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Rolland L. Soule

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THE USE OF VISUAL AIDS IN TRAINING IDENTIFICATION OFFICERS

ROLLAND L. SOULE

The author is Associate Director of the Southern Police Institute, University of Louisville, and formerly served as an instructor in the Department of Police Science, Washington State College and as a member of the Wichita, Kansas, Police Department. Since the organization of the Southern Police Institute in 1950 Mr. Soule has been actively instructing on various police science subjects, and particularly on the training of identification officers. His present article reflects his experiences in this work and also his interest in the use of visual aids in police science instruction.—EDITOR.

The use of visual aids in training Identification Officers includes all illustrative materials and devices that can be practicably used to enhance understanding. In a practical way, one can explain visual aids in this manner: By editing (making reality easier to grasp) and simplifying a subject or specific subject area, the instructor can focus all the students' attention on learning the key points. Illustrative material or devices are absolutely necessary for improved instruction. The history of education is a record of battles against the use of words without understanding. If an instructor, through visual aids, makes a student more attentive to the specific subject area, he will soon make him curious about it. It is the sense perception of the subject area (the residual deposit of information), whatever the subject, that counts, and the instructor has to reach his students' attention. The proper use of accurate visual teaching tools is the practical approach for the instructor.

The relative values of visual aids (motion pictures, slides, mimeographed material, graphs, diagrams, mechanical instruments, models, mock-ups, pictures, etc.) are determined by past experience and mechanical advantages. The two main questions for the instructor to consider are: (1) Which method makes the subject to be learned most clear? (2) Which method is most interesting and most economical in time, space, and money? However, the instructor must never lose sight of the students' previous training and background experience.

Identification training must be made both more concrete and more general—more concrete in providing a body of experience out of which generalizations are developed. The road to fruitful learning is one that is well paved with definite experience. The use of a wide variety of visual

aids in training identification officers will enable the education gained to be more specific. Identification instructors fail their students if they do not encourage them to make better generalizations about identification methods and techniques. Identification officers keep growing intellectually by obtaining more experience and by making better use of the experiences they have already accumulated. The use of a wide variety of teaching aids—visual aids—in identification training programs will enable that education to be more concrete and, therefore, to build better abstractions. Intelligence and well-grounded abstractions are impossible without rich, meaningful, concrete experiences. Also, well-organized concepts and generalizations enable one to manage new experiences with increased skill.

TYPES OF VISUAL AIDS

The most frequently used instructional aids are visual aids, which help the student learn through observing while hearing the instructor's explanation of the specific aid in use.

Visual aids are divided into two different types:

1. Projected visual aids via
 - a. Motion pictures
 - b. Slide film strips
 - c. Lantern slides (35mm, $3\frac{3}{4}'' \times 4''$)
 - d. Opaque projectors
 - e. Transparent overhead projectors
 1. Visual cast
 2. VU-Graph
2. Non-projected visual aids via
 - a. Blackboards
 - b. Flannel boards
 - c. Flip charts
 - d. Pictorials (charts, photos, etc.)
 - e. Displays

ESTABLISHING THE REAL VALUE OF AN INSTRUCTIONAL AID

The real value of an instructional aid to a training program cannot be established until after it has been used in instruction for a period of time; therefore:

1. Base all judgment of results upon established objectives.
2. Progress toward these goals should be judged objectively and then measured against a standard of performance.
3. There must be conclusive evidence that the results achieved by the use of the aid are (1) superior to, (2) equal to, (3) inferior to, those obtained by the use of another aid or by other instructional techniques.
 - a. Only then can a valid evaluation of the aid's worth in training be established.
 - b. One must spend time and effort in sound evaluation practices. This will pay dividends in increased efficiency of instruction.

The forward-looking instructor recognizes that training aids are devised to help him do a better job of teaching, and he is aware of their limitations.

The remainder of this article is confined to a summarization of nine different instructional aids used by the author to teach students the techniques of classification and identification work. Each of the nine visual aids have been used under control conditions in different classes for the past seven years. Seven years ago, a total of 30 hours classroom time was allocated to teaching fingerprint classification. Through constant revision of some visual aids, the total classroom time now allocated to the subject is only 20 hours.

