

## AN UNSOLICITED PLEA FOR ASSISTANCE IN REEVALUATION OF THE ROCKWALL CO., TEXAS - ROCKWALL ANOMALY

Within Rockwall County, Texas there lies a series of features that geologists in the past have classified as clastic sandstone dikes. There has been a recent resurgence of an old debate that the dikes demonstrate many recognizable architectural features common to stone masonry both ancient and present. John Lindsey, a native Rockwall architect, is currently spearheading a reinvestigation of the reported features, including an excavation. The thrust of his investigation is to document additional architectural like features. Several structural and construction materials engineers that have been invited to view the stone works, consider the stone to be an ancient example of a cast material similar to the present day igneous or metamorphic materials based geopolymer and geopolymer mortar that is superior to what is in use today. It is the possibility of a new construction materials science that is of interest to this author. The author has visited Lindsey's present excavation site and observed the seemingly out of place and context stone, possible mortar and plaster like materials related to distinguishable architectural like features. He is currently of the opinion that the current geological explanation, that of a clastic sandstone dike sourced by the Upper Cretaceous Trinity Group Lower Wolf City sandstone member does not adequately explain the presence of the feature. He has completed a partial review of existing North Texas and Rockwall dike related geological literature and would like to begin this paper with a review of the literature and add to it his observations and conclusions. It is the opinion of the author that the lack of interest in this unique, highly visible, out of place local feature by the geological community has resulted in a less than rigorous treatment and study of the area leading to mistaken classification and mechanism outlined in obscure published reports. The public's reaction to this, has been to continue to label the feature as manmade, based on their own personal observations that differ from those of geologists. The above mentioned mistakes on the part of researchers have been repeated over the years and have been accepted as fact without critical review until the present. If the currently accepted classification is mistaken, one wonders how many other mistakes like this have been accepted on faith as fact by succeeding generations of geologists. Because of this, the author has chosen to use this paper on the Rockwall feature to discuss what he believes to be much larger oversights that relate to the geology of the Cretaceous that deserve re-examination and resolution.

### ROCKWALL AREA GEOLOGY AND MINERALOGY

This discussion of the geology will be limited chiefly to the Upper Cretaceous Trinity Group in which the anomaly occurs as it relates to this local, the current excavation the author has visited as well as what he has gleaned from the literature, current lab reports and his field work.

#### Current Excavation Site Description:

The site is located NE of the city of Rockwall near the northern extent of the most easterly known major dike occurrence. This dike trends NNE-SSW and is most likely associated with the predominate set of joints generated by a currently unidentified easterly splay of the Balcones Fault System that probably surfaces near the east bank of the East Fork of the Trinity River. The author first visited the excavation site in late October of 1999 when the extent of the excavation was approximately 25'X4' by 8' deep along the easterly wall face. As of this writing the excavation now measures 140'LX16'WX35'D and has exposed a stepped nature of the fracture/joint fill stone material and many additional fractures in the surrounding clay. The excavation had revealed approximately 2-3' of weathering zone (soil profile) before entering an older weathering zone of calcareous montmorillonite clay that contained the stone dike/wall material. The invasive action of the near surface swelling clays had jumbled the stones to the point that the wall resembled a rubble filled masonry wall complete with sanded mortar and plaster. The exposed dike displayed a differential weathering profile due to sloping topography influencing runoff direction, being more weathered on the eastern side than the western side. The "plaster" covered only one face of the wall to a consistent thickness of 2" and the contact between the material and the surrounding clay was vertical, abrupt and distinct with no invasion by rock minerals or evidence of normal contact metamorphism noted. The weathering is explained as the action of downward percolation of acidic rainwater preferentially dissolving the stone's carbonate matrix chiefly on the eastern dike face. The sorting of unconsolidated weathered mineral grains appears to have been a later development than the action of the swelling clays on

