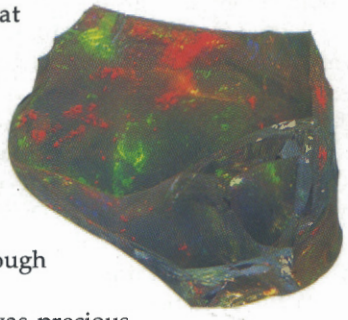
African Opal Unearthed

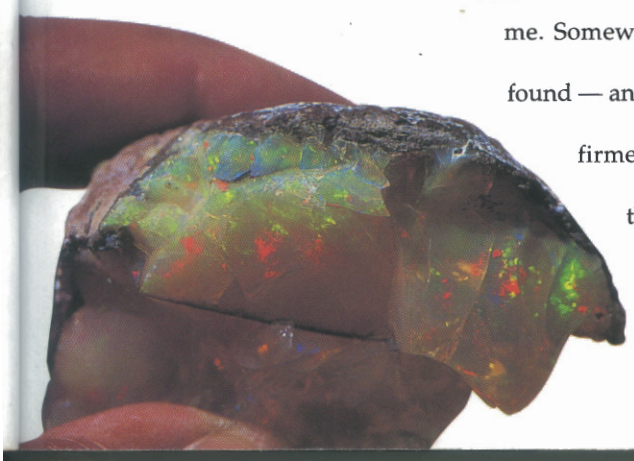
BY PAUL B. DOWNING, Ph.D.

After decades of rumors, a recent find may make Ethiopia an important source of opal.

TOP, RIGHT, AND BELOW: The percentage of precious opal in the Ethiopian locations is quite high. The material is similar to Mexican opal, transparent with red and green fire. Once only a tantalizing rumor, Ethiopian opal is now known to be abundant — and, most importantly, facetable.

In 1939, famed anthropologist Dr. L.S.B. Leakey reported that early man used opal to fashion tools, based on the discovery of artifacts in a cave near Nakuru, Kenya, that were dated from around 4,000 B.C. From the evidence, Leakey extrapolated that there were important opal mines in the vicinity (*Minerals Yearbook*, 1939, p.10). Although there was no mention of whether the opal was precious (with a play-of-color, or fire), that report has always intrigued me. Somewhere in Africa there surely was precious opal to be found — and over the years, rumors (always maddeningly unconfirmed) have continued to circulate. One person claimed that an Australian friend knew where it was, but that the Australian had died before revealing his secret. That, of course, only served to pique my interest.





Then, in February 1994, the rumors were confirmed. At the end of one of my talks in Tucson, a gentleman named Dr. N. R. Barot from Nairobi approached me with samples of material from Ethiopia. There before me was opal from Africa — and some of it was precious. The best examples were nodules of dark brown rhyolite with opal centers just like Oregon thunder eggs in outside appearance. The opal had an orange base color and was transparent. Red and green fire floated through it. It had a look quite similar to Mexican opal and to the few precious opal specimens I have seen from the Pridy Ranch. It was very interesting and potentially cuttable, so I was encouraged.

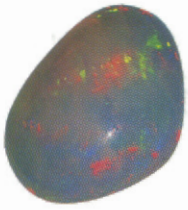
There is the potential that this find will rival those in Mexico and perhaps even Australia in its extent.

The best examples of Ethiopian opal are nodules with opal centers, like Oregon thunder eggs.

Later that year, I was reintroduced to Ethiopian opal. A friend of mine, minerals engineer Telahun (Tel) Yohannes, and his wife Christi showed me large numbers of opal nodules and some cut stones that Yohannes' brother had sent from his native Ethiopia. I saw a wide variety of clear, yellow, orange, and red base colors, many with fire and a few with beautiful fire. Clearly, a lot of this opal would cut good to great precious opal gems, and the material without fire was facetable. I quickly shifted from encouraged to excited.