The author knows that his approach is sound because of the correlation of test scores from previous classes and current classes. The reason the classroom time has been shortened is that a more concrete understanding and concept of the course is taught in less time than it used to be. All of this is possible because of suitable visual training aids.

EFFECTIVE VISUAL AIDS

Mimeographed hand-out material. Mimeographed material consisting of 36 pages is handed out at the orientation lecture to the course. Its content is the essential reading material to go along with the visual aids used during the presentation of the course. Blank spaces are left on many of the

pages for hand drawn illustrations or the insertion of illustrations and personal notes that the students will take during the course. Listed below will be found a typical table of contents that is required to be made by the student as it pertains to the topics discussed in the mimeographed material. This subject matter has been developed by the author over a period of years and is the factual meat of the course.

The initial hand-out study material insures that the students' reference material is correct for the purposes of the course and that the instructor will not have to correct the students' own daily prepared handwritten notes, other than just those taken as a result of the explanation of the visual aids used during the daily lectures.

TABLE OF CONTENTS—(*Mimeographed hand-out*)

Fingerprint Classification	<i>Page</i>
Classification chart—&—Reference books cited.	1
Bertillion system—vs—Fingerprint system....	2
Methods which furnish partial identification..	3
Methods which furnish absolute identification.	3
Formation of fingerprint patterns.....	3
Procedure for taking fingerprints.....	4
Classification by the Henry System.....	5
Type Lines, Cores, and Deltas.....	8
Definitions of fingerprint patterns.....	11
Ridge counting in loops (ridge counting in whorls—18).....	15
Whorl tracing.....	15
Extension of the Henry System.....	16
Scarred Patterns.....	19
Bandaged and missing fingers.....	19
Amputations.....	20
Schedule of combinations and order of filing....	22
Fingerprint classification test.....	25
Fingerprint classification test.....	34

Included with the mimeographed material are two separate tests. The first test is of 50 questions, the majority of the questions require the student to draw an illustration to represent what is called for, i.e.: Illustrate by a drawing, an ulnar loop in the left hand; Draw a diagram showing a loop pattern with four (4) rods of equal length within the innermost free recurving ridge. Identify in your drawing each of the following (a) type lines, (b) delta, (c) core, and (d) dot in the line of count. Immediately under your illustration, indicate the correct ridge count for the illustration you have drawn.

The second test is of 100 questions, all of which are multiple choice, with either 3 or 4 choices only

