# POROSCOPY AND EDGEOSCOPY

BY
**Elizabeth Oliver CLPE**

In 1973 the identification community in North America embraced a new standard for friction ridge identification. The static threshold identification ideology, where a set number of points were counted, was rejected. It was replaced with a floating threshold philosophy where an expert using three levels of detail evaluates the worth of the friction ridge formations. The first level of detail is ridge flow, which includes pattern type, ridge count and focal areas such as core, delta and orientation. Individualizations, or matching the print, cannot occur at this level. Level two is ridge path also known as Galton details, the commonly known "points". These include ridge endings, bifurcation's, dots, combinations of above and their relationship to one another. Individualization can occur at this level. Poroscopy and edgeoscopy both involve third level detail and are used by latent examiners on a regular basis, even without their conscious knowledge.

In fingerprint work Poroscopy is the term applied to a specialized study of pore structure found on the papillary ridges of the skin as a means of identification. Papillary skin contains an average of 2,700 sweat glands per square inch, and each gland opens through a duct onto the ridge surface. An opening at the ridge surface, called a pore, continuously excretes sweat. The skin on the palmer surfaces of the hands and the plantar surfaces of the feet are covered with ridges. These friction ridges begin to form on the human fetus during the third and fourth months of fetal life. The ridges begin as raised apertures around the pores and then join together into rows, forming the ridges. The pores may open anywhere across the ridge surface, but they are most often found near the midline. A pore near the edge is the exception. Pores may also open on the skin surface apart from the ridges, with only a single raised aperture. A single pore appears as a dot in a fingerprint. In some instances, only two or three pore apertures may fuse together, forming a short ridge.

Poroscopy is a refinement of the science of identification by ridge characteristics. Pore structure of papillary skin is as uniquely characteristic of the skin as ridges, but due to the microscopic nature of the pores and the fact that they are not commonly reproduced by ordinary physical methods of development, their presence in an impression cannot be depended upon. They are seen in powdered images occasionally, but they are revealed in chemically developed images more often. Pore structure is most often seen in latent fingerprints developed using several chemically processes, two of which are ninhydrin and silver nitrate latent fingerprint techniques.

The science of poroscopy was established by Dr. Edmond Locard of Lyons, France in 1912. He began to study poroscopy as the result of a break-in and theft. A rosewood jewelry box, which had held the stolen jewelry, was found to be covered with fingerprints. Several latent prints were develop with carbonate of lead and photographed.

In the year 1912 friction ridge identification was in its infancy and still somewhat novel. The prints clearly illustrated relative pore location, Locard decided to compare them. After the pore locations were compared, one print was found to have 901 pores in the correct relative position when compared to the suspect. Another suspect's palm print had 2000 pores in agreement. This amount of third level detail had an enormous value toward individualization. Both men were convicted.

The lack of interest in poroscopy has been blamed on its so-called shortcomings such as the low percentage of fingerprints displaying pore structure in the latent or inked forms, inadequate visual aids to examine pore structure, difficulty locating the pores to be compared, the degree of study required to gain expertise in poroscopy, and the time required to make the comparison. More likely the lack of interest was the level of understanding the experts of the day had concerning the identification process rather than any of poroscopy's shortcomings. In the last 20 years, crime scene processing techniques and fingerprint development advancements have made the study of third level detail mainstream among latent print examiners. To use poroscopy effectively it must be incorporated into an evaluative identification process. Poroscopy became one more link in the chain of available ridge formations if clarity permits. Edgeoscopy is a term applied to the study of the characteristics formed by the sides or edges of papillary ridges as a means of identification. Like poroscopy, edgeoscopy is an extension of identification by ridge characteristics, and these characteristics are generally, but not always, microscopic in nature. Papillary ridges are formed during fetal lift. They begin as apertures around the pores and then join together into rows, forming ridges. These ridges have irregular edges and are as individualistic and unique as pore and ridge characteristics.

The term "edgeoscopy" was originally coined by Salil K. Chatterjee in a paper published in the *Fingerprint and Identification,* September 1962 issue, and republished in the

*(Continued on page 14)*

*(Continued from page 13)*
second printing of his book, *Finger, Palm and Sole Prints,* in 1967. Chatterjee's original idea was to use ridge edges in concert with other friction ridge formations to establish individualization.

Chatterjee encountered some shapes on the friction ridge edges that tended to reappear frequently, so he gave them specific names. He used the following terms to describe the various characteristics encountered: 1. Straight edge: 2. Convex edge: 3. Peak-the edge protrudes and the protrusion has a broad base and pointed top: 4. Table-the edge has a protrusion with a narrow base and a broad flat top: 5. Pocket-the edge looks like a pocket with a narrow opening. This characteristic is formed by a single pore with one side not completely enclosed by the ridge: 6. Concave edge; 7. Angle; and 8. Infinite-any-other characteristics other than those mentioned about. Subsequent research into edgeoscopy has found that all characteristics encountered along the friction ridges can be placed into one of these catagories.

Edgeoscopy is similar to poroscopy in that it may rarely be used as a basis for identification without being considered as an adjunct to ridge formations. The problem of having inked impressions of adequate quality for comparison and the difficult task of comparing so many possible characteristics make edgeoscopy impractical as the sole means of identification. Considering the difficulties that may be expected in development techniques and pressure distortion, the possible applications of edgeoscopy are extremely limited. There is no publicized case of an actual identification based on edgeoscopy alone. However, as previously stated, any characteristic which appears in more than one print made by the same finger may be used to establish identification.

People all over the world mentally carry out the identification process in exactly the same way. The ability to identify patterns and shapes as a natural process instinctive to the human brain, like when you scan a crowd to see if you know anyone. This process corresponds to the way in which we see and identify objects every day of our lives. Any identification process must mimic as closely as possible the brain's natural approach to this task. Most any examiner will tell you that when comparing prints they often just "see" an area and they know they have a match, or at least a starting point. Often they are seeing not only points, but also edges and pores that attract their attention. I have spoken with examiners who used level three detail unconsciously before they even knew what it was. Once it was explained t them they realized they had been looking for it all along, they just didn't know what to call it. The three levels of detail use all of the available information contained within a fingerprint to make comparison and identifications.
References:

Ashbaugh, D.R. Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advance Ridgeology.

Cowger, J. Friction Ridge Skin Comparison and Identification of Fingerprints.

Lee, H. Advances in Fingerprint Technology.

Olsen, R. Scott's Fingerprint Mechanics.

**Elizabeth Oliver is a retired Senior Criminal Identification Specialist from that Charleston, SC Police Department. She is currently serving a UN mission in Kosovo in the field of Forensics.**

**Reprinted from The Prairie Whorlwind, June, 2002-Kansas Division of the IAI**

**THE MEMBERS OF THE GEORGIA DIVISION OF THE INTERNATIONAL ASSOCAITION FOR IDENTIFICATION WOULD LIKE TO EXPRESS OUR APPRECIATION TO MAYOR MARY LEE AND HER DEDICATED STAFF OF THE CITY OF RIVERDALE, FOR THEIR HOSPITALITY IN HOSTING OUR SPRING MEETING.**