses involved. It is helpful to put it into your head. It can make it more "sticky" for remembering. That is one way of helping students. In secondary, if you come up with a chant, it's got to be awfully cool. I don't know if you have tried, but coming up with chants that are cool enough to want to get up in front on Grandparent's Day and chant is not easy, because I have tried. Raps work a little better. But then the grandparents don't want to hear them.

Chanting can use things like "Gilligan's Island" or "Happy Birthday." I'm not going to spend a long time on chants because all of you have heard them. Another technique is word takeaway. For example, say you want students to memorize the St. Crispin's Day speech. I first put the whole speech on the sheet. Then I would write it with some words missing. And then I would put it with just the first words and then . . . . I'm trying to do something to help them put it into their brains. And it was helpful—well, a little bit helpful.

Using acronyms is a method which our students are already doing. They know more acronyms than about anybody, anywhere. Here are a few of theirs: BTW = by the way, BRB = be right back, TTYL = talk to you later, and LOL = laugh out loud.

We have used some acronyms. I taught Latin for a few years. The Latin word *moneo* means: warn, advise, remind. The first letters in warn are WAR, an acronym for warn, advise, remind. That's a pretty easy one. Here is an acronym for logic teachers: "Any student earning Bs is not on probation." This shows the rule for distribution: If you have an "A" statement, the subject is distributed; in an "E" statement, both are distributed; in an "I" statement, nothing is distributed; and in an "O" statement, the predicate is distributed. This comes from rhetoric: "Theory, imitation, practice—which is a good TIP." Another rhetoric acronym is "I Ate So Many Deliverymen" which helps remember invention, arrangement, style, memory, and delivery. Science teachers could use "My Very Educated Mother Just Served Us Nine Pizzas," which stands for the planets. Of course, now that should say, "My Very Educated Mother Just Served Us Nine . . . " (Pluto is no longer considered a planet.) "Please Excuse My Dear Aunt Sally" for our math teachers, stands for parenthesis, exponents, multiplication, division, addition, subtraction. For the geography teachers, "HOMES" designates the Great Lakes (Huron, Ontario, Michigan, Erie, and Superior.) For the music teacher (since I'm a football coach, I put "football;" I know other people have said other things), an acronym is "Every Good Boy Deserves Football," which are the notes on the lines of the treble clef (E, G, B, D, F). And one more for science, ROY G BIV, which stands for the colors in the rainbow: red, orange, yellow, green, blue, indigo, and violet.

I believe that the memory palace is the most powerful way to memorize anything. It is helpful in every subject. Why spend time on these other methods? These methods help organize information to be able to put it into a memory palace. It's much easier to put one word into a memory palace, than having to put every item in. Using acronyms helps organize information if you use a memory palace. I believe that it is the teacher's job to help students do this—whether it's coming up with acronyms for them, or helping them come up with acronyms on their own. Give them some sort of tool. Sending them home with a big sheet of paper, telling them to memorize this for Friday, when you haven't taken the time to possibly look for acronyms that you could help them with, is just not helpful.

Before we move on to a memory palace, here are more methods for organizing information. With ROY G BIV, you'll notice that one of the things that we do is separate it out: ROY – G – BIV. This leads us into our next technique, called chunking.

Chunking is taking things and breaking them into groups, so that there are less things to remember. An acronym is a sort of chunking. When you chunk, you take, for instance, ROY G BIV instead of ROYGBIV. It makes it a lot easier. In chunking, you group items to decrease the number of things to memorize.

At Carnegie Mellon, they did a case study on chunking. They had an undergrad come in every day, five days a week. They started with one number and he would have to repeat it back. Then they would give him two numbers and he would have to repeat them back. When it got to the point where he couldn't remember the numbers anymore, they would decrease the number and give them to him again. He did this between one and two hours every day for two years. At first, he was hitting the magic number of about seven items. Five to nine items he could remember pretty well and then he would just kind of fall off from there. By the end of two years, he was able to remember 79 numbers per day, on average. How did he do it? He started to chunk the numbers into groupings. What he would do (there is a way to memorize long strings of numbers called the major system) was to break the large number into chunks of three and four. With chunks of three he would make ages. For instance he would see 8-9-3 and he would say 89.3, that's a pretty old man. And that's how he would remember 8-9-3. He was a track guy. He would do four-digit sequences by connecting them with

track times. So, he would remember 3-4-9-3 as 3:49.3 and he would say "that's pretty close to the world record for a mile." He would do that and he was able to expand the amount of information he was able to remember up to 79 items.

