Your Memory: How It Works and How to Improve It by Kenneth L. Higbee

AN INTRODUCTION TO MNEMONICS

What Are Mnemonics?

The word mnemonic (pronounced "ne MON ik") is briefly defined as "aiding the memory." It is derived from Mnemosyne, the name of the ancient Greek goddess of memory. "Mnemonics" refers in general to methods for improving memory; a mnemonic technique is any technique that aids the memory. Most researchers, however, define mnemonics more narrowly as being what most people consider to be rather unusual, artificial memory aids.

First-letter Mnemonics

A cue is what is known as an acronym—a word that is made out of the first letters of the items to be remembered. In this example the acronym HOMES stands for Huron, Ontario, Michigan, Erie, and Superior. Using the word HOMES as a cue you can likely now remember the names of the Great Lakes.

A mnemonic technique that is similar to the acronym is the acrostic—a series of words, lines, or verses in which the first letters form a word or phrase; for example, an acrostic for remembering the names of the Great Lakes might be, Healthy Old Men Exercise Some. Acronyms and acrostics are referred to by most mnemonics researchers as "first-letter mnemonics" (for reasons that should be obvious).

There are at least four ways in which acronyms and acrostics can help memory:

- Acronyms and acrostics make the material meaningful; they give you something meaningful to remember, such as HOMES, and Every Good Boy Does Fine.
- 2. Acronyms chunk the information so you do not have to remember a lot. Instead of five lakes or seven colors, for example, you only have to remember one word or one name. Of course, an acronym or acrostic itself is not the original information; it merely gives you some cues to help you retrieve the original information. After you remember the acronym or acrostic, you still must be able to generate the original information from it.
- 3. First-letter mnemonics provide cues to help you retrieve the items; therefore, they change a recall task to an aided recall task. This makes your memory task easier by narrowing your memory search.

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4. First-letter mnemonics can tell you how many items are to be remembered, so that you know when you have recalled all of them.

The Keyword Mnemonic

A great amount of research has been done on a mnemonic that is usually called the "Keyword mnemonic." The Keyword mnemonic consists of two steps, one verbal and one visual. The first step is to construct a concrete keyword to represent the foreign word to be learned. For example, the Spanish word for duck is pato, which could be represented by the sound-alike keyword pot. The second step is to form a visual image connecting the keyword with the English meaning. For example, you could picture a duck cooking in a pot or wearing a pot on its head. To recall the meaning of the Spanish word pato you first retrieve the keyword pot, and then the stored image that links it to duck.

BASIC PRINCIPLES OF MNEMONICS

Mnemonics make use of all the basic principles of learning and memory:

Meaningfulness. Mnemonic techniques and systems help make material meaningful by using rhymes, patterns, and associations.

Organization. Most of the mnemonic techniques just described, and all of the mnemonic systems described in subsequent chapters, impose a meaningful organization on the material. As mental filing systems, they give a systematic way to record and retrieve the material.

Association. We have seen some examples of mnemonic associations. The principle of association is basic to all the mnemonic systems discussed in subsequent chapters. In the Link system the items are associated with each other. In the Loci, Peg, and Phonetic systems, easily remembered material that is memorized previously serves as your filing system; you associate the new material that you want to learn with the material that has been memorized previously.

Visualization. Visual imagery also plays a central role in the mnemonic systems because the associations are usually made visually. Visualization is probably the most unusual aspect of mnemonic systems.

Attention. Mnemonic systems force you to concentrate on the material in order to form pictures and associate them. Mnemonics can foster attention because they tend to be more interesting and fun than rote learning.

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HOW TO MAKE EFFECTIVE VISUAL ASSOCIATIONS

Three factors that help to make your visual associations effective — interaction, vividness, and bizarreness.

Interaction. Visual imagery by itself is not maximally effective. To make visual association effective, your imagery must both be "visual" and involve "association." The two items you are associating should be pictured as interacting in some way with each other (one of them doing something to or with the other), rather than as merely sitting next to each other or one on top of the other. For example, if you were associating the words dog and broom it would be better to picture a dog sweeping with a broom.

