FINDING DIAMONDS IN ARKANSAS!

J. Michael Howard
ARKANSAS GEOLOGICAL SURVEY
BEKKI WHITE, STATE GEOLOGIST
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Diamonds were first discovered in Arkansas on August 1, 1906, by John M. Huddleston some 2.5 miles southeast of Murfreesboro in Pike County. Since that time, various efforts have been made to mine diamonds, but due to inadequate funding and a lack of experience, all failed sooner or later.

Several igneous bodies of kimberlite-lamproite affinities have been discovered (fig. 1). The largest body, called the Prairie Creek pipe (83 acres), is now the Crater of Diamonds State Park. For a nominal entry fee, visitors are allowed to search for and keep any diamonds they discover. The other intrusions are under private ownership and as such are not available for the public to visit.

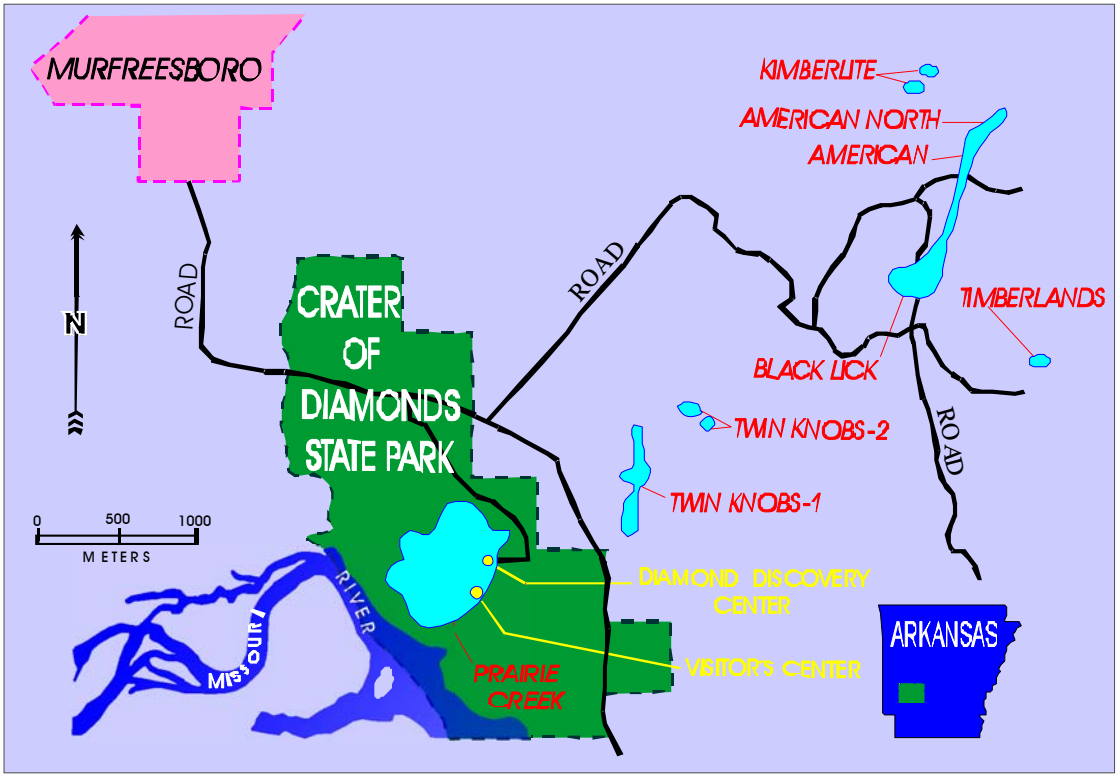

Figure 1 *- Location of lamproite bodies in Pike County, Arkansas (Modified from M. A. Waldman et al., 1985).*

General Geology

The diamond-bearing igneous rocks are thought to have been derived from the earth's mantle and cut through a section of Early to Cretaceous sediments, surfacing in a shallow sea as explosive event. Isotopic age date of mica from the intrusive breccia place the event at 106±4 million years, but the diamonds are much older. Inclusions in diamonds have been dated as 3.2 billion years old. The origin of diamonds goes back to the early history of the earth, probably during or shortly after the earth's differentiation into a core, mantle, and crust. At the great temperatures and pressures of mantle depths, the stable form of the element carbon is diamond.