Yohannes had learned about this opal while on vacation in October of 1993. One day he was in the offices of Mr. Wodaje Abebe of the ARDCO Company in Ethiopia's capital, Addis Ababa, and noticed an unusual rock sitting on a file cabinet. What had caught his eye was a nodule of translucent-based opal full of beautiful fire in all the colors of the rainbow. Mr. Abebe gave Yohannes the rock (which I have subsequently cut into several superior gems), telling him that it had been found northeast of the city. A minerals engineer who had worked in Australia for several years, Yohannes immediately recognized its potential and started investigating its location. With the help of his brother, Kifley-ohannes Zewdie, he acquired the samples I was looking at and an exclusive lease to explore and mine the area.

HISTORY. The exact details of the discovery (or rediscovery) of this opal are sketchy, but the story is familiar. In about 1978 a young farm girl from the small village of Yita Mikael in the Shewa Provence showed a government official some pretty rocks with which she and the other children were playing. The official thought that there might be some potential in the rock and reported it to his superiors.



Experimental cutting has been quite successful, with most cabochons giving the appearance of fire suspended within the stone.

Exactly what happened then is unclear. All we know is that the central DERG (Communist) government took interest in the opal and initiated plans to develop the site. They posted guards to protect the opal, much of which had eroded out of the hill and lay on the surface, and started constructing a road to the area. But before mining could begin, the government was overthrown. All plans were scrapped, and the guards left.

After that, local farmers apparently collected and sold some opal, although it is not clear to whom they sold it. It may be that Dr. Berot's samples came from those farmers, although his report suggests there may be another site elsewhere in Ethiopia. In any case, there was no serious development of the site, and there were no claims or leases in existence before Yohannes and his brother took an interest.

GEOLOGY AND TEST MINING. After investigating the samples and learning about opal mining in Australia and the U.S., Yohannes left to conduct a test-mining operation, intending to develop information on the geology of the opal formation, to assess the extent of the find, and to return samples from underground mining for further study. The test mining took place from December 1994 through February 1995 and, by all accounts, was highly successful.

During the testing, 13 different pits were dug to collect opal. These pits were strung out along a length of approximately 15 kilometers. All pits produced opal.

The opal is found as rhyolite nodules in a welded volcanic ash (tuff) which crops out of the northern face of the Yita ridge. There are at least two opal-bearing tuff bands, each five to 10 feet thick. An area of 15 kilometers by 400 meters (1,480 acres) has been identified as primary opal-producing ground; however, the tuff visible on the hillside extends far beyond the area of the test pits. There is further evidence of precious opal over the top of the ridge, where the tuff is again exposed. Thus, there is the potential that this find will rival those in Mexico and perhaps even Australia in its extent.

The nodules are very numerous, with perhaps as many as 80 per square yard. Not all have gem potential — although the percentage of precious opal is quite high, some have opaque common opal and some are empty. Fortunately, many contain clear opal

with faceting quality, precious cab potential, or both. The difficulty is that all the nodules look the same from the outside. Sorting for quality is impossible until each nodule has been opened.

CHARACTERISTICS & CUTTING. The gem-potential material comes in many base colors: clear, translucent white, lavender, red, orange, yellow, green, and blue. Both transparent (crystal) and translucent (semi-crystal) precious opal have been found. The play-of-color shows in the normal way, or as contra luz — that is, when held against the light. Inclusions of dendritic manganese oxide are occasionally found on natural fracture surfaces and within some opals. Air bubbles are sometimes found as well.

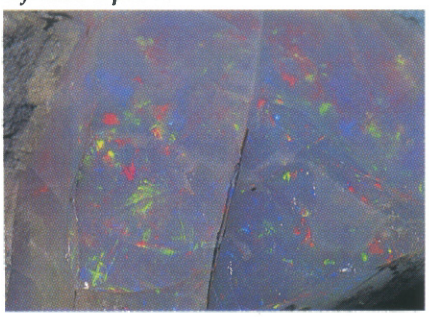
Experimental cutting has been quite successful. To open a nodule with the least amount of damage, I ground around the circumference of the nodule in a band until the opal was exposed. This band always showed one or more natural fracture lines in the opal. I placed a screwdriver on one of these fracture lines and hit it with a hammer, splitting the nodule along the natural fracture lines. The exposed opal always contains numerous natural fractures, the apparent result of the "maturation" of the opal rather than of harsh mining. These pieces can be separated with little damage by a combination of more grinding and separation along the fracture lines with tile nippers. The result of this effort is usually a number of fracture-free pieces ranging in size from less than a gram to (in some cases) over 15 grams. A single nodule can produce various base colors and both precious and non-precious opal. The opening of a nodule is quite exciting, for you are the first to see the beauty that nature has produced.