Every year on Pi Day (March 14), we have a competition to see how many digits of Pi students can remember. Last year was the first year that I ever taught the major system to students and we had a student remember 185 digits, but he made a mistake in the middle. So, it really only got them somewhere in the 90s but they had up in the 180s memorized. This year, a girl memorized 151 digits by chunking three digits together. She created a rhythm, 437, 549, 862. She was able to get up to 151. That's another form of chunking.

We do this already; we see this in social security numbers. Why do we separate them out like that? It makes them easier to remember: phone numbers, ROY G BIV, and SOH COH TOA (a way to remember how to compute sine, cosine, and tangent.)

There are a couple different ways of chunking. The first is sequencing, which is creating some sort of order. Let's say you take these six words: chair, door, pen, mail, letter, and desk. You can categorize them pretty easily right? They are things that you would find in an office. But if you wanted to help someone remember this, you could create a sequence out of them. You walk in the door, you sit down in a chair, pull up to a desk, pick up a pen, write a letter, and mail it. Creating a little story is one way of doing sequencing.

Another is categorizing or grouping like items. Take this list: small child, hockey stick, candy cane, teenager, cane, and old lady. These words can easily be grouped into two sections— what would they be? People and things would be kinds of a bigger group. We also have the shape of a thing, right? A cane, a candy cane, and a hockey stick all have kind of the same shape. And then we have kind of a sequence of people: we have small child, teenager, and old lady.

Now someone might ask, "Well, it's easy to do if you are given words like this, but how could you do this in the classroom?" Here is an example: We read the *Iliad* every year. I used to give the students a huge, four-page sheet of all of the characters in the *lliad*. And of course, the best way to organize them for students to remember was alphabetically (I'm saying this sarcastically). So, you have Achilles, right next to Aeneas, who of course have nothing in common whatsoever. What I discovered, whenever I took that same list and separated them into Greeks, Trojans, and gods and goddesses, then separated them into male and female, and then separated them into where they appeared in the book, was that it was much easier for them to remember who everybody was. It took me ten minutes to organize the list and it revolutionized my kids' ability to remember the characters in the *Iliad*.

So, now we have worked on some methods for organizing information; now let's work on remembering it. As I said earlier, the memory palace is the most powerful tool of memory and every student will benefit from knowing how to do it.

A memory palace is also known as the method of loci, the journey method, or the Roman room method. This method is found as far back as the first century B.C. (It was all in Cicero, so all of us classical chaps get warm fuzzies.) It's old. The goal of the memory palace is to take the things that are in short-term memory and put them into long-term memory. One way of doing that, the most creative way of doing that, is to put them into visual memory. I could give you lots of reasons why I think that this is a good way to memorize. It works. But more than that, students absolutely love doing memory palaces. I have students all the time wanting to tell me their memory palaces.

How do you do a memory palace? We are going to memorize a list of 20 words. First, choose a place. It can be a real place or an imaginary place. It should be a place that you know pretty well: house, school, or video game

map. Some of you might think you don't want your kids playing video games. Well, that's great, tell them not to and maybe they won't. But I can tell you right now, my students who play video games—and I don't promote it—are killers at memory palaces. They have hundreds of maps, and houses, and cities, and towns in their heads, that they can stick things into in seconds. I've never seen anything like it. So you might as well think of video games as a tool of learning.

At the Oaks in Spokane, Washington, they use paintings for memory palaces. They have a painting in the room. You look at the painting, say the *Mona Lisa*, and use items from the painting—one of her eyes, the other eye, her nose, mouth—and you "place" your items to remember there.

Your palace also needs to have rooms and checkpoints. It's nice to have smaller sets of rooms.