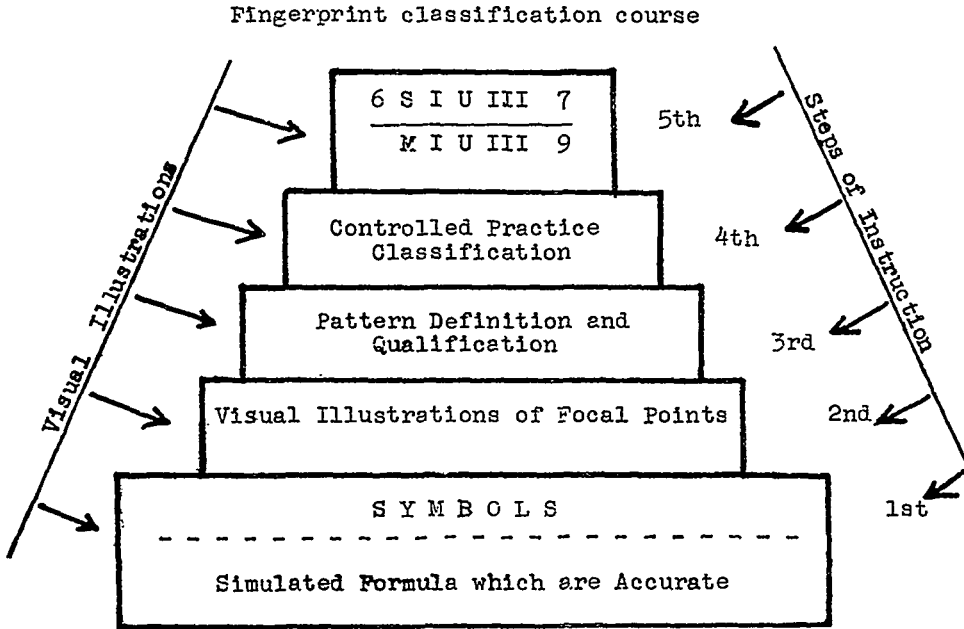


Figure 1

one of which is correct. The purpose of this test is to allow the student who is entirely new to the subject to daily check all of the test questions, and when he is able to answer a question or questions, it is an index to him of newly gained information. For the older experienced identification officer taking the course, it allows him the benefit of taking the test immediately, and the instructor can also immediately correct the test. Where there is an error upon the student's part, the instructor and student immediately have focus points for concentration of study.

In addition to the above-mentioned tests, there are daily tests given in the subject matter, the questions being different in composition than those found in the handout material.

Hand made transparencies. Most of these are hand lettered or illustrated and are 7" by 9" in size. They are used to edit and simplify the specific point being made at the moment and are projected by an overhead projector in the front of the class. Figure 1 is an example which shows the five steps of experience (instruction) pursued during the course of instruction. When properly edited (to the students) this will define the instructor's approach to the fingerprint classification course. Those who are experienced identification men and technicians will probably say this is the back door approach to the course. The author

realizes that it is—but he has been extremely satisfied with this approach to the subject and has found that as soon as he has justified his approach, the student is more than willing to let him lead the way. After all, in classification, one does start with symbols and ends with symbols in the formula.

The writer has found that if he teaches the new student that symbols are the significant factor in classification, the student soon is interested in classification formula derivation and not immediately concerned with the focal points in a particular fingerprint pattern. We all know that it is age-old argument, which came first—the hen or the egg? In fingerprint classification, which comes first, symbols (formula) or visual identification of focal points in a fingerprint pattern? The writer is sure that it is the instructor's viewpoint on it. Experience has proved to the writer that his approach teaches classification quicker and in the long run, he answers less questions for the students, because in most instances, the student soon finds out that most of his questions are answered in the explanation of the visual aids that are constantly used.

In the course of instruction, the symbols which will be used in the editing and identification of the various fingerprint patterns are identified to and for the student. Also, the derivation of all of

O-5 14 W	O-10 U	M-1 W	O-15 U	I-3 3 W
4	M-1	O-13	I-5	6
U	W	U	W	U

1.
$$\frac{5 \quad 0 \quad 1 \quad U \quad OMC \quad 3}{S \quad 32 \quad W \quad MOI \quad 6}$$

2.
$$\frac{10 \quad 0 \quad 1 \quad U \quad MON \quad 3}{S \quad 32 \quad W \quad MOI \quad 6}$$

3.
$$\frac{10 \quad 0 \quad 32 \quad U \quad MOM \quad 3}{S \quad 1 \quad W \quad MOI \quad 6}$$

4. None of the above are correct

Figure 2

	I-8		O-5	4
A	R	T	W	U
I-5	O-14		I-6	
W	U	A	R	T

1.
$$\frac{8 \quad 13 \quad R \quad I-C \quad 4}{1 \quad U \quad O-I}$$

2.
$$\frac{5 \quad 1 \quad aRt--}{13 \quad -Uert}$$

3.
$$\frac{8 \quad 13 \quad aRt-- \quad (4)}{1 \quad -Uert}$$

4. None of the above are correct

Figure 3

16	I-5	O-17	I-6	6
U	U	U	U	U
17	O-10	O-14	O-17	19
U	U	U	U	U

1.
$$\frac{16 \quad S \quad 1 \quad U \quad IOI \quad 6}{S \quad 1 \quad U \quad OOO \quad 19}$$

2.
$$\frac{16 \quad S \quad 1 \quad U \quad IOI \quad 6}{S \quad 1 \quad U \quad OOO \quad 19}$$

3.
$$\frac{16 \quad S \quad 1 \quad U \quad IOI \quad 6}{L \quad 1 \quad U \quad OCO \quad 19}$$

4. None of the above are correct

Figure 4

16	I-5	M-2	O-7	O-9
I-3	W	W	W	16
W	W	W	W	W
17	O-5	M-1	O-9	O-10
O-4	W	W	W	5
W	W	W	W	W

1.
$$\frac{16 \quad I \quad 32 \quad W \quad IMC \quad 9}{0 \quad 32 \quad W \quad OMO \quad 10}$$

