

SPECIAL COMMUNICATION

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Dr. McCrone's Teaching Methods in Forensic Microscopy, Their Nature, History, and Durability

ABSTRACT: The microscopy teaching activities of Walter C. McCrone started long before the McCrone Research Institute (McRI) was incorporated as a not-for-profit research institute in Chicago. McCrone obtained his first microscopy training at Cornell University, with Émile Monnin Chamot, and was shortly thereafter appointed a full instructor in chemical microscopy before obtaining his Ph.D. (in 1941). After leaving Cornell, he had classes at the Armour Research Foundation (now Illinois Institute of Technology Research Institute- IITRI) from 1942–1956 and founded McRI in 1960. The course and student totals from McCrone's educational activities are impressive. As of January, 1, 2002, the cumulative for McRI (1942–2002) is 2,130 courses for 22,557 students. There has been an average of 600 students in an average of 60 classes for the last several years. Nearly all of the courses contain one week of intensive hands-on microscopy training with usually only one instructor for the entire duration of the class, making it a unique teaching experience for both student and Instructor. Thousands of students have successfully completed at least one of McCrone's specialized forensic microscopy (trace evidence) courses and the number will steadily increase as a result of McRI's continued efforts to interest forensic investigators in microscopy.

KEYWORDS: forensic science, Walter C. McCrone, teaching, forensic microscopy

Education

There is nothing about the teaching methods used by Dr. McCrone, in any of the microscopy courses that he taught and developed, that by today's standards would be considered ordinary. This undoubtedly stems from his introduction to microscopy as a graduate student in the Department of Chemistry at Cornell. The then twenty-year-old McCrone took his first polarized light microscopy course in 1936. The course was taught by Professor Émile M. Chamot (Fig. 1) in what would be one of the last courses that Chamot would directly teach before leaving the institutional world. Chamot's teaching assistant was Clyde W. Mason. Evidently, Mason, who corrected the student's laboratory notebooks, regularly folded up pages he wanted more work done on or corrections made. The students made changes and returned the notebooks to Mason who folded it back down if he was satisfied or left it up if he wasn't. Mason was also liberal with the red pen and would use this mercilessly throughout the notebooks to ask questions or mark his disapproval. The tradition carried on for all who had the pleasure of working or studying under McCrone's supervision; never would he be seen without a red (or green) pen, a permanent marker for labeling everything and the traditional half-sized notebooks that are still used in microscopy classrooms and laboratories today (Fig. 2).

Dr. McCrone's life interest was probably most influenced by Chamot who was the developer, if not the father and biggest proponent, of chemical microscopy. By the time McCrone reached

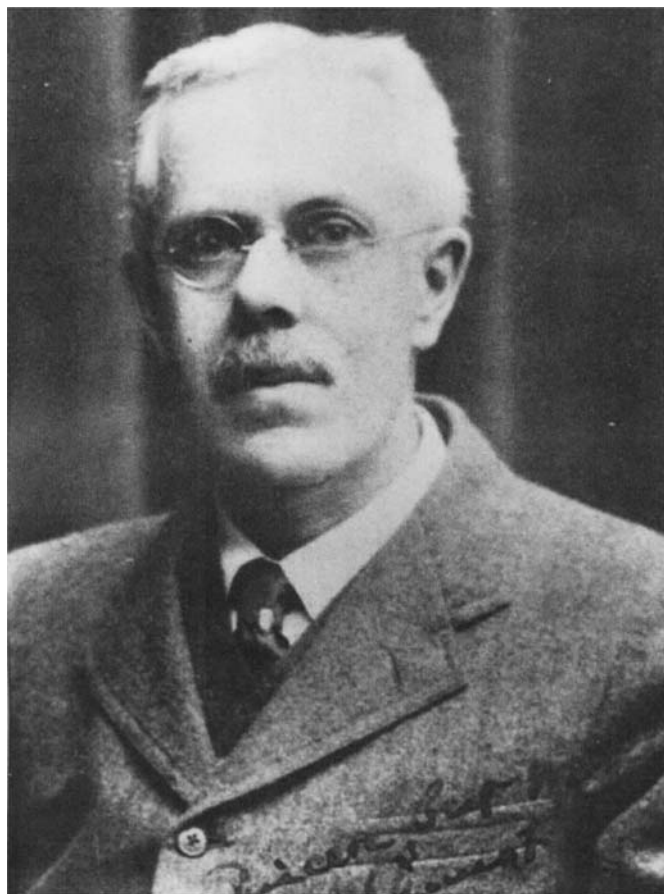


FIG. 1—Portrait of Émile M. Chamot (1868–1950), Cornell University.