Vividness. A vivid visual image is one that is clear, distinct, and strong—one that is as similar as possible to actually seeing a picture. Pictures have an even stronger effect on memory than instructions to visualize, so that the more you can see the image like you were actually looking at a picture, the better. You should try to see your mental pictures as clearly as possible. For example, if you are associating the words dog and broom you should not just think about the two words together or think about the idea of a dog sweeping with a broom, but you should try to actually see the dog sweeping with the broom in your mind's eye.

In addition to detail, three suggestions that are frequently recommended to help make visual associations effective are aimed at making them more vivid (and maybe even more bizarre—see the next section):

- 1. **Motion**. See the picture in action (the dog is sweeping with the broom, not just holding it).
- 2. **Substitition.** See one item in place of the other (you are sweeping with a dog instead of a broom, or a broom is coming out of a doghouse).
- 3. **Exaggeration.** See one or both of the items exaggerated in size or number (a Chihuahua is sweeping with a giant broom, or a large St. Bernard is using a small whisk broom).

Bizarreness. Popular memory-training books typically recommend that visual associations should be bizarre (unusual, weird, implausible, incongruous, ludicrous). The opposite of bizarre would be plausible—imagining a picture that makes sense and could really occur. For example, a picture of a dog being

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chased out of a house by a person with a broom is plausible; a dog sweeping with a broom would be somewhat bizarre; and a dog riding a broom like a witch,

If you find it difficult to make up bizarre images or you feel uncomfortable doing so, then I recommend that you concentrate on making the images interacting and vivid—do not worry about making them bizarre.

MORE ON EFFECTIVE MNEMONICS

How Can You Use Images for Abstract Material?

It is not hard to picture concrete words like apple, car, book, and horse, but it is harder to picture more abstract words like nourishment, liberty, justice, and happiness. Since most mnemonic systems use visual imagery, how can the systems be used to remember abstract material?

The procedure for using imagery to help remember abstract terms is the same as for concrete terms except that you add a step using "substitute words." You substitute a concrete word to represent the abstract word. One way of doing this is to use objects that typify the abstract term: for liberty, you might picture the Liberty Bell; for justice, a judge; for happiness, a smiling face.

A second way of substituting a concrete word for an abstract one is to use objects whose names sound like the abstract term: celery for salary; fried ham for freedom; happy nest for happiness. You can even use this technique to remember nonsense syllables: Cage for KAJ; rocks for ROX; seal for ZYL; sack for XAC.

Verbatim Memory

Some memory tasks may require word-for-word memorizing (for example, learning scriptures, poems, scripts, etc.). Mnemonic systems are not especially appropriate for such verbatim memory tasks. We will see in subsequent chapters that mnemonic systems can help in remembering the main points or ideas covered in such materials and in getting these points in the right order, thus providing a framework within which the exact words can then be learned. But the systems do not help much directly in the word-for-word memory part of the task.

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MENTAL FILING SYSTEMS: LINK MNEMONICS

Mnemonic systems are general-purpose methods that can be applied to different kinds of memory tasks; they are not limited to only one set of material, but can be used over and over to learn different material. There are five mnemonic systems—Link, Story, Loci, Peg, and Phonetic.

YOUR MENTAL FILING SYSTEM

Mnemonic systems may be viewed quite literally as mental filing systems. They allow you to store information in your memory in a way that you will be able to find it and get it back out when you want it.

When you are trying to find items in your memory, a mnemonic system can help in at least three ways as a mental filing system:

- 1. It will give you a place to start your search, a way to locate the first item.
- 2. It will give you a way of proceeding systematically from one item to the next.
- 3. It will let you know when your recall is finished, when you have reached the last item.

WHAT IS THE LINK SYSTEM?