2.
$$\frac{16 \quad I \quad 32 \quad W \quad IMO \quad 16}{0 \quad 32 \quad W \quad OMC \quad 5}$$

3.
$$\frac{16 \quad I \quad 32 \quad W \quad IMO \quad 16}{0 \quad 32 \quad W \quad OMO \quad 5}$$

4. None of the above are correct

Figure 5

the various portions of the total fingerprint classification formula are taught at the same time. Before the actual focal points in the fingerprint patterns are taken up, synthetic but accurate classification formula problems are pursued in the classroom until all students can actually compute proper classifications. Figures 2, 3, 4, and

5 demonstrate this mode of instruction in its final phase.

Hand drawn transparencies are used extensively throughout the course of instruction. Figures 6, 7, and 8 reproduce three individual slide projection transparencies which are presented so that the

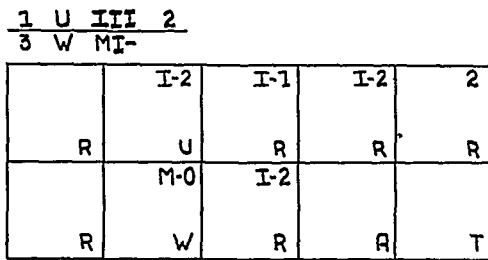


Figure 6

students will have a better concept of when the Small Letter Group Classification should be used.

Figure 6 is an outline representing the 10 squares upon which a prisoners' fingerprints are rolled. However, here it illustrates only the symbols that would be placed in each of the ten squares as they would be classified and edited by a fingerprint technician. Above the 10 squares is a classification formula that could be derived from the edited symbols in the classification problem.

Figure 7 has exactly the same classification problem as figure 6. However in this illustration, pattern characteristics of the different types of

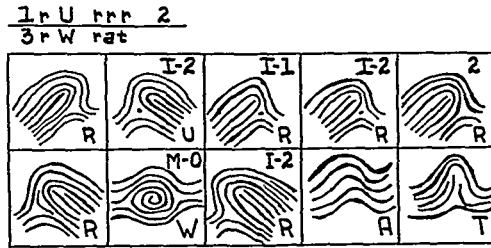


Figure 7

tioned fingerprint patterns and placing them together in r-a-t order, spells the word RAT.

The Small Letter Group formula applies only when anyone of the 8 squares containing a rat symbol has (1) a radial loop, (2) a tented arch, or (3) a plain arch pattern in that particular square. The formula also applies if just 1 of 8 squares containing a RAT symbol should have one of the aforementioned type patterns.

When this visual presentation is made to the students, at least a dozen of this type visual aid classification problems are presented and explained to the students. When their questions have been satisfied, the next portion of the total classification formula is then taken up.

Occasionally, a cartoon projection is presented to the class. The cartoon is held until a strategic moment in terms of the author's experience with the class. Then he uses it to completely drive home his teaching point. Figure 9 is an effective visual-aid—particularly when the instructor has laid the proper ground work before it is shown to the class. Cartoons of this type are frequently used throughout the course and build effective rapport with the student.

Lantern Slides. These lantern slides—black and white—are a true photographic reproduction of various fingerprint patterns. They were photographed from prisoner fingerprint cards and are 3 1/4" x 4" in size. They are projected directly from the projection field of either a visual cast or VU-graph overhead projector. When using the proper type and size adapter lens for the overhead projector, it is possible to greatly enlarge the size of the projected fingerprint pattern, thus making it easy to explain, (see figure 10). Forty different lantern slides, illustrating all of the various types of fingerprint patterns are used. It is possible to edit these lantern slides in several ways: (1) By projecting the slide directly on a conventional blackboard, it is very easy to trace out the focal points of the pattern very quickly and accurately

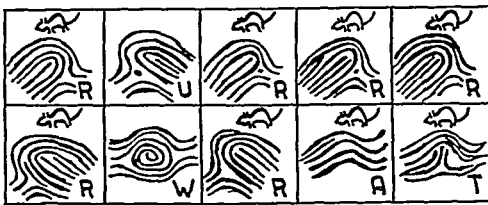


Figure 8

fingerprint patterns found in each of the 10 squares have been included. Also, the proper use of the Small Letter Group Classification has been illustrated this time. You will observe that the classification formula is different from that presented in figure 6.