the stones. At approximately 12' depth, in mid-November, what local construction personnel call the blue shale was reached. From samples and photographs the contact between the overlying tan to buff calcareous clay and the blue shale is abrupt and distinct. The character of the dike stones and "masonry" within the blue shale changes to undisturbed closely fitted staggered joint stones of stone masonry like appearance. The "plaster" material has for the most part disappeared, representing only a thin smoothing coat over the rough faces of the stones as the deeper surrounding clays were impermeable to acidic groundwater percolation. This appears to be a weathered patina that encases each stone related to how the stone material undergoes oxidation-degradation. Additionally, this change can probably be attributed to a marked decrease in montmorillonite content and higher carbonate and bituminous material content of the blue shale. Changes occurring within the clays are not evident from fresh hand specimen. The contact between the buff shale and the blue shale is noted to be a distinct color change. Several "architectural" features are associated with this section of the dike. The most striking is a collapsed 5' wide keyed archway let through the wall, below which is a uniform two-stepped platform. Beneath this feature lies a symmetrically curvilinear and semi-circular section of the wall that is 9' in length, both sides of which return into the dike/wall face. One might attribute this to localized buckling of the joint, related to a noticeable opposing pair of joints that intersect the wall at 45 degree angles resulting in partial redirection of material during emplacement. The stones of this feature curve to conform to the serpentine section of the wall. The stones appear to have slid horizontally. Sometimes sliding in courses, while still in an apparent semi-plastic state, the stones demonstrate definite compression-shear failure due to the imposed stresses. This feature is highly suggestive of strike slip movement along the joint. Compared to old photos from other sections of the wall these stones are more densely packed and compressed end to end, demonstrating considerably more internal fracture than stones further away from the curved feature. Likewise, the overlying arch can be explained as a response to compressional stresses. Two other small portals through the wall on either side of the arch are documented, one of which is arched. An intervening rain caused the upper section of the wall within the swelling clay section to collapse, leaving only the exposed section of the tightly packed, staggered joint, large elongated stone section of the wall within the blue shale. Approximately 8 courses of staggered joint stones below the top of the blue shale have been unearthed to date. Judging from published geological reports, the author concludes that the tan to buff swelling clay is the eroded remnant of the basal Marlboro Marl member and that the blue shale is the Pecan Gap Member of the Taylor Group. This stratigraphic positioning is in alignment with Sellarads' et al. (1932) determination. Several well preserved examples of the Upper Cretaceous fossil *Inoceramus*, in upright position, were found when widening the excavation out from the wall face, indicating that the surrounding shale is in an undisturbed depositional state. No evidence of previous excavation by infill or backfill of dissimilar material is noted. If the wall were the result of construction, it would have had to be narrowly excavated, repaired and built below grade under near in situ conditions or have undergone rapid burial and inundation by Cretaceous seas.

#### LOCAL GEOLOGICAL REVIEW FROM PUBLISHED SOURCES, UNREFERENCED

Burleson(1871) described the features as igneous dikes. Hill(1901) arrived at the currently accepted conclusion that the dikes were sedimentary diapirs of a clastic sandstone origin. Stephenson (1927) and Monroe (1950) felt that they resulted from sand washed into earthquake fissures in the clay from above. This notion is effectively replaced by field observations recorded in a very good, though dated technical paper by Kelsey and Denton (1933) that offered both a sand source and mechanism for clastic sandstone dike intrusion by classical means related to active Balcones associated faulting-overburden loading during Larimide times with possible assistance from earthquakes. Kelsey and Denton also noted that bedding planes within the Pecan Gap Marls appear to coincide with the horizontal jointing of the stone layers. Their explanation of the subordinate vertical staggered jointing between individual stones however, leaves a lot to be desired.

Expanding on Kelsey and Denton's as well as Sellarads' work, the dikes do in fact appear to lie predominately within the Pecan Gap Formation, and by this author's observation within the base of the Marlboro Marl. The two authors felt they had a mineralogy match to the dike material with the Lower Member of the Wolf City Formation, the Wolf City Sandstone, which implies that if present, the upper member Wolf City mudstone must also be penetrated by the dikes. The Wolf City Formation directly underlies the Pecan Gap Fm. The author has not had the opportunity to visit an outcrop of the Wolf City to collect samples and make comparisons. Several buildings requiring piers in the city of Rockwall are resting