Until the mid 1970's the host rock that diamonds came to earth's surface in was simply termed kimberlite. The rock type peridotite is identical to kimberlite, but contains no diamonds. By 1977, it was recognized that the Arkansas diamond-bearing rock was not a true kimberlite because certain minerals were either rare or not present. By 1984, geologists had gathered sufficient geochemical and mineralogical data to prove that the kimberlite at the Prairie Creek intrusion is actually closer to a rock called lamproite, which was first identified in Australia where it is being mined for diamonds. Distinctions of the true nature of the rock type are very important because the presently accepted emplacement model for each type is different. The completion of Phase I and 2 drilling has given us the data to determine the shape of the Prairie Creek pipe (fig. 2) and a conservative estimate of the quantity of diamond-bearing rock.

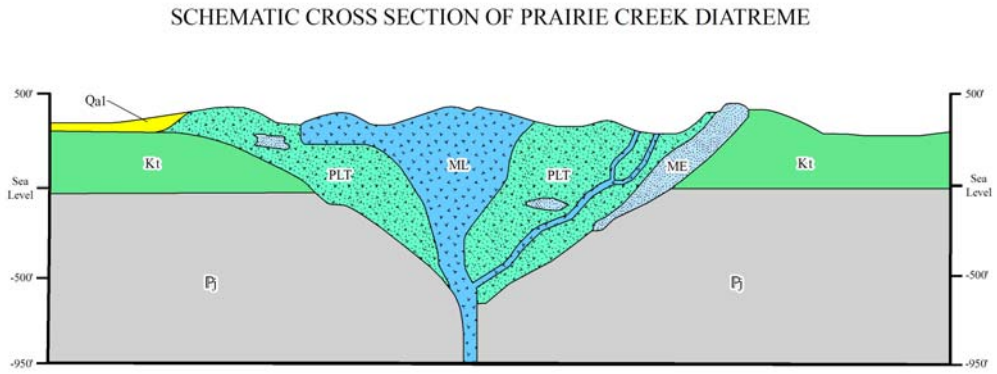

Figure 2 *- Generalized cross section of Prairie Creek Pipe, Crater of Diamonds State Park, Arkansas Geological Survey*. ML = magmatic lamproite, PLT = pyroclastic lamproite tuff, ME = maar epiclastics.

From surface mapping and examination of drill core, three general types of igneous rocks have been identified: magmatic lamproite, formerly named intrusive peridotite; pyroclastic lamproite tuff, formerly named kimberlite breccia and tuff; and epiclastics, formerly called Jackfork(?) Sandstone. The pyroclastic lamproite tuff is the major source of diamonds collected by visitors. Magmatic lamproite appears to contain no diamonds of significant size. The potential of the epiclastics is presently unknown. The pyroclastic lamproite tuff and epiclastics account for about 59% of the surface exposure. The lamproite tuff is altered, highly weathered, and contained a highly variable combination of early lapilli (stony or glassy volcanic fragments), ultramafic and crustal fragments, and

olivine grains set in a matrix of serpentine and chlorite. This rock type is unstable at surface conditions and rapidly weathers to a very sticky green and yellow gumbo clay. Diamonds remain as one of the resistant detrital minerals which wash out of the clay.

It is estimated that about 78.5 million tons of diamond-bearing pyroclastic rock and 24 million tons of magmatic lamproite (non-diamond-bearing) compose the Prairie Creek pipe, to a depth of 650 feet.