Figure 8 has the same classification problem but is presented in a different visual concept to assist the student in understanding when the Small Letter Group Classification applies and not the SubSecondary Formula which is illustrated in figure 6. In figure 8, eight of the ten squares have a symbol that has not been presented in the preceding slides. To press the point to the student strongly, it is illustrated *now* that the Small Letter Group Classification applies when Radial Loops, Arches, and Tented Arches are found in any of the eight squares that contain a RAT symbol. Taking the first letter from each of the previously men-

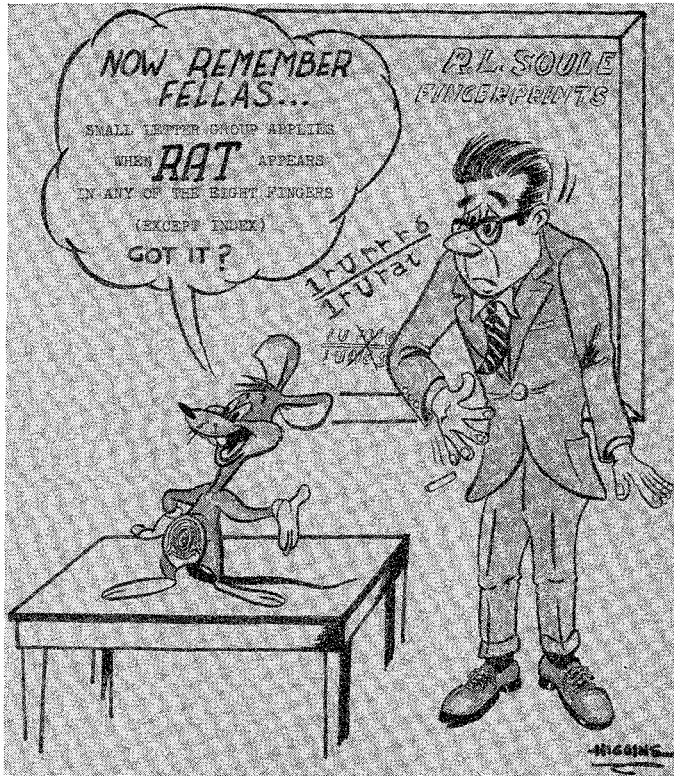


Figure 9

by using chalk directly on the projected ridge lines sought out; (2) By coloring (with transparent colored inks) the desired lines in advance of projection time, the instructor only has to ask his students to note the red ridges, the green ridges, etc.; (3) By the use of a sharp-pointed pointer, the instructor may trace out the ridges manually himself, or ask his students to do so.

It is possible to double the number of these lantern slides by turning them over and using the opposite side for the next projection. (i.e.) (an ulnar loop in the right hand would become a radial loop in the left hand; i.e., a whorl with an inside tracing would become a whorl with an outer tracing.)

Enlarged photographs of 10 rolled impressions. For the practical work in classifying fingerprints, the following visual aid was selected. Thirty different sets of rolled impressions, the ten rolled



Figure 10

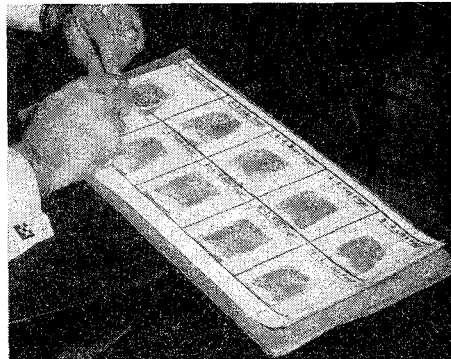


Figure 11

impressions photographically enlarged so that these ten rolled impressions in gross size will measure 8" in height and 17" in width (figure 11). At this degree of magnification, each rolled impression will average 2" in width and 3" in height. At this size, it is not necessary to use a fingerprint magnifier to see the detail in the individual rolled impressions.