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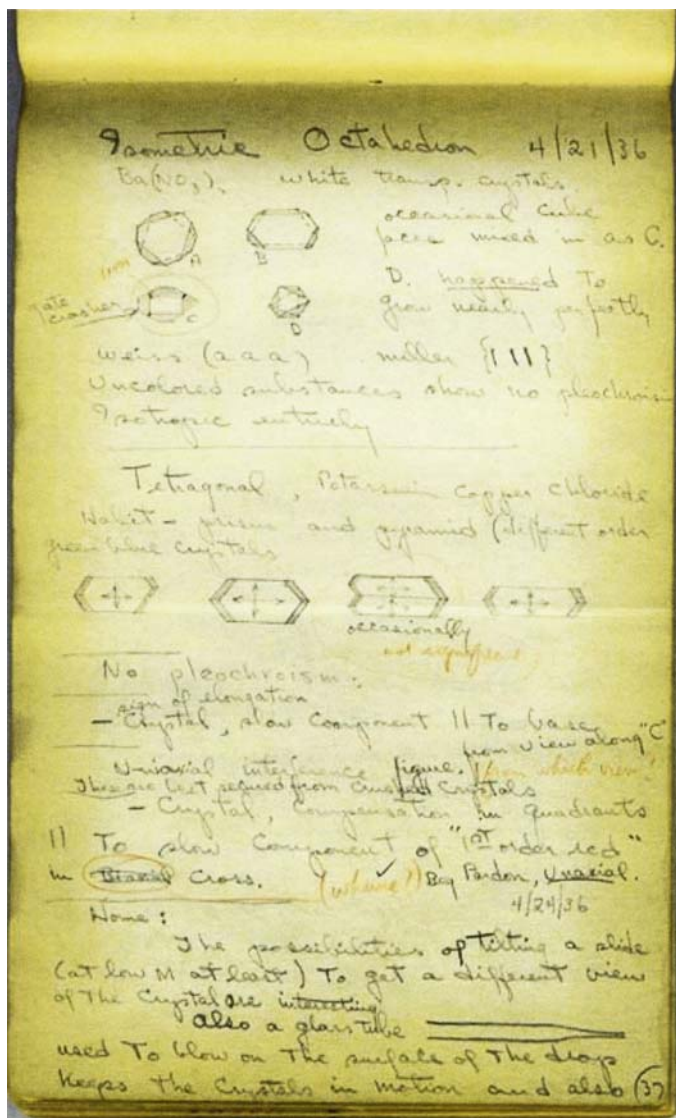


FIG. 2—A page from McCrone's beginning microscopy lab notebook. Notice the corrections and crease in the middle of page, Cornell University, 1936.

the campus in Ithaca, Chamot had already developed and extended microscopical methods into the academic, technical, and forensic subdivisions of chemistry. The Department of Chemistry at Cornell had been offering courses in organic and inorganic microchemical analysis since about 1900. And by 1915, Chamot's "Elementary Chemical Microscopy" and soon after the "Handbook of Chemical Microscopy" were available to chemists, forensic scientists, and industrial workers. Soon thereafter, courses at other universities were offered and patterned after those at Cornell. Chamot's classes and these two books were instrumental for the instruction in chemical microscopy at Cornell and deeply influenced the microscopy training of McCrone.