About the Stones Themselves

Very conservative estimates place the number of stones found to date at around 35,000 whereas a very liberal figure of 300,000 stones is occasionally mentioned. More realistically, somewhere between 50,000 to 100,000 stones have probably been recovered from the pipe by mining ventures and individuals. Since the Crater of Diamonds State Park was established in 1972, park personnel have maintained records of the number of stones found (table 1).

The average size of the diamonds found since 1972 is about 0.21 carat of 0.04 gram. If the stone is equidimensional, a 0.25-carat diamond measures approximately 3/32 of an inch in diameter. A number of stones larger than 5 carats have been discovered since 1972 (table 2). Well-known named stones are listed in table 3.

Well-formed diamond crystals from Arkansas tend to be spherical because instead of having a cubic or octahedral crystal form like many African stones, Arkansas stones typically are trioctahedroid or hexoctahedroid (figs. 3 and 4). Crystal faces become rounded by resorption and face boundaries are curved, giving an overall spherical appearance.

Figure 3*: Examples of Arkansas stones: 25 pt. brown, trioctahedroid and a 50 pt. yellow hexotahedroid.*

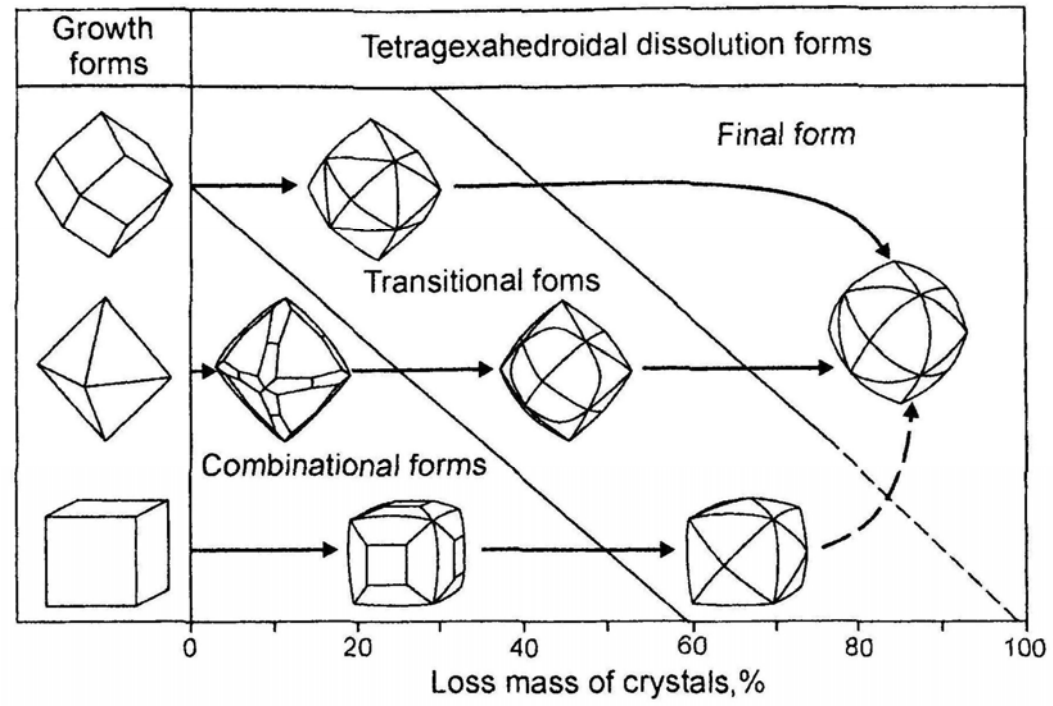

***Figure** 3 - Common diamond crystal forms from Arkansas are in the 60-80% loss of mass range on the dissolution diagram.*

TABLE 1 – Crater of Diamonds State Park Diamond Statistics Summary
Source: http://www.craterofdiamondsstatepark.com