Not having to use a fingerprint magnifier at this stage of instruction is the first reason for using the enlarged photographic visual aid. The second reason is to insure that all students have exactly the same pattern to classify. Sometimes, if one would roll 30 different sets of fingerprints from the same person—as is done in some training schools—there would be a variation in amount of ink used, also in the amount of pressure when taking the impression. This is sometimes a liability when new students are studying classification, as the instructor sees one set of factors, a student another and another student may still have a slightly different variation. Using the photo reproductions, it is possible for the instructor to take his sets of impressions, and with an opaque projector, project the pattern in question on a screen—now the students and instructor are all seeing one specific pattern—and at the same time each student has exactly the same at his seat for his practical work.

When the enlarged photographic visual aids are passed out to the students, they also receive two pieces of laminated cardboard which are slightly larger than the photographs. These are used as protective covers for the visual aids and are held together like a sandwich by the use of rubber bands. In this manner, the instructor can pass out 30 different sets of fingerprint classification problems. The student can work at his seat using the laminated cardboard as a working surface. The cardboard also protects the visual aids from the weather when they are transported via a student from classroom to the dormitory, and also from wear and tear.

The plain impressions usually found at the bottom of the conventional fingerprint card are deleted from this visual aid—to reduce the size of the aid when it is used by the student in the classroom. Plain impressions are given their due significance in other portions of the course of instruction. This deletion of the plain impressions also reduces the cost factor in making up the visual aid.

Stimulated fingerprint magnifier and coding disc. This visual aid has been made up in several me-

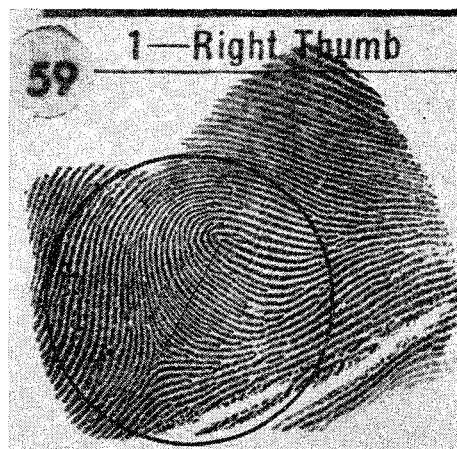


Figure 12

dioms. The one the author likes best personally is made from clear plexiglass, $\frac{1}{4}$ " thick. It is round 2 inches in diameter and has a straight scratched fine line on it. This fine line acts just as does the hair line on a coding disc of a conventional fingerprint magnifier. The scratched line can be left white in color, or can be colored either red or black by rubbing a red or black grease pencil along the scratch line. The excess grease pencil is then rubbed off.

The students use this plexiglass disc in place of a regulation fingerprint magnifier and coding disc and get exactly the same result. The clear plexiglass disc is merely placed directly upon a photographed fingerprint pattern. The scratch line of the disc is used in the same manner as the hair line on a regulation fingerprint magnifier.

To orientate the student in the use of the coding disc, the instructor first illustrates the use of the disc via the various lantern slides. Using the Visual Cast or VU-graph overhead projector, a lantern slide showing a loop pattern is first projected. Then the instructor lays the coding disc in the proper manner on the lantern slide and the projection is completed. In this manner it is very simple to illustrate ridge counting to students (figure 12). Just one word of caution in the use of the simulated magnifier. The scratch line should always be on the underneath side of the disc, so that there is no displacement of distance (the thickness of the plexiglass) to the proximity of the ridges being counted.

Enlarged photographs (16" x 20") of all types of fingerprint patterns. In all, forty (40) different patterns (arches, tented arches, radial and ulnar loops, and whorls—plain, central pocket, double