McCrone, no doubt, worked very hard but thoroughly enjoyed his time at Cornell. In his lab notebook dated February 17, 1937, his entry begins: "Boy, it's a beautiful day, sunny and the visibility is limited only by resolving power. Cornell's micro lab is the most advantageously placed lab in the world. I can see 30 miles up the lake today but . . . back to the chloroplatinates." (Fig. 3)

He was appointed full instructor in chemical microscopy prior to obtaining his Ph.D. in 1941 (Fig. 4). After leaving Cornell for

Chicago, he taught classes at the Armour Research Foundation (now the Illinois Institute of Technology Research Institute) from 1942–1956 (the year McCrone Associates was founded) with the most intensive courses first taught by him in 1952. He founded the McCrone Research Institute, located on Chicago's south side, in 1960.

McCrone repeatedly acknowledged his indebtedness to Cornell and Chamot and in 1987, as a tribute, he dedicated the building and classroom facilities of the McCrone Research Institute, 2820 S. Michigan Avenue, Chicago, as "The Émile M. Chamot Laboratory" (Fig. 5). Furthermore, in the 1990's he made possible the full endowment of the Chamot Professorship at Cornell University where McCrone Research Institute faculty currently oversee and teach at the "Chamot Microscopy Facility" in Baker lab. The Department of Chemistry and Chemical Biology recognized him as the Émile Chamot Adjunct Professor of Chemical Microscopy (1984–2002) for both reestablishing the Cornell Laboratory of Chemical Microscopy, created by Émile M. Chamot, and developing the course in Chemical Microscopy, which he taught from 1984–2000 (Fig. 6).

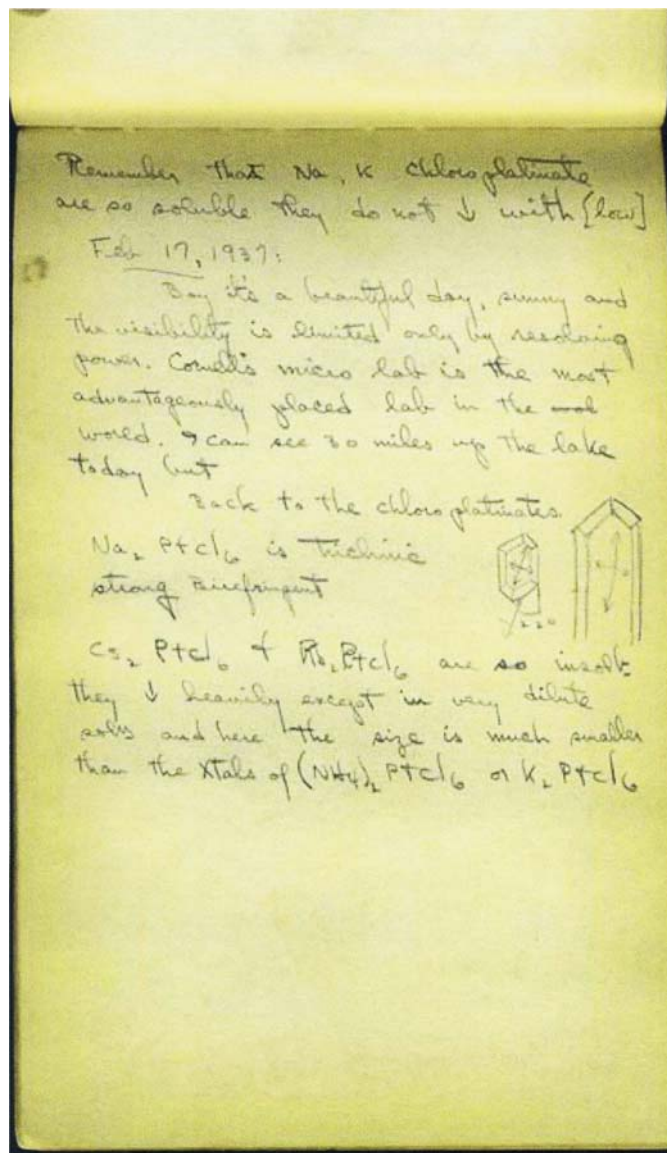


FIG. 3—McCrone's microscopy lab notebook and "visibility" passage, Cornell, Feb. 17, 1937.



FIG. 4—Walter C. McCrone (center) with classmates while attending Cornell University in 1939.