I want you to close your eyes. Some people, those who have been doing this for awhile, can do it with their eyes open. But I find that most people, especially with a lot of distractions, need to close their eyes. Picture in your head your front door. I want you to walk up to your front door and put your hand on it. If it's metal, you know what it feels like, hot or cold depending on where you live. If it's wood, you can feel the grain. You can look down and see the door handle. Open the door, walk in, and close the door behind you. Start looking in whatever your front room is. If it's just a little entry room, go into your first main room. Look at all the furniture in the room, look at each item. Pay close attention to it. Look at the fabrics.

Now I assume there's a chair in the room. Imagine a *pink camel* sitting down with his legs crossed and petting a *black cat*. How many of you can see this? Can you actually see the pink camel? Next to the pink camel with the black cat you see your *headmaster*. He opens up a briefcase and he begins handing you *large sums of money.* (This might be hard to envision!) But can you picture him standing there, handing you large sums of money? OK, go ahead and open your eyes; you just did a memory palace.

That was a short one, it was an easy one. But you can see the power, and the fun, of being able to do visual memory. If I were to ask you what four items you saw in there, I think all of you could quickly say you saw a pink camel, a black cat, your headmaster, and large sums of money being handed to you. If we had four items, you just did it in less than one minute.

[Note: In the next example, Scott leads the workshop attendees through a memory palace where they place 20 random items. The audio recording of this section of Scott's workshop is available here on the ACCS website: http://www.accsedu.org/school-resources/classis-(journal)-and-forum-(newsletter.]

Here are some of the uses that we have found with memory palaces at the River Academy. My goal was to go to every classroom and say, "What do you have to memorize?" Whether it was pre-calculus, or whatever class it was, what do you memorize in your class? I collected everything and started putting them into a memory palace to see if it was possible.

The peg system can be added to your memory palace. The peg system is a system of making numbers visual. There are two ways to do it. One is to take them and put a rhyme to them. For instance one = bun, two = shoe, three = tree, four = door, five = hive, six = sticks, seven = heaven, and so on. When you get to eleven, you do the same exact images, but you put them all on ice. For example, you have a bun that is encased in ice, or a shoe that is encased in ice. You have a tree that is encased in ice. For instance, if we were doing our list of 20 words, you would somehow take that apple and incorporate a bun. Put hamburger buns on both sides of the apple. It would remind you that the apple is number one in your list. If you were to get to number nine (in my peg it's wine), you would go to the second room and peg wine with the second to the last item (paint).

PEG SYSTEM

Rhyme	Shape
1 – Bun	Pen
2 – Shoe	Swan
3 – Tree	Heart
4 – Door	Sailboat
5 – Hive	Wheelchair
6 – Sticks	Elephant head
7 – Heaven	Cliff
8 – Gate	Snowman
9 – Wine	Balloon
10 – Hen	Bat and ball

After 10

10–19–Frozen

20's–Burning

30's–Dirty

40's–Wearing shorts

50's–Tipsy (bubbles popping above it)

We memorized the presidents with their numbers. There were 44 presidents and their numbers. If you gave the students a number they could tell you the president. If you gave them the president, they could tell you the number, in just a couple of seconds. We did that by putting pegs so if someone said 13, or whatever it is, I picture a frozen tree. And I picture a frozen tree on top of the little bust that's in cars that says Fillmore. 13 is Millard Fillmore. That is the peg system. That is one way to do it.

You can also use a link system with memory palaces. When you have different items, you can connect them all together. When we memorized the states of the United States, the first state is Alabama, so we pictured an album. In the album, you have a bunch of cars going by, then you really pay attention to "a last car" the last one, Alaska. Above the last car there's this air zone that has the red and blue little spikes like you see on a meterologist's map. That's the air zone or Arizona. You have Alabama, Alaska, and Arizona. And you can do all the states by connecting them and by using associations.

You can use memory palaces for lists of words, presidents, or states. Strings of numbers, those are more for fun. We do that for Pi Day. You can memorize those pretty fast. Use it for definitions for science and for short summaries. I teach the *Iliad* and the *Odyssey*. On the final test for the *Iliad*, the front page is just a blank sheet of paper with lines. Students write out 24 summaries, one summary for each book of the *Iliad*. We make them rhyme. We make them fun. For instance, I think that this year number one was "Apollo's plague is bacon and Achilles' babe is taken"—pretty easy to put into a memory palace. I actually give two class periods to help them put them into a memory palace. We do it together, especially early on. You send them home with no help and it doesn't happen. That is why I think that this is a tool of learning. You actually need to assist students through it.

