

GOTA DE ACEITE: NOMENCLATURE FOR THE FINEST COLOMBIAN EMERALDS

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The finest and rarest emeralds are sometimes said to have an optical effect called *gota de aceite*. This term describes an aspect of emerald clarity that is associated with Colombian emeralds. Yet overuse has separated the term from its actual meaning. This article reports on the gemological causes of the *gota de aceite* optical effect and defines the phenomenon.

Made famous by Spanish *conquistadores* nearly five centuries ago, the Colombian emerald mines still produce stones of superb quality and fineness today. Most notable are emeralds from the Muzo region, which encompasses not only the Muzo mine but also the La Pita,

Figure 1. In the six upper facets of this 9.20 ct heart-shaped Colombian emerald, a roiled, softening effect lends texture to the stone. This effect, called gota de aceite, is a result of transparent growth structures within the emerald. Photomicrograph by R. Ringsrud.

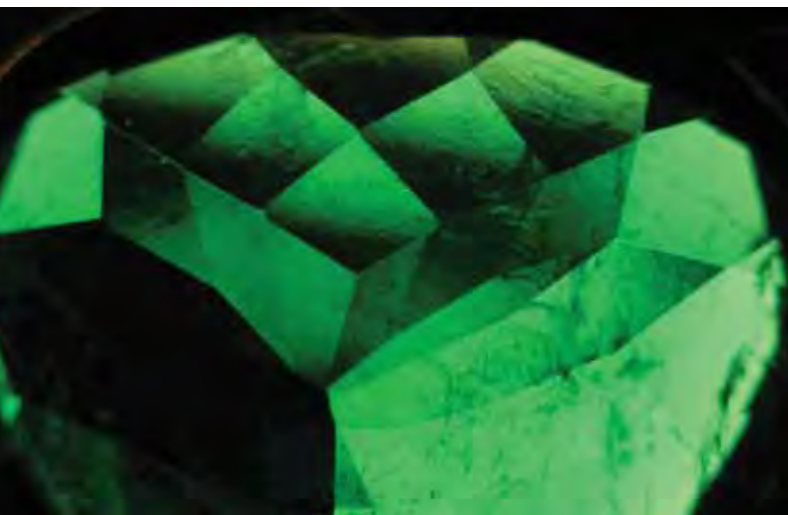


Figure 2. The approximately 2.15 ct emerald in this ring provides an exceptional example of the gota de aceite effect. Photo by Thomas Hainschwang.

Coscuez, and Peñas Blancas mines. The nomenclature that applies to certain Colombian emeralds has specific and useful meaning, but many terms have lost precision over time.

Gota de aceite (Spanish for “drop of oil,” pronounced “go-tuh day ah-say-tay”) describes a remarkable phenomenon that occurs very rarely and typically only in the finest emeralds (figure 1; see also Hainschwang, 2008). Emeralds with this effect display a roiled appearance (see figures 2 and 3) that is reminiscent of honey or oil—hence the name. The phenomenon has also been called the “butterfly

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GEMS & GEMOLOGY, Vol. 44, No. 3, pp. 242–245.
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Figure 3. In this 2.77 ct emerald, the zones of internal reflection have soft edges that reveal the presence of gotha de aceite. The phenomenon is best appreciated by rocking the emerald back and forth, as shown in these two views. Photomicrographs by R. Ringsrud.

wing effect" (*efecto aleta de mariposa*). In fact, the term *gota de aceite* has largely fallen from favor in Colombia, perhaps because of the negative connotations associated with the word *oil* in recent decades (due to its use in filling emerald fissures). Yet the expression has been used by at least three generations of Colombian emerald dealers, and the optical effect may increase the value of a stone significantly.

In six years of studying this phenomenon, the author has detected it in only one out of every 1,000 or so fine emeralds, personally viewing about 18 unmistakable examples and 50 muted ones. The contribution of *gota de aceite* to the desirability of such stones is similar to that of the velvety effect in Kashmir sapphires. In both cases, the diffusion of light spreads the area of color, thus reducing extinction (figure 4).