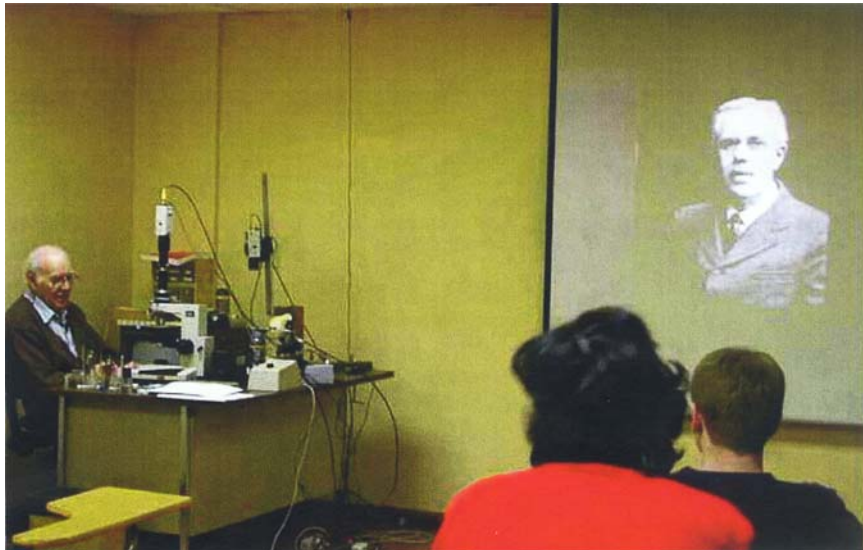


FIG. 5—Walter C. McCrone teaching at the McCrone Research Institute with Chamot's portrait on screen, 2000.



FIG. 6—Chamot Microscopy Facility, Baker Lab, Cornell University, 2000.

Forensic Microscopy

McCrone's introduction to the forensic applications of light microscopy probably occurred during the first days of his class with Chamot and Mason. The laboratory experiments at Cornell emphasized small-scale techniques coupled with practical, technical applications. On page 1 of his lab notebook, 1936, among the first exercises he completed, was an exercise that required him to determine the thickness, color, and number of paint coats on a wooden surface. Then he was asked to determine the spreading power and calculate the area, in square inches, that the paint would cover. McCrone calculated correctly but Mason turned up the page and wrote in red ink "How many readings?" McCrone returned the notebook with the one word response: "Innumerable." Mason folded the page back down and returned the notebook to McCrone.

McCrone acknowledged the setback that forensic microscopy experienced in the last half of the 20th century and was prepared to do something about it. He attributed the potential demise of light microscopy to a succession of newly emerging chemical/analytical instruments together with the decline of microscopy courses being taught by universities. It seemed that the light microscope was no competition for mass and infrared spectrometers, electron and X-ray diffractometers and electron optical microscopes. He also learned that few professors were familiar with the proper use and practical applications of the light microscope. He disproved the prediction that light microscopy would die and attributed the hard work and example of numerous light microscopists for holding on during the assault.

McCrone also credited the efforts of many of the professional light-microscopists during the late 1970's, and criminalists at the Law Enforcement Assistance Administration (LEAA), for strongly supporting the resurgence of polarized light microscopy. It was a direct result of the LEAA sponsorship of McCrone Research Institute's intensive courses in forensic microscopy and the dedication of McCrone and other renowned microscopists and criminalists, that microscopy began its resurgence as an essential tool for the characterization, identification, and comparison of trace evidence.

He cautioned that microscopy could meet its demise again and recommended (of all things) that trained forensic microscopists should not be promoted! What he meant, of course, was that the most important accessory to the microscope was the eye and it's associated brain, and many laboratories were quite literally "losing their minds" by promoting their microscopists from trace evidence areas to fingerprints, serology, DNA, or, worse yet, laboratory directory. He cautioned against this unless, of course, the microscopist wished to change disciplines.

Teaching

After 1960, teaching of microscopy was entirely handled, as it is today, by the McCrone Research Institute. Courses were taught in rented spaces, usually hotels, with borrowed equipment and 2-3 students per microscope. Some classes were held at the old Del Prado Hotel on 53rd Street in Chicago. The courses (Chemical Microscopy, Crystallography, Fusion Methods and later Photomicrography) were two weeks in length and cost \$250.