on a limestone "bedrock" that supposedly occurs approximately 50' below the top of the wall. The author presently equates the "bedrock" to the Wolf City lime mudstone. The Wolf City sand is stated to have been injected into joints that roughly parallel the Balcones System. Cunliffe(1999), in an unpublished letter to an editor/friend of Lindsey also stated that there is evidence for a transverse set of joints along which dikes are found across the area. Transverse and sub-parallel joints are observed at Lindsey's excavation site. Additionally a series of closely spaced non-intruded, parallel set of joints within the Pecan Gap and Marlboro section extend 15-20 feet out from the dike itself in the shale section. Older stress-strain features are noted along the joints as well as Leisegang banding along sub-parallel joints that intersect the dike. The Texas Bureau of Economic Geology's 1972 geological map of Texas denotes an outcrop of the Wolf City Sandstone along the eastern bank of Lake Ray Hubbard that itself was in association with a sandstone dike remnant documented by Dr. Cunliffe who also gave the sandstone member a thickness of 10'. It is not known if this sandstone description is from this local or an outcrop described by the BEG in Navarro Co. Within the city of Rockwall, along a creek where the wall outcrops the author has collected displaced blocks of a coquina limestone in association with the wall that appear to have been brought up with the dike. No such example of a coquina limestone is observed within the marls of Upper Taylor or Navarro section above the Wolf City. The predominate fossil is an unidentified small species of exogyra that exhibits a planar curl. Several examples of scallop also occur within the samples. The author has no way of determining if these samples are an example of Wolf City or older high energy carbonate. The sample containing the exogyra is from an oyster "reef". Even without having viewed the Wolf City sandstone in outcrop, the author suspects that the dikes penetrate the Wolf City. The documentation for this speculation is forthcoming.

The mechanism for thin overburden loading and minor fault displacement forcing sand into joints and hydraulically preferentially transferring sand instead of a plastic hydrated swelling clay up along a joint seems structurally and mechanically unsound, proposed intermittent earthquake activity notwithstanding. Shallow clay diapirs are normally associated with high clastic sedimentation rates where clays have not had time to dewater or degas prior to burial. The area's Cretaceous depositional environment was not of this type. Except for a few sparse schistose shale clasts within the stone itself there is no diapiric shale present. With the exception of the Larimide event initiation of the Balcones System, this area has been a relatively stable platform since the end of the Paleozoic. Stone composition and the regular vertical appearance of the wall from photographs taken as deep as 32' in old hand dug wells compared to near surface occurrences do not show indications of emplacement during deposition of the blue shale. Various authors have stated that there are no vertical slickenside evidence of movement up the joints which would be present in the surrounding clays even if the material were injected in an unconsolidated state. Quite the opposite. Kelsey and Denton spoke of bedding plane feature continuity from marl to dike. The author's onsite viewing of the excavation yielded evidence of horizontal lineations of small amounts of sand being stacked like mortar with overflow spillage like lines present in the "plaster" material that may be indicative of material inching its way up enmass, horizontal materials transfer or incremental weathering effects. It is these features as well as bedding lift planes/fracture planes in the stone itself that probably gave rise to Stevenson's and Monroe's supposition that the sand had been fed into existing fissures from above. This speculation is countered by the fact that wall thickness of the dike increases with depth and not vice versa as would be typical to fissures. Most earthquake fissures display irregular and jagged edges whereas the wall joints do not. The excavation revealed closely spaced parallel en echelon joints or fractures that die off in frequency of occurrence away from the wall over a distance of about 16'. The author is not sufficiently versed in rock mechanics to generate an estimate of the magnitude of pressure required to generate this set of fractures. The "mortar" material at the site was most likely displaced from between the stone by action of swelling clays within the Marlboro Marl fairly recently. Montmorillonite clays swell in the presence of fresh water and flocculate from colloidal suspension in the presence of salt water. Each course of stones displays beveled edges that appear to have resulted from the action of rapidly flowing fluid or gas in turbulent spiral motion under a considerable pressure. Honeycomb flow channels are common on the base of stones. When a stone is broken open transverse to its long axis, one often notes shale clasts and small hollow bubble structures (vugs) in a pattern that resembles bread dough rolled up from a sheet, and other features denoting activity prior to hardening. Since the location of the dike complex in the 1850s, it has been utilized as a conduit to underlying aquifer shallow water well vertical aquifer along its slightly tilted hanging wall face. The poor porosity and permeability of the calcareously cemented Wolf City sandstone probably precludes its being a viable water source capable of watering cotton fields, livestock, tending to