The Link system, which could also be called the "Chain system," consists of two steps. First, form a visual image for each item in the list to be learned. Second, associate the image for each item with the image for the next item. Thus, you form a visual association between the first two items, then between the second and third items, then between the third and fourth items, and so on. You do not try to associate every item with every other item in one big picture; rather, you associate the items two at a time. The reason for the name of this system should be obvious: You are linking the items together to form a chain of associations.

The Link system is appropriate for serial learning tasks, where you have a series of items to remember: The Link system helps you remember all the items in order.

As an example of the Link system, suppose you were given a list that begins with the following five items: paper, tire, doctor, rose, ball. To use the Link system in remembering these five items, you first form a visual association relating paper

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and tire. You might picture a car driving on paper tires, or using a tire to erase writing from a paper. Next associate tire and doctor. You might picture a tire running over a doctor, or a tire performing an operation. To associate doctor and rose, you might picture a doctor operating on a rose, or a doctor giving roses to a patient. To associate rose and ball, you might picture two people playing catch with a rose, or balls growing on a rose bush. Of course, it may be just as easy for some people to remember only five items without using a system; however, the procedure is the same whether you have 5 items or 50 items.

Whenever I read a list of items to an audience so that they can try using the Link system, or any other mnemonic system, I emphasize two additional points:

- 1. I first tell them, "Make sure you actually see each of your associations, even if it is only a brief second. If it helps at first to cut out distractions, close your eyes."
- 2. Then I tell them, "After I have given you several items you are going to start worrying about forgetting the first few items, and you will want to go back and review them. Don't go back and review, or you will miss the new associations. Just concentrate on making a good association for each item as it comes, and trust your memory that you will be able to get the items back when you want them."

In the Link system each item is cued by the previous item except for the first one. You need some way to cue yourself to remember the first item. One way to do this is to associate the first item with something that is related to the list and that is easy to remember. For example, you might associate the first word with the source of the list: If a person is giving you the list, associate the first item on the list with that person. If the list comes from a textbook, associate the first item with the book. If the list is a shopping list, associate the first item with the door to the store.

HOW CAN YOU USE THE LINK SYSTEM?

What are some practical situations in which the systems could be used?

- 1. The Link system can be used in almost any situations where you want to remember lists of things. One category would include shopping lists and lists of things to do.
- 2. The system can also be used for learning material that consists of separate, ordered parts, such as the amendments to the Constitution, the Ten Commandments, or the names of the presidents. The procedure for

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such a task is to pick a key word representing each item and then link the words together or form a story with them.

For example, to remember the Ten Commandments you might link the following: One god, graven image, swearing, Sabbath, parents, kill, adultery, steal, lie, covet. You could use concrete substitute words and their pictures to represent the terms that are abstract; thus, you might picture a church meeting to represent Sabbath and a person whose face is green with envy and who has dollar signs in his eyes to represent covet.

3. Speeches or reports are another possible use of the Link system.

MENTAL FILING SYSTEMS: LOCI MNEMONIC

One limitation of the Link and Story systems discussed in the previous chapter stems from the fact that each item is associated with the previous item so that forgetting one item affects memory for subsequent items. The Loci system does not have that limitation. In the Loci system you build up a mental file of previously memorized images with which you can associate new information to be learned. These images exist independently of the information to be learned. Thus, the Loci system fits the analogy of a mental filing system better than does the Link system.

WHAT IS THE LOCI SYSTEM?

The Loci system is the most ancient mnemonic system, dating back to about 500 B. C. It was the mnemonic system until about the middle of the seventeenth century, when other systems, such as the Peg and Phonetic systems (discussed in the next two chapters), began to evolve.

The word loci (pronounced LOsi) is the plural of locus, which means "place or location." Thus, the Loci system is the system that uses places or locations. The Loci system was used by Greek and Roman orators to remember long speeches without notes. Orators visualized objects that represented the topics to be covered in their speeches, and then mentally placed the objects in different locations—usually parts of a building. They then moved through this building mentally while delivering the speech, retrieving the object images from the locations as they came to them.