What Is *Gota de Aceite*? The *gota de aceite* effect was first mentioned in an article by E. J. Gübelin in the Winter 1944–45 issue of *Gems & Gemology* (figure 5). At the time, this phenomenon was thought to be a result of calcite grains microscopically "dusting" the interior of the emerald, disrupting the growth structures. Dr. Gübelin described an emerald "exhibiting a great mass of calcite inclusions (presumably precipitation during growth of the host mineral) which is responsible for the slightly oily appearance of some of the most beautiful and highly priced Colombian emeralds" (p. 179). Since then, the term *calcite precipitation* has also been used occasionally to describe this phenomenon (Gübelin and Koivula, 1986).

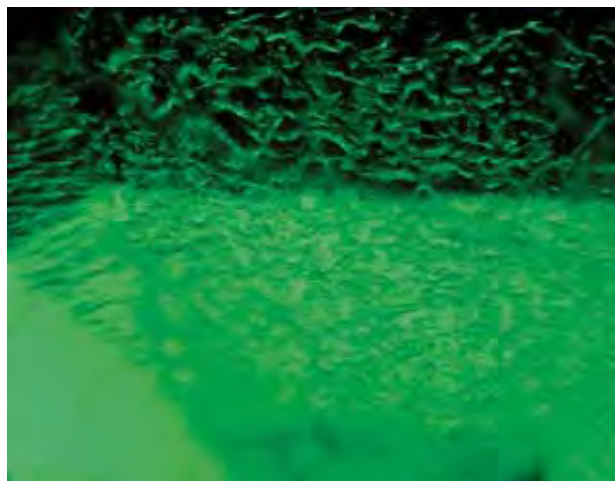
However, recent microscopic and microprobe studies by John I. Koivula have demonstrated that calcite inclusions are probably not involved with creating the *gota de aceite* effect (pers. comm., 2008). Instead, unusual irregularities in the internal crystal structure are responsible for the roiled dispersion of light. These microscopic features are apparently the result of irregularities in growth conditions during emerald crystallization that gave rise to both raised hexagonal terminations and geometric depressions. After their formation, these growth structures were further

overgrown with emerald. When the columnar structure is viewed parallel to the c-axis, the roughly hexagonal forms are visible (figures 6 and 7, left). However, when the emerald is turned 90° and viewed perpendicular to the c-axis (i.e., perpendicular to the table of the faceted emerald), the narrow cross-section of the columnar structure is revealed (figure 7, right). Mr. Koivula also reported that, using Raman spectroscopy, he did not identify any calcite inclusions in two emeralds with *gota de aceite*.

Although this author could find no reference to emeralds with this effect from sources other than Colombia, there is no apparent reason why these growth structures could not occur in emeralds from other localities.

Similar Optical Effects. Some emeralds have an attractive soft appearance that is not caused by true *gota de*

Figure 4. This image dramatically reveals how extinction in an emerald (the dark area at the top of this 3.60 ct stone) can achieve color through the soft diffusion of light caused by the gotha de aceite effect. Photomicrograph by R. Ringsrud; magnified 20x.