human needs or exhibiting artesian spring characteristics noted at points along the dike. The stones of the dike display less than 0.5% porosity and no permeability. A water analysis of the dike water, Wolf City sandstone water and say Woodbine well water is called for. The unconsolidated sands associated with the dike calculate out to be only a few acre feet of recoverable water to have serviced the 40 or so wells that utilize water from a dike source and it is too small in surface extent to serve as an adequate conduit for runoff recharge. Timing of the intrusion appears to be of Upper Trinity Group basal Marlboro Marl age. This represents a problematical lithostatic gradient for hydraulic differential pressure lifting of a sand material by fault tensional stresses from a 10' sand source. If this were so, we would need to see structural evidence of a regional catastrophic event in addition to faulting. It is felt that earthquakes may have been related to such an event but would have been secondary to the initiating fracture inducing event. As previously stated, we may be viewing highly anomalous local small displacement strike-slip faulting. It is highly probable that the proposed sand source was calcareously cemented shortly after deposition that would have precluded it from being a source for unconsolidated vertical materials hydraulic transfer along a zone of weakness.

## MINERALOGY

The Wolf City Sandstone from various localities has been described as a gray to green calcareously cemented glauconitic, micaceous fine grained sandstone of predominately angular to sub-angular quartz grains. According to Monroe (1950), Kelsey and Denton (1933), the Wolf City Sandstone as described from the dike stone and possibly from the supposed outcrop as a gray to green glauconitic, micaceous very fine grained, slightly feldspathic, quartz crystal sandstone with associated heavy minerals as follows ( % heavy minerals): 55% Zircon, 17% garnet, 13% Tourmaline, 2% Rutile, 2% Staurolite, 10% Titanite and 1% Brookite. The calcite cement is said to be 35% by weight of total stone weight. The author has confirmed the following from handspecimen and 100X illuminated field microscope examination: Predominance of VFG quartz crystals, 40% VFG zircon crystals, VFG garnet crystals, VFG Sphene crystals, VFG Tourmaline crystals and a minor amount of sedimentary marcasite grains. No mica has been found. Both the stone and loosely consolidated material display the same bimodal distribution of silt sized mineral grains, the bimodality being due chiefly to the quartz silt grains vs the crystalline predominately zircon grains. Only a small percentage of the grains display the weathering profile of a sedimentary sourced silt. A fair percentage of feldspar is present. The grain texture is interlocking. The calcite cement is completely crystallized, displaying entire large crystal cleavage faces upon breaking. The stone possesses a greater density than quartz or many granites and has the hardness and appearance of a quartzite requiring multiple heavy blows from a two pound maul to fracture a small conchoidally fractured sliver from a stone. Occasional calcite healed fractures and en echelon calcite healed microfractures are found throughout. If this were normal calcite fracture fill material it would possess the same hardness and density of calcite. It does not. Gentlemen this is not a description of any far from source Cretaceous sandstone this author has ever been exposed to. It is the description of a metamorphosed calc cemented siltstone, a silt rich marble fracture fill cement at least. Many of these minerals would not survive transport from areas like the Central Texas Uplift. Many of the mineral grains display pristine crystal faces and edges that suggest either slow continuous transport from great depths or no transport what so ever, with crystallization in situ. The most recent sample assay commissioned by Lindsey was a positive metal materials ID test performed on a single curious sample. The results listed in % metals is as follows: Iron=35%; Tin=32%; Vanadium=0.01%; Titanium=0.05%, Manganese=0.14% and Molybdenum=0.01% with the balance consisting of the alkali metals group. The high percentage of tin was unexpected and totally out of context. There is no chance that this metal was in sulfide form. If the dike stone had more volumetric extent, Rockwall would be the only commercially significant tin deposit in North America. Working in parallel on the mineralogy when he finds time, out of curiosity, is igneous petrographer and geochemist Robert McKinney of Houston. His first glance at the material led him to believe that this was an Aplite Dike material. His thin section analysis suggests a non-igneous sedimentary origin. He is, however, baffled by the metamorphosed crystalline calcite cement. Typical Aplite dikes are, in classical terms, the result of hydrothermal or intrusive events related either to deep seated crustal magmas or high temperature high pressure metamorphism whose normal geochemical composition is that of an alkali granite-rhyolite, chiefly quartz-plagioclase feldspar. The associated secondary heavy mineral assemblage present in the Rockwall dike material is common to Aplites. Aplites typically have a sugary crystal sand texture and weather out with the unconsolidated crystalline sand present along the sides of the dike, like that noted in the exposed Marlboro Marl section,