How to Use It

The Loci system consists basically of two steps.

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1. Memorize (overlearn) a series of mental images of familiar locations in some natural or logical order. This series of locations is your mental filing system, which you can use over again for different lists of items. This is an important feature, because the system would hardly be worth the effort if you had to memorize a new set of locations every time you wanted to memorize a new list of items; you would have twice as much to learn each time.

2. Associate a visual image of each item to be remembered with a location in the series; do this by visually placing the items, in the order they are to be remembered, in the locations as you take an imaginary walk past the locations. Locations have the advantages of being concrete (thus easy to visualize) and of being learned in a natural serial order.

The Loci system enables you to change a free-recall task in three ways to help recall:

- 1. The task is changed to an aided-recall task because you can use the locations as aids to cue yourself.
- 2. The task incorporates paired-associate learning, with the location serving as the first word in each pair and the item serving as the second word.
- 3. The task incorporates serial learning because the locations are organized in a natural serial order.

It is not difficult to construct several extensive mental files of locations. In the house you could continue to the living room, to the bedroom, and then on to each room in your house; then you could go downstairs, out into the yard, etc. You could increase the number of loci in your series by visualizing two or three distinctive locations in each room (for example, the refrigerator, table, and sink in the kitchen; the couch, window, and television in the living room; and the bed, dresser, and clothes closet in the bedroom).

Other buildings could also be used, such as a familiar school building, office building, or store. Nor are you limited to buildings. You could take a walk through your neighborhood, or downtown, and construct a file of mental locations. A familiar golf course has at least 36 ready-made locations (18 tees and 18 greens). You could also use different parts of your own body, or of your automobile, for loci.

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The Loci system has an advantage over the Link system in this respect: Forgetting one item does not affect recall of subsequent items in the Loci system, because the items to be remembered are associated with an independent series of locations rather than with each other.

HOW WELL DOES THE LOCI SYSTEM WORK?

When S read through a long series of words, each word would elicit a graphic image. And since the series was fairly long, he had to find some way of distributing these images in a mental row or sequence. Most often (and this habit persisted throughout his life), he would "distribute" them along some roadway or street he visualized in his mind.... Frequently he would take a mental walk along that street ... and slowly make his way down, "distributing" his images at houses, gates, and in store windows....

This technique of converting a series of words into a series of graphic images explains why S could so readily reproduce a series from start to finish or in reverse order; how he could rapidly name the word that preceded or followed one I'd selected from the series. To do this he would simply begin his walk, find the image of the object I had named and "take a look at" whatever happened to be situated on either side of it.

HOW CAN YOU USE THE LOCI SYSTEM?

All of the uses of the Link system are also possible uses of the Loci system—remembering shopping lists, lists of things to do, naturally ordered material like the Ten Commandments, lists of names, speeches, and so on. The only difference is that you associate each item with a location rather than with the previous item. In addition to all of the above uses, there are some further uses for the Loci system.

Using the Same Loci Over and Over

It was noted that the same loci can be used more than once for new lists. This presents a potential problem in practical uses of the Loci system: Learning several lists attached to the same loci might lead to unwanted interference. For example, suppose you have a series of 20 loci and you want to learn three different lists of 20 items each. If all the items are associated with the same set of loci, you might have interference as to which items are on which list.

Such interference is the basis of one of the most frequent questions people ask when I am teaching the Loci system: "If I use the same loci over to learn new

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material, won't there be some confusion between the new and old material?" I answer: "Yes, of course ... but there won't be nearly as much interference as you would get if you tried to memorize several different sets of material without any system." I also point out that this problem is not as serious in situations where you only want to remember a list for a short time or where there is enough time (for example, a day or two) between learning the two lists to allow some forgetting of the first list, because when you put the new list in the locations it will weaken the old list. In addition, there are two ways to reduce such interference.