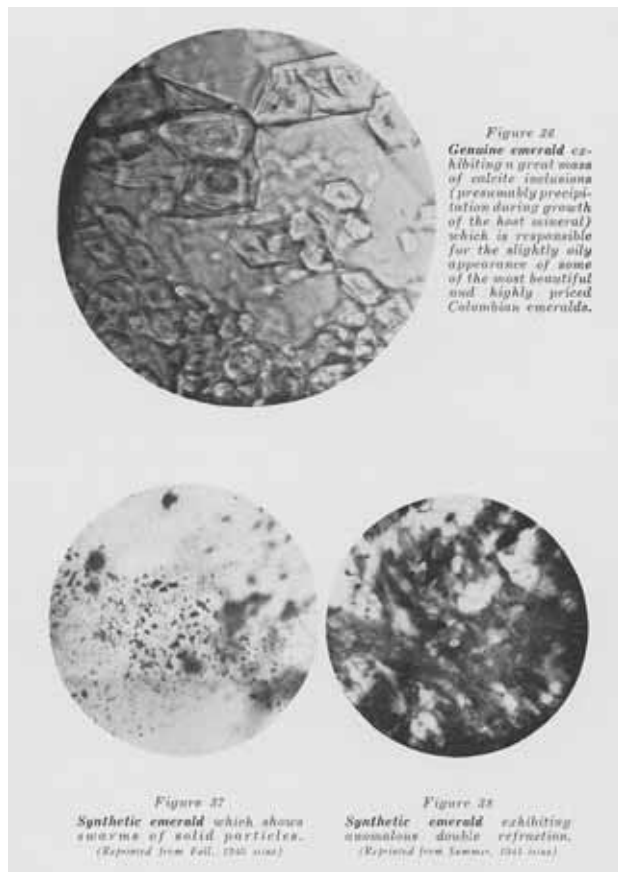


Figure 5. Although Dr. E. J. Gübelin did not specifically use the expression *gota de aceite*, his figure 36 caption refers to the “oily appearance” of an emerald he documented in the 1940s (Gübelin, 1944–1945). This is comparable to the roiled appearance (like water in cognac) of a hessonite. Dr. Gübelin recognized that this effect occurs in some of the finest emeralds.

Figure 7. The growth structures that cause *gota de aceite* can be difficult to see or capture on film. In the photo on the left, the shadowing technique was used to reveal the geometric (but not necessarily hexagonal) growth features seen when looking down the *c*-axis. On the right, the same emerald is shown in a view perpendicular to the *c*-axis, which reveals the typically narrow band of columnar structures associated with this phenomenon. Photomicrographs by John I. Koivula; fields of view 2.1 mm.

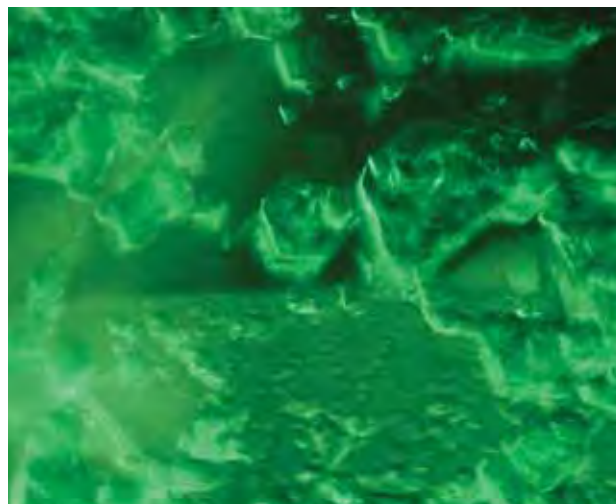
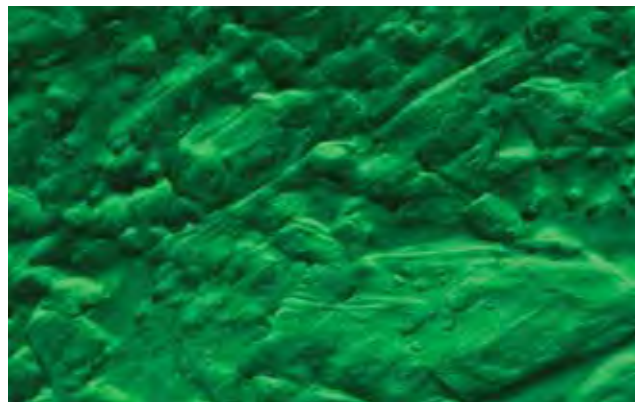


Figure 6. This image shows the geometric growth structures within a *gota de aceite* emerald. Note the similarity to the Gübelin image (figure 5, top). Photomicrograph by R. Ringsrud; magnified 30 \times .

aceite growth structures. For example, the author saw a 3.07 ct emerald that was initially thought to show *gota de aceite*, but microscopic examination revealed the presence of a large field of two- and three-phase inclusions (figure 8). Because these inclusions were semitransparent, they effectively mimicked *gota de aceite*. Such a phenomenon could be called a pseudo-*gota de aceite* effect.