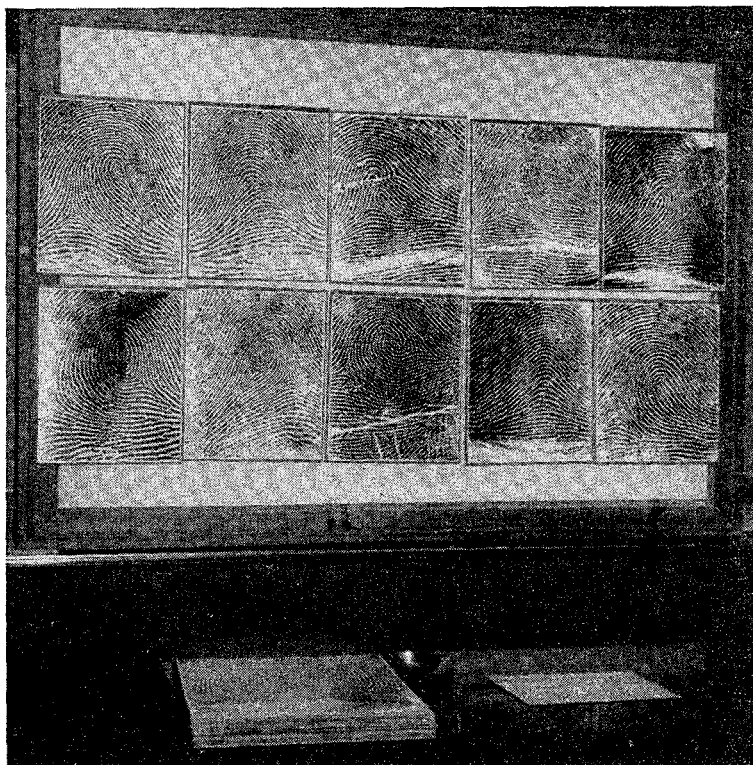


Figure 13

loop, and accidental) are used. They are mounted back to back, on 17" x 21" pieces of laminated cardboard, each of which has a round metal grommit, centered at the top, so that the visual aid can be held to the wall or other desirable place by a regular wall-type picture hanger. In this manner, ten (10) of these visual aids can be hung on a bulletin board in the same manner as the ten rolled impressions of a prisoner who has been fingerprinted appear on a regulation fingerprint card. (See figure 13).

The visual aid now is a greatly enlarged set of rolled fingerprints, so situated in front of the class that the instructor can easily edit each one individually and all of them collectively. Each student is seated in his regular seat and observing the ten rolled impressions. The visual aids' size is more than adequate for this teaching phase in applied classification. The student has a simulated fingerprint card in front of him—a small rectangular outline containing ten squares, to approximate the ten squares on the regulation fingerprint card.

The class, with the aid of the instructor, observes and qualifies each of the ten photographs hanging on the bulletin board. The instructor assists the class in the accurate ridge count of each pattern

that requires a ridge count. Otherwise, the students, with the aid of the instructor when necessary, determine the location of cores and deltas. When core and delta determination and a ridge count have been made (when it applies for patterns other than the plain arch and some of the tented arches), the instructor and the students have sufficient information for each pattern to completely edit each of the ten squares for classification purposes. A completed classification problem, by the student, in this phase of the training program would be as shown in figure 14.

In the course of teaching the symbols of classification formulas, the student has been taught that whorls are subdivided into symbols of I-M-O; likewise, he has been taught that loops are subdivided into symbols of I-O. Concurrently, he has been taught that in the primary classification formula comes from the value of whorls found in the odd or even numbered fingers as applied to the numerator and/or denominator. The secondary and subsecondary formula derivation is also carefully explained, as is the final classification. It is not long until the whole class is working classification formulas containing the complete extension of the Henry system. A little patience, with careful

4	I-5	O-14	I-11	6
U	U	U	U	U
4	O-11	I-8	O-19	9
U	U	U	U	U

4	S	1	U	IOI	6
<hr/>					
S	1	U	OIO	9	

Figure 14

and simplified editing of additional visual aids, illustrating the particular fingers as applied to the various parts of the total classification formula, soon has the whole class working up synthetic classification formulas, prior to the time they are qualifying and classifying actual fingerprint patterns.

This is an abstract approach to classification. The trial and error method of teaching fingerprint classification over a period of years has finally led the writer to this technique. The class as a whole works these classification problems prior to using the visual aid (figure 11). A new classification problem is effected by merely turning over (and presenting the hidden fingerprint pattern on the back side) any one or several of the ten photographs hanging on the bulletin board in front of the class.