- 1. You can construct multiple sets of locations so you do not have to use the same set many times in close succession. A student could select a set of loci in one part of campus to use in memorizing material for one class and loci in a different part of campus for material for another class. People could similarly have one set of loci around the house, another around the office, and another on a familiar neighborhood street.
- 2. A second way to reduce interference among several lists learned with the same loci is "progressive elaboration"—adding each subsequent word at a particular location to a progressive picture. Re-imagine each earlier item in its location when you associate the new item by elaborating a grand scene of interacting objects.

For example, if your front porch were the second location in your set of loci, and the second word in each of three lists were swing, hat, and fish, then the scenes might be: list one—a swing hanging from your porch; list two—a hat swinging on the swing on your porch; list three—a fish wearing a hat while swinging on your porch. Several research studies have found that such progressive elaboration does help reduce interference among different lists.

I recommend that the person who may make frequent use of the Loci system learn several different sets of loci and use the multiple-sets method. The benefits of having several sets of loci are probably worth the effort it takes to learn them.

There is another way in which the Loci system can be combined with the Link or Story system. A set of 10 loci could be used to remember 100 items. Place the first item in the first location; then use the Link or Story system to associate the next nine items in order; then place the eleventh item in the second location and link the next nine items onto it; and so on, until you place the ninety-first item in the tenth location and link items 92 to 100 onto it. In recall, you then use your loci to cue you for the first item in each group of 10, and your inter-item

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associations (links) to recall the next 9. You can thus recall 100 items with no single chain of associations longer than 10 items.

The students in my memory course have tried this combining of the Link and Loci systems to remember a list of 40 words. The words were read to the students once, with a 5- to 10-second pause after each word. Students used 10 loci with four words linked at each one.

MENTAL FILING SYSTEMS: PEG MNEMONIC

As previously noted, direct retrieval of an item at a certain position in a memorized list (for example, the twelfth item) is difficult for both the Link and Loci systems. They are both dependent on sequential retrieval.

WHAT IS THE PEG SYSTEM?

The Peg system is a mental filing system consisting of a series of pre-memorized concrete nouns. The concrete nouns are not arbitrarily selected; rather, they are selected in such a way as to correspond meaningfully with numbers. For example, each digit is represented by any one of several objects that resemble the numbers (for example, 1 = candle, 3 = trident, 8 = spectacles, 0 = orange).

Another way of using the Peg System is with rhyming nouns. The nouns rhyme with the numbers they represent so that it is easy to remember what nouns represents each number.

One – bun	Six – sticks
Two – shoe	Seven - heaven
Three – tree	Eight - gate
Four – door	Nine – wine
Five – hive	Ten - hen

How to Use It

The Peg system gets its name from the fact that the pegwords serve as mental pegs or hooks on which the person "hangs" the items to be remembered. To use the Peg system to learn new material, you associate the new material with each of the pegwords in order.

For example, the first five pegwords could be used to learn the list we have used in the last two chaters—paper, tire, doctor, rose, ball—as follows: Associate

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paper with bun; see yourself eating a bun made of paper, or reading the evening news-bun. Associate tire with shoe; see yourself wearing tires on your feet, or see a car that has four shoes in the place of tires. Associate doctor with tree; see a doctor operating on a tree, or a doctor climbing a tree. Associate rose with door, see a rose in the place of the doorknob, or a rosebush growing from the middle of the door. Associate ball with hive; see a round beehive in the shape of a ball, or balls rather than bees flying out of the hive.

One limitation of the Peg system is that it is difficult to find good pegwords to represent numbers beyond 10. It is hard to find words, for example, that rhyme with (or look like) the numbers 24 or 37. However, it is possible to find rhyming words for the numbers from 11 to 20. Most of them are verbs representing an action that can be visualized.

HOW CAN YOU USE THE PEG SYSTEM?

The Peg system can be used for any of the uses suggested for the Link and Loci systems, including learning lists, naturally ordered material, names, and speeches, or as a mental filing system for temporary storage when it is inconvenient to write something down, or as a mental filing system for more permanent storage on a regular day-to-day basis.