It should also be noted that the *gota de aceite* effect in fine Colombian emeralds may appear somewhat similar to the roiled growth zoning observed in many hydrothermally grown synthetic emeralds, particularly those from Russia. Therefore, careful examination is important to avoid a potential misidentification.





Figure 8. Although this 3.07 ct emerald (left) was initially thought to show *gota de aceite*, subsequent microscopic examination revealed that its soft appearance was caused by a field of minute fluid inclusions (right; magnified 22×). Photos by R. Ringsrud.

Gota de Aceite: Use and Misuse of the Term.

Confusion of nomenclature with regard to *gota de aceite* has taken two forms. Because the phrase is typically used only with respect to very fine emeralds, some exceptional stones are labeled with this term even though they do not actually have the effect. The mere fact that the emerald is very fine often inspires the owner or seller of the stone to use *gota de aceite* as a superlative.

There is also confusion relating to “old mine” emeralds. *Old mine* is another term applied to rare and fine emeralds, but it refers to the provenance and age of the emerald. Specifically, it refers to emeralds sent by the Spanish colonies in the New World to Europe and Asia in the 16th, 17th, and 18th centuries, as well as Swat Valley and Habachtal emeralds of the same era (Schwarz and Giuliani, 2002). However, the presence of *gota de aceite* may wrongly inspire the owner or seller to call the stone “old mine.”

Conversations with Colombian emerald dealers and connoisseurs reveal common agreement that the traditional definition of *gota de aceite* requires the presence of growth structures, either angular or hexagonal, as seen in figures 6 and 7 (Oscar Baquero, Ray Zajicek, Jimmy Rotlewicz, Roland Schluessel, and Pierre Vuillet, pers. comms., 2007). By definition, the structures causing the effect must be transparent. Because of variations in the size of the hexagonal structures and in the thickness of the zone containing them, the strength of the effect is also quite variable. This author recommends that gemologists classify *gota de aceite* as either “muted,” “moderate,” or “distinct.” To be considered “distinct,” the effect should be clearly visible to the naked eye as the stone is rocked back and forth. It is important to move the stone to reveal the liquid-like softening of the texture that is the hallmark of *gota de aceite*.

Conclusion. The term *gota de aceite* refers to a specific optical effect that is seen rarely in Colombian emeralds; it is not meant to be a marketing superlative. It is hoped that

this article will call attention to some inconsistencies of nomenclature in a trade full of arcane terms and meanings. Only with careful examination and an understanding of the growth structures that cause the effect can it be determined that an emerald merits the descriptor *gota de aceite*.

ABOUT THE AUTHOR

Mr. Ringsrud owns Ronald Ringsrud Co. in Saratoga, California, and has been importing Colombian emeralds into the United States for 25 years.

ACKNOWLEDGMENTS

The author thanks John I. Koivula (GIA Laboratory, Carlsbad) for sharing his knowledge and experience and for supplying photomicrographs. Ray Zajicek (Equatorial Imports Inc., Dallas, Texas) is thanked for providing emerald samples as well as information. German Sanchez (Universal Emeralds Ltda., Bogotá) and Gabriel Acuña (Esmeralda Gems, Los Angeles) provided emeralds and discussion. For additional insights, the author thanks Roland Schluessel (Pillar & Stone International Inc., Tiburon, California), Pierre Vuillet (Institut de Recherche pour le Développement, Paris), Guillermo Angarita (The Best Emeralds Ltda., Bogotá), and Jimmy Rotlewicz (Gemtec, Bogotá). Oscar Baquero (GemsMetal S.A., Bogotá) is also thanked for introducing the author to *gota de aceite* emeralds 12 years ago.

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