Year	Total Found	Total CT. Weight	# Over 1 CT.	White	Brown	Yellow	Other	Paid Visitation
1972	135	55.44	12	65	43	12	15	34,664
1973	151	71.20	19	61	31	17	42	35,669
1974	241	90.92	21	126	66	33	16	54,336
1975	663	88.05	34	388	167	88	20	96,452
1976	395	98.95	18	225	94	65	11	93,870
1977	366	141.06	41	212	79	54	21	91,849
1978	611	232.30	40	359	153	96	3	119,844
1979	402	149.87	24	257	68	67	10	93,793
1980	579	190.97	26	400	101	73	5	80,803
1981	1324	238.58	26	838	266	213	7	97,490

Year	Total Found	Total CT. Weight	# Over 1 CT.	White	Brown	Yellow	Other	Paid Visitation
1982	1383	264.38	37	886	237	242	18	71,413
1983	1501	312.57	44	796	353	332	20	87,271
1984	1339	202.26	18	776	304	241	18	75,838
1985	699	148.54	24	458	146	91	4	67,532
1986	930	154.21	23	589	168	165	8	73,447
1987	959	160.38	20	617	185	145	12	71,107
1988	1280	185.14	17	762	246	247	25	75,491
1989	1277	176.29	15	836	226	190	25	86,479
1990	1292	265.17	36	847	239	197	9	67,563
1991	442	105.82	10	245	108	78	11	70,133
1992	470	96.36	14	291	101	73	5	67,145
1993	800	144.44	12	432	204	142	22	55,589
1994	1421	192.09	24	832	270	266	53	53,187
1995	813	138.85	16	464	196	131	22	57,786
1996	923	161.35	20	518	226	160	19	61,252
1997	673	130.15	23	363	159	142	9	55,140
1998	506	103.16	14	318	95	86	7	60,705
1999	471	82.60	10	279	85	100	7	50,698
2000	606	130.02	20	390	106	101	9	46,513
2001	543	78.98	12	353	82	104	4	46,260
2002	614	73.79	7	418	105	89	2	45,167
2003	641	128.37	18	388	136	117	0	47,864
2004	383	58.72	5	231	90	62	0	47,373
2005	536	103.43	19	310	137	89	0	51,852
2006	488	117.51	15	295	106	87	0	83,576
Totals:	**25,857**	**5,071.92**	**734**	**15,625**	**5,378**	**4,395**	**459**	**2,375,151**

*Source: Crater of Diamonds State Park
Arkansas Department of Parks and Tourism.

TABLE 2 - DIAMONDS 5 CARATS OR LARGER REPORTED SINCE 1992.
Source: http://www.craterofdiamondsstatepark.com

Name	State	Carat Wt.	Ranking	Color	Year
W.W. Johnson	Texas	16.37	1st	White	1975
C. Blankenship	Louisiana	8.82	2nd	White	1981
B. Lamle	Oklahoma	8.61	3rd	Brown	1978
K. Connell	Illinois	7.95	4th	White	1986
M. Dickinson/C. Stevens	Louisiana	7.28	5th	Yellow	1998
T. Dunn	Missouri	6.75	6th	Brown	1975
R. Cooper	Arkansas	6.72	7th	Brown	1997
S. Lee	Arkansas	6.30	8th	White	1988
C. Newman	Arkansas	6.25	9th	White	1981
J. Fedzora	Arkansas	6.23	10th	White	1991
W. Stockton	Kansas	6.20	11th	White	1981
R. Schall	Arkansas	6.07	12th	White	1981
R. Cooper	Arkansas	6.00	13th	Brown	1997
M. Griffin	Illinois	5.90	14th	Brown	1981
L. Hawkins	Texas	5.76	15th	White	1978
G. Snearly	Arkansas	5.63	16th	White	1983
J. Palermo	Louisiana	5.58	17th	Brown	1984
H. Lay	Arkansas	5.57	18th	White	2000
M. Rieff	Arkansas	5.50	19th	White	2000
J. Archer	Arkansas	5.25	20th	Yellow	1994
T. Moore	Oklahoma	5.19	21st	White	1986
S. Barkley	Arkansas	5.15	22nd	White	1980
J. Williamson	Arizona	5.08	23rd	Brown	1979
J. Macy	Louisiana	5.00	24th	Yellow	1978
D. Mayes	Arkansas	5.00	25th	White	1978

*Source: Crater of Diamonds State Park
Arkansas Department of Parks and Tourism.