Another student used the Peg system to prepare for an open-book test on the content of about 50 Bible scriptures that had been marked in class. She linked all the scriptures in each chapter together, and then used pegwords for chapter numbers and associated them with the first scripture in each link of associations. She then linked the chapter pegwords together to remember which chapters had scriptures marked.

Like the Loci system, the Peg system can be combined with the Link system to remember as many as 100 items. Associate the first item with "bun" and link the next nine items; associate the eleventh item with "shoe" and link the next nine items, and so on. Using this approach, you do not have any link longer than 10 words, and you use the pegwords to cue you for the first word in each link.

MENTAL FILING SYSTEMS: PHONETIC MNEMONIC

The Phonetic system is the most sophisticated and most versatile of the mnemonic systems discussed in this book. It is also the most complex and thus requires the most study and effort to master. However, for use as a mental filing system, the Phonetic system overcomes a limitation of the Peg system by

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allowing construction of more than 10 to 20 pegwords. At the same time it retains the Peg system's advantage of direct retrieval. In addition, the Phonetic system enables us to remember numbers better by making them meaningful.

WHAT IS THE PHONETIC SYSTEM?

In the Phonetic system each of the digits from 0 to 9 is represented by a consonant sound; these consonant sounds are then combined with vowels to code numbers into words, which are more meaningful and thus easier to remember than numbers.

Description

The following display summarizes the digit-sound equivalents that are the basis of the Phonetic system:

Digit	Consonant Sound	Memory Aid	
1	t , th ,d	"t" has one downstroke	
2	n	Two downstrokes	
3	m	Three downstrokes	
4	r	Last sound for the word four	
5	I	Roman numeral for 50 is "L"	
6	j, sh, ch, soft g	Reversed script "j" resembles 6	
7	k, q, hard c, hard g	"k" made of two 7's	
8	f, v	Script "f" resembles 8	
9	p, b	"p" is mirror of 9	
0	z, r, s	"z" for "zero"	

There are several advantages to the way the consonant sounds have been selected to represent the digits in the display above:

- 1. The digit-sound equivalents are not too hard to learn (see the memory aids in the display).
- 2. The sounds are mutually exclusive: Each digit is represented by only one sound or family of similar sounds.
- 3. The sounds are exhaustive: All the consonant sounds in the English language are included, except for "w," "h," and "y," which you can easily remember by the word why (the letter h has value only as it changes the sounds of other consonants—th, ch, ph, sh).

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All of the digits except 2, 3, 4, and 5 are actually represented by families of similar sounds rather than by a single sound.

It is important to realize that in the Phonetic system it is the consonant sounds that are important, not the letters themselves. This is why I have chosen to call it the Phonetic system. To understand why certain sounds are grouped together, say the following words aloud and pay close attention to how similarly the underlined sounds in each group are formed with your mouth and tongue: for 1—toe, though, doe; for 6—jaw, show, chow, gem; for 7—key, quo, cow, go; for 8—foe, vow; for 9—pay, bay; for 0-zero, sue, cell. Actually, there are only three sounds for 6 because "soft g" is the same as "j," two sounds for 7 because "hard c" and "q" are the same as "k," and two sounds for 0 because "soft c" is the same as "s."

When a repeated consonant makes only one sound it counts as only one digit (button = 912 not 9112, and account = 721 not 7721), but when a repeated consonant makes two different sounds it counts as two digits (accent = 7021). A silent consonant is disregarded; it has no value if you don't hear it when pronouncing a word: limb = 53 not 539 (but limber = 5394); bought = 91 not 971; knife = 28 not 728; could = 71 not 751; scene = 02 not 072 (but scan = 072). Two different consonants together represent only one digit if they form only one sound (tack = 17 not 177; acquaint = 721 not 7721).

By now you can appreciate what I meant when I said that the Phonetic system is more complex than the other mnemonic systems, and thus takes more effort to learn. You will need to spend some time studying this section.