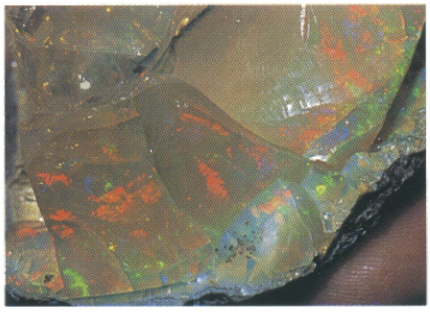
The loosened pieces of opal can be cut like any other opal. A number of transparent precious and common opal pieces have been faceted and compare quite favorably with similar Mexican opal. Faceting contra luz material can produce a particularly attractive gem. This opal appears to be somewhat harder than its Mexican cousin.

Cutting cabs is again like cutting Mexican opal. The best look is generated from a relatively thick, high-domed stone. Be careful to orient the best color to the top of the dome. Fire patterns are usually less well defined than in Australian opal. Most stones give the appearance that the fire is floating as though suspended.

A small portion of the opal is hydrophane — it gains water when soaked and loses it when left to dry in the air. When dry, the opal has a hazy cast to it, and will stick to the tongue and moistened surfaces. Stones cut from hydrophane material have been quite striking and appear to be holding up over time, but are somewhat softer than other opal and may be subject to gradual discoloration as they pick up foreign substances.

STABILITY. Whenever a new precious opal source is found, its stability is subject to question. One of the purposes of the test mining was to determine if material found in place and not subject to centuries of weathering and drying would be stable. Since Ethiopian opal looks quite similar to Mexican opal when cut, it is especially important to establish its stability before it is sold — a significant percentage of Mexican opal develops small interlocking fractures, called "crazing," after it has been cut. The test-mined opals were cut by numerous test cutters, and I am pleased to re-





FAR LEFT: Exposed opal always contains numerous natural fractures, apparently the result of the "maturation" of the opal rather than harsh mining.
LEFT: A single nodule can produce various base colors and both precious and non-precious opal.

port that all the Ethiopian opals cut in 1994 from the surface-collection sample have remained fracture-free. The few pieces that are hydrophane became obvious within a day of opening the nodule.

According to these tests, Ethiopian material appears to be more stable than Mexican opal and may even be as stable as the best Australian material.

FUTURE PLANS. Filled with enthusiasm and buoyed with the success of the test mining, Yohannes is embarking on the second phase of development of this mine. In late August he will return to Ethiopia to conduct a detailed survey to determine the potential reserves of the area. He will also do more exploratory mining to generate a bulk sample of material to work and sell. Nodules will be opened at the site to assess quality before being shipped to the U.S. Yohannes expects that more rough will be available after his return in the late fall and is currently seeking private funding to complete this phase of his program.

Yohannes plans to develop both a mining and a cutting operation at the mine, providing employment for the local people. For now, all mining is done with simple hand tools, although in the future, mining may be conducted with more advanced tools. Also planned for the future is completion of the road, as the site is currently only accessible by mule or on foot.

Simply put, the potential is fantastic. Clearly there is a lot of opal to be found — all indications are that Ethiopia will become an important world source for opal in the near future. The opal is beautiful, and varied in its characteristics. I expect, given the worldwide acceptance of Mexican opal, that the international gem community will begin a long-term love affair with Ethiopian opal.

Was this Dr. Leakey's opal source? There is no way of knowing, but I can certainly imagine early man sitting by a campfire, marveling at the beauty locked inside this stone. ◆

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