I teach logic. We study logical fallacies—24 of them and they memorize all 24.

Memory is a tool of learning. There is no claim that just because you put something into a memory palace that you are going to have it forever. Nothing creates memory stuff that lasts forever. We choose carefully the things that I have them put in memory palaces. A lot of times, we memorize the tools of learning. For instance, in my hermeneutics class, I give them a really big list at the beginning of the year of things to observe in Scripture. The list includes contrast, comparison, cause and effect, figures of speech, nouns, pronouns, questions and answers, all those things. At the beginning of the year we put them into a memory palace and use them all year. So, I'll say that I want them to do an observation markup. They take their Bibles, circle the words and make connections. And I don't give them the list back. They go through the memory palace and they do this. The same works with the logical fallacies and with the Veritas history flashcards. I've worked through with

each one of my kids helping them put the Veritas cards into their heads. You can fill a whole house with Veritas flashcards. We've done it.

In regards to precalculus functions, if I can do that anybody can do it. Remember, I went to every classroom, no discrimination at all and one of the first things that I came to was "Oh, we memorize these things; they are called functions." So I had these: a line on the ear for linear; square root, a square with a root coming off of it. There's cube root; you can picture a cube and the root goes off in a different direction. You can create visual things out of even the strangest things.

Here's an example with Scripture. My oldest son is somewhat of a crammer, always has been. He came to me, about 9:00 p.m. Thursday night. Of course, the teacher just told him that day to memorize that entire chapter of Proverbs (not really). So, he came to me and he said, "I need to memorize Proverbs, chapter 13." I said "OK, let's sit down and do it; how long do you have?" "Well, it's due tomorrow." So, we took about an hour and we put the book of Proverbs 13 into a memory palace. The interesting thing is, because we put it into a memory palace, was it cramming? Technically, yes. We waited until the last minute. But in a very strange way, he still knows it because it was a visual memory. In some ways, it is still cramming but it stays in there.

Whenever you are memorizing something like Proverbs, how do you get the "As" and the "ans" and the "ands" in there? You have to be somewhat familiar with the work. You have to have read through it a couple times before you can put it into a memory palace. A memory palace acts as a link to the knowledge that you have. We had to read through the passage a few times. My son had already been taught through Proverbs 13. He didn't have it memorized but he had been taught through it. So, whenever I would say, "A wise man does . . ." he would be able to kind of give it back to me. In some ways, you are just creating two or three images that really remind you of the proverb verse that you have read through a few times. It is harder with things that need to be verbatim. You have to really be familiar with the work. The memory palace creates the link to the knowledge.

So that is how a memory palace works. For further understanding of this method, consider reading *Moonwalking with Einstein* by Joshua Foer, or watching his TEDx Talk on YouTube. If we really seek to teach tools to our students, finding ways to help them remember them would be a great place to start.

RESOURCES:

1. Joshua Foer, *Moonwalking with Einstein: The Art and Science of Remembering Everything* (New York, NY: The Penguin Press, 2010).

2. Joshua Foer, "Feats of Memory Anyone Can Do" (TEDx talk, http://www.youtube.com/watch?v=U6PoUg7jXsA)

3. Tony Buzan, *Use Your Perfect Memory: Dramatic New Techniques for Improving Your Memory* (New York, NY: E. P. Dutton & Co., Inc., 1984).

4. Harry Lorayne and Jerry Lucas, *The Memory Book: The Classic Guide to Improving Your Memory at Work, at School, and at Play* (New York: NY, Stein & Day, 1973).

5. Joan Minninger, *Total Recall*: *How to Boost Your Memory Power* (Emmaus, PA: Rodale Press, 1983).

6. Ronnie White's Brain Athlete YouTube Channel, http://www.youtube.com/user/rwhite73.

7. Scott Welch, "Memory Tools," Prezi presentation from 2014 ACCS Repairing the Ruins Conference: http://prezi.com/xnhmt6bjpo1h/?utm_campaign=share&utm_medium=copy