How to Use It

After the consonant sounds representing each digit have been thoroughly learned, the Phonetic system can then be used in two general areas:

- 1. Words can be constructed to serve as a mental filing system for use in the same way as the Loci and Peg systems, and
- 2. Any numerical information can be coded into words to make it easier to learn.

Mental filing system. The Phonetic system can be used to construct words to serve as a mental filing system just like the Loci and Peg systems. The keywords are constructed by combining vowels with the consonants. For example there

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are many words that could represent the number 1: *doe, day, die, tie, toe, eat, hat, head, wade* and *the*. Two suggestions:

- 1. It is best to use a concrete word; thus *toe* would be better than *the*.
- 2. Also it would be best choose a keyword that begins with the consonant sound, such as *tea* or *doe* instead of *eat* or *hat*.

Two-digit numbers are represented by a keyword that begins with a consonant sound representing the first digit and ends with a consonant sound representing the second digit. For example, the number 13 could be represented by tomb, dome, or dime, and the number 25 could be represented by nail, Nile, or kneel. Keywords for numbers up to 100 can easily be constructed by combining consonants and vowels. Examples of possible keywords for the numbers from 1 to 20 are:

1 = tie	6 = jay	11 = tot	16 = tissue
2 = Noah	7 = key	12 = tin	17 = tack
3 = ma	8 = fee	13 = tomb	18 = taffy
4 = ray	9 = pie	14 = tire	19 = tub
5 = law	10 = toes	15 = towel	20 = nose

The procedure for three-digit numbers is the same: for 145 you could use trail, drill, or twirl.

You should choose one keyword that you can visualize easily for each number and use it consistently. The keywords serve as your mental filing system. They are used in the same way as the locations are used in the Loci system and the pegwords are used in the Peg system.

You can expand your basic 100-word list to 1,099 words by learning only 10 more words. The 10 words are adjectives that represent the numbers from 1 to 10; examples might be: wet = 1, new = 2, my = 3, hairy = 4, oily = 5, huge = 6, weak = 7, heavy = 8, happy = 9, dizzy = 10. For numbers from 101 to 1,099 you would use your regular keyword to represent the last two digits of each number, and the adjective to represent the first digit; for example, wet tie = 101, new tie = 201, hairy chin = 462, happy movie = 938, and dizzy baby = 1,099.

Remembering numbers. The second major area in which the Phonetic system is useful is in coding numerical information into words, so that the information will be more meaningful and easier to associate.

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HOW CAN YOU USE THE PHONETIC SYSTEM?

The Phonetic system can be used for all of the uses described previously for the Link, Loci, and Peg systems. Its main advantage over the Peg system is that you can use it for long lists. Its main advantage over the Loci system is that you can retrieve numbered items directly (of course, the items do not have to be numbered). It has an additional advantage over all previous systems in that you can use it to remember numbers.

Remembering Numbers

The unique advantage of the Phonetic system over the previous systems is its usefulness in learning numbers. Much of the information we need to remember consists of numbers: phone numbers, street addresses, historical dates, financial data, stock numbers, population figures, ages, identification numbers, social security numbers, license plates, time schedules, prices, style numbers, and so on. Unfortunately, numbers are about the most abstract kind of material to remember.

Learning Scriptures

A program developed for learning scriptures is based on the Phonetic system. Phonetic phrases were constructed for 1,200 selected verses in the Bible. Each phrase is meaningfully related to the content of the verse and also identifies the book, chapter, and verse numbers by the Phonetic system. The books are represented by numbers giving their numerical order in the Bible, rather than by their names.

USING MNEMONICS: REMBERING PEOPLE'S NAMES AND FACES

Perhaps the most common memory complaint is the inability to remember people's names. Memory for names must be trained just like any other kind of memory. You must learn the techniques and practice using them.

HOW DO WE REMEMBER NAMES AND FACES?

Remembering names and faces is a paired-associate task: In most situations we see the face and recall the name; the face serves as the cue and the name serves as the response. Remembering faces is easier for most people than remembering names for at least three reasons:

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1. We generally see the face but only hear the name, and most people remember things they see better than things they hear.