TABLE 3 - FAMOUS ARKANSAS DIAMONDS (L.G. KROL, 1988).

The Uncle Sam (1924)……	40.42 carats
Star of Murfreesboro (1964)……	34.25 carats
Amarillo Starlight (1975)……	16.37 carats
Star of Arkansas (1956)……	15.31 carats
Gary Moore (1960)……	6.43 carats
Eisenhower (1956)……	6.11 carats

Other habits occur along with distorted forms giving tabular or rice grain shapes to some diamond crystals. The diamonds occur in a variety of colors and an examination of several thousand stones yielded the following percentages: white - 40%, yellow 33%, brown 37%, bort 1%. Rarely stones are seen with a blue or pink tinge.

TIPS AND TECHNIQUES FOR FINDING A DIAMOND

Many techniques have been used to find diamonds at the Park, but none of these are successful if the individual cannot recognize a diamond. The key factor seems to be recognition. Most visitors to the Crater of Diamonds simply do not know what a diamond crystal looks like. They look dramatically different than the faceted diamonds found in jewelry stores. They are small (generally smaller than a pencil eraser), have an oily metallic luster (surface light reflection), usually are rounded or spherical in form, clean and slick to the touch, and may be a variety of colors. DIAMONDS ARE HARD; in fact, the hardest substance known to man. But they also have well-defined cleavage planes (internal planes of breakage). Do NOT test the hardness of your stone by hitting it with a hammer because it will easily break or cleave. The Crater of Diamonds Museum at the Visitors Center has displays to help the inexperienced "rock hound" learn how to recognize a diamond and distinguish it from the other more common stones found in the Park.

Once the visitor can recognize a raw or rough diamond, the search for stones can begin. Three basic methods of hunting for diamonds are used, all having some potential for success.

1) Surface walking, particularly after a rain when stones are exposed by erosion, is the most popular technique. Walk over an area slowly, picking up everything that reflects light or looks like a diamond. Place the stone in a container; identification can be done later. Most of the larger stones have been found this way.

2) Another successful method is a very careful examination of a small defined area. Take a yard-stick and strike off on the ground a square yard. Then examine the ground very closely. You are looking for something small so you have to get close to the ground and concentrate on finding a stone. If nothing is found in that square, strike off another and repeat the process. No one has ever said that finding a diamond is easy!

3) Digging or scratching is popular, but one cannot cover as much surface area as quickly as by using methods 1 and 2. Experienced "rock hounds" come to the Park with shovels, screens, buckets, and other tools. These serious diamond hunters account for the majority of small stones found every year. They locate an old drainage and dig a hole to

reach the gravel at the bottom of that drainage. Next, they screen the material by scalping off the larger gravels, then washing out the clay, to obtain a relatively uniform fraction of grains. Then a special type of round bottomed screen, called a seruka, is used to concentrate the heavy minerals. The concentrate is examined for diamonds after it dries. This can be done at the Park or the concentrate may be taken home. This type of hunting is productive, but if you do not like to be wet and muddy or hard physical labor is not appealing, this may not your "cup of tea".

The amount of time you have to spend at the Crater will also determine which is the best method for you. If you don't have a week or more, the first two methods are best. If you have longer, then you should seriously consider the last technique.

For information about the geology of the Arkansas diamond area the reader may wish to contact the **Arkansas Geological Survey**, Vardelle Parham Geology Center, 3815 West Roosevelt Road, Little Rock, AR 72204. Information about the Crater of Diamonds State Park fees and facilities may be obtained by writing the **Arkansas Department of Parks and Tourism**, Attn.: State Parks, No. 1 Capitol Mall, Little Rock, Arkansas 72203.

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