Starting in about 1970, several changes in course structure were made that continue through today. The class would now be one week in length, use one manufacturer and design microscope per classroom, and there would be one student per microscope setup, each student working independently. Most of the classes have only one instructor, the class size is restricted to 18 students, there are no

teaching assistants used in the courses, and each student receives individual, personalized, hands-on instruction.

On site

In addition to regular classes, on-site courses were developed wherein McCrone Research Institute brings all of the microscopes, accessories, reagents, reading materials and instructor to any classroom or laboratory, anywhere in the world. These continue today and seem to be growing increasingly more popular.

Currents Trends

In a continuing effort to increase the use of polarized light microscopy and the number of trained polarized light microscopists in the forensic and scientific labs of the world, McCRI continues to teach. Most of the teaching in the USA is done by one of five full-time research professors, supplemented as necessary by the research staff of McCrone Associates, Inc., and other outside instructors.

The course and student totals from McCrone's educational activities must be a world record. Cumulative totals for McCrone Research Institute from 1960–2003 are 2,194 courses and over 23,000 students. Chamot, with between two and three thousand students himself, would be duly impressed at these staggering totals. There are expected to be more than 50 courses and 500 students this year (2003) alone. And like Chamot before him, Dr. McCrone derived far greater satisfaction from the contributions his students have made than the recognition he received in his lifetime (Fig. 7).

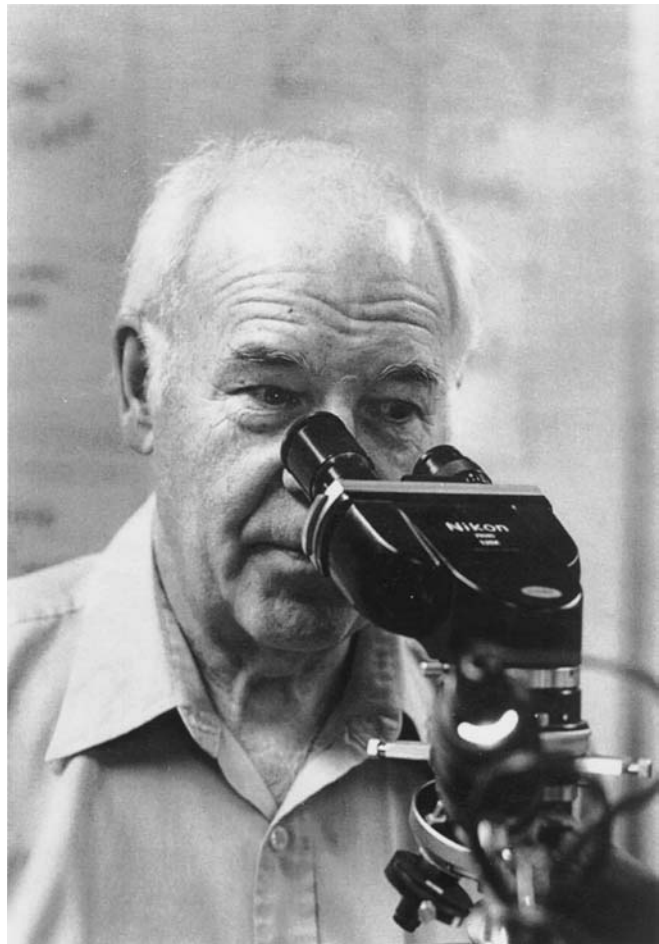


FIG. 7—Walter C. McCrone (1916–2002), McCrone Research Institute.

Conclusion

McCrone has had a rich history and the future continues to look bright, but it wasn't without hard work and perseverance. In a personal correspondence between McCrone and his McRI staff in 1999, he wrote: "I read now often that I am "the world's best and most respected forensic microscopist." This proves you can fool a lot of people and maybe also that there aren't many very good forensic

microscopists in the world, but no one would say such things if I hadn't worked hard all my life to fool them."

References

1. www.mcri.org
2. www.mccrone.com