- 2. pictures (faces) are easier to remember than words (names). Faces are treated differently from names in memory, and may even be treated differently from other pictures.
- 3. Face memory is a recognition task whereas name memory is a recall task. If name memory were put in the form of a multiple-choice question (people had four names printed on their foreheads and we just had to recognize the right one), we would not have nearly as much trouble "remembering" people's names.

A SYSTEM FOR REMEMBERING NAMES AND FACES

The main determinant of your memory for names is your awareness of these steps, and then your practice of them. The following five steps are used by most people who have exceptional ability to remember people's names:

- 1. Make sure you get the name.
- 2. Make the name meaningful.
- 3. Focus on a distinctive feature of the person's appearance.
- 4. Associate the name with the distinctive feature.
- 5. Review the association.

Step 1: Get the Name

Failure to pay attention may be the single most common reason why we "forget" the names of people we are introduced to: We never really got the name in the first place.

Even when you are paying attention, you may not get a person's name if it is spoken too fast or too quietly. If this happens, stop the person or introducer and ask him to repeat the name. This seems obvious, so why don't people do it more often? One reason may be that they do not want to seem rude by interrupting the flow of the conversation. Or it may be that they are somewhat embarrassed that they did not get the name; but they are likely to be even more embarrassed later when they cannot remember the name.

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Use the name in the conversation, repeat it, spell it aloud, work it over, ask about it. These activities help you make sure you get the name. They force you to concentrate your attention on it. Repeating the name and using it involves applying the principles of repetition and recitation.

Research has found that memory for names can be improved significantly even without any additional steps or particular mnemonic technique if people merely concentrate on the name and pay attention to it.

Step 2: Make the Name Meaningful

After you get the name, you should make the name meaningful and concrete. This is not hard for names that already have meaning. Many names have meaning in themselves or through association with something that is meaningful. For names that do not have any readily apparent meaning, you can use the principle of substitute words to give meaning to the name.

Even if you come across an occasional name that you cannot make meaningful in the time you have available, merely having tried to do so will help you remember the name better because you have had to focus your attention on the name in order to try to find a meaningful substitute word (step 1).

Step 3: Focus on the Face

The next step is to note a distinctive feature of the person's face or appearance, a feature that will be likely to first attract your attention the next time you meet him. The purpose of focusing on the face is to find something distinctive that will help you recognize it.

Many people who are not used to studying faces have a hard time at first finding something really distinctive about every face. Actually, there are many distinguishing features in a face, but you must train yourself to look for them.

Step 4: Associate the Face with the Name

After you have made something meaningful of the person's name and noted a distinctive feature of his appearance, you can form a conscious, visual association between the name and the distinctive feature. For example, if Mr. Ball has red hair, you could picture hundreds of red balls coming out of his hair; if Ms. Cook has long eyelashes, you could picture her eyelashes cooking.

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The common criticism of this step (especially by people who have not tried it) is that the next time you see that person you might think of the substitute word but not the name. You might even call the person by the substitute word or some other related name.

It is possible that you might remember a substitute word without remembering the name it represents. That is one of the hazards of using substitute words in visual associations. Although this system improves your memory, it does not necessarily make memory perfect. But even if you did fail to recall a few names, you would probably still recall more than you do without using substitute words.

If a person remembers the facial features and substitute word, he has about a 90 percent chance of remembering the correct name. When errors do occur, they are usually a result of poor association of the substitute word to the name.

Step 5: Review the Association

No matter how you learn something, you are likely to forget it if you do not use it occasionally unless you review. If you really want to remember a name for a long time, you should review it as soon as possible after meeting the person, and then occasionally afterward. Gradually expanding intervals between reviews have been found to be very effective. Repeat the person's name immediately, and then say it again to yourself 10 to 15 seconds later (remember that most forgetting occurs soon after learning). Review it again after a minute or so, and then again several minutes later.