F. B. I. publications. Two formal publications are used to supplement and provide additional visual illustrations for the course in classification. The Federal Bureau of Investigation can supply these two excellently written publications. The first one mentioned is the pamphlet *Questionable and Interesting Fingerprint Patterns* published in 1951. In it are forty-three questionable and/or interesting patterns, each one with a summary qualification statement beneath it. With one or two exceptions, each enlarged fingerprint pattern is edited and simplified by properly placed lines indicating the core, or delta, or other significant detail.

The second publication is *The Science of Fingerprints*, U. S. Government Printing Office, 1957, 0-393678. This is the latest FBI book on the subject of fingerprints (classification and uses). In general, it is an excellent text for an instructor to use.

Chalk talks on the blackboard. The blackboard, of course, is the main visual aid as far as this course is concerned. In the 20 classroom hours spent on Classification and the 8 classroom hours spent on Latent Prints, daily use of the blackboard and chalk (to further illustrate slides projected on the blackboard, or to draw new original chalk work

for the specific discussion that is at hand) is pursued.

Over 350 different projections, most of them hand drawn, are used in the presentation of the course. These prepared slides save considerable time. Each is the basis for further chalk talks and illustrations, depending upon the level of the class and in the specific question at hand at the moment.

A tachistoscope with 3 1/4" x 4" lantern slides of fingerprint patterns. The flash recognition technique is used in the 4th stage of the training course. Figure 1 illustrates the five steps that are pursued during the course of training. As you will note, pattern definition and qualification were studied in the third phase. The fourth phase is controlled practice classification. It is at this time that the flash recognition technique is brought into play.

In using flash recognition for perceptual training, it is important to observe carefully the following steps in the exercise: (1) Expose the slides long enough for the student to secure accurate recognition; (2) repeat them as often as necessary, but gradually shorten the exposure time until the students can perceive the simpler slides at 1/100th second; (3) then continue with the slides that are of a compound or detailed nature in the same way as recommended in #2 above. (4) Do not lose sight of the fact that the initial, primary purpose of this type of flash recognition training is to improve perception and not to teach immediate analysis. It is very important that the instructor keep these four steps separate from each other. The results will prove the wisdom of having done so. Start off with the slow flashes (1/25th) which is necessary at the start and gradually build up to a flash of 1/100th of a second.

Students through proper tachistoscopic training¹ develop total concept of form. They are amazed

¹ For further and detailed explanation of the function and use of tachistoscopic training see: (a) DR. SAMUEL RENSHAW, "The Visual Perception and Reproduction of Forms by Tachistoscopic Methods," JOURNAL OF PSYCHOLOGY, Vol. 20, pp. 217-232, 1945, (b) ROLLAND L. SOULE, "Flash Recognition Training in Law Enforcement Work," JOURNAL OF CRIMINAL LAW, CRIMINOLOGY, AND POLICE SCIENCE, Vol. 49, pp. 590-600, 1959.

at how soon they can correctly identify a fingerprint pattern flashed at $\frac{1}{100}$ th of a second.

CONCLUSION

The instructor must keep in mind that teaching aids include all illustrative materials and devices that can be practicably used to enhance student understanding. By editing and simplifying a specific subject area, the instructor develops for the student a better sense perception of the subject area, and therefore the residual deposit of information left with the student is much better in scope and concept. In this manner (by using proper and accurate training aids) the instructor develops rapport with the individual student and the class as a whole, so that the students are at a peak of attention and interest most of the time. The instructor's forcefulness and enthusiasm that are developed by his presentation techniques (oration,

verbalization, gestures, training aids selection, mannerisms while teaching, eye contact with the class, repetition of a specific item at strategic times, etc.,) are the significant factors every instructor must develop.

If the student is in doubt about the instructor's (1) sincerity, (2) deep knowledge of the subject being taught, (3) belief in the importance of the particular lesson being presented, or (4) inference that the student will be able to master the subject, the instructor has already lost his place at the lecture stand. Inattention, indifference and apathy will to some extent prevail in one or more students. If this is allowed to infiltrate to other students, much damage has and will be done that will be extremely hard to overcome. Therefore, to develop student-instructor empathy (through the proper use of accurately timed and tested instructional aids and techniques) is the tactical problem that confronts every professional instructor.