and the stone patina within the Pecan Gap at the excavation site. This type of dike is usually thin, of uniform thickness and is known to continue laterally for long distances with unchanging mineralogy very similar to what is present at Rockwall. The author favors this type of Rockwall dike genesis. The absence of a readily observable high percentage of plagioclase is classically construed as temperature and pressure changes that resulted in solution fractionation, precipitation and crystallization of the feldspar from the silicate rich hydrothermal waters more deeply, early on and leaching and removal of feldspar by artesian surface steam vent and replacement with calcite while temperatures remained high enough to produced the crystalline metamorphosed calcite stone matrix. The metamorphosis could be aided by the pressures involved in strike slip faulting. The sand between the stones and the unconsolidated fraction displays the same grain size distribution but a lesser percentage of some of the representative heavy mineral fraction (being mostly quartz and zircon crystals), is more porous and has a lesser corresponding density and hardness than the stone material. Individual grains of this material are coated with a fine crystalline calcite dust that converts to a cement on exposure to air causing the unconsolidated material to harden into stone. The author also suspects that a zeolite is involved in this reaction. He also strongly suspects that the interlocking crystal grain structure of the stone has a residual degraded feldspar zeolite in addition to the crystalline calcite that is responsible for its hardness and tendency toward conchoidal fracture. The heavy mineral assemblage and interlocking grain structure that reduces the porosity to 0.5% accounts for the density of the stone. The author has no explanation at this time for the preferential cementation found in the dike material that produces the mortared and plastered staggered stone joint stone masonry appearance of the anomaly other than typical Aplite weathering. Something else must have been present that served to insulate the ingredients from one another and restrict chemical bonding. As a for instance, the author has coated Portland cement silt sized aggregate grains with tar to alter the electro-negativity of the grain to form a very hard and tough cement. The "weathered " material-mortar bed gives the wall every appearance of being a mortar buttered stone masonry wall. The before mentioned hydrothermal hypothesis horizontal stresses present in the plane of the wall allowed the stones to slide over one another. This evidence is present in the "mortar" material itself and it appears to have hardened well after the stones reached their final destination. More than likely the lesser calcite cementation of the individual stone joint infill took place well after the temperature and pressure dropped below metamorphic phase conditions and after some weathering had taken place. It may represent the consequences of a later low temperature hydrothermal event. The sanded "mortar" material is everywhere present between stone joints when found within the Pecan Gap Formation. The sliding and rolling while in a semi-plastic state accounts for the archways and serpentine wall sections in some cases. If this occurrence is due to a hydrothermal event, a horizontal planer stressing mechanism, i.e. high pressure high temperature water-silicate solution phase would mean that there were preferred channels along a joint that reached higher pressures before outlying areas and expanded the joint walls apart and opened them laterally with a force that exhibited both an upwards vertical vector as well as a strictly horizontal lateral vector. It is suggested that the horizontal vector was generated by bedding planes within the marl. The upward movement of the fluids would reach a sealing marl and transfer the force horizontally along the joint beneath the indurate layer until it was finally breached. The presence of swelling clays or other lubricant would have served to reduce friction between the wall face and the material undergoing hydrodynamic transfer. This same mechanism can be used to explain the dike in general if the bedding plane proposal proves to be unsound. Most researchers have documented that the dikes die out to simple joints by thinning both in plane, horizontally in plan view and vertically upwards. This feature tells that the mass of the mineral rich fluids flux along the joints is coincident with where the dike/wall achieves the greatest lateral thickness. This wedge-shaped lenticular overall appearance approximates the ideal of an induced breathing fracture along a preexisting planer zone of weakness by fluids under hydraulic hydrodynamic pressure conditions. There is much existing evidence at the excavation site that the intrusion-dilation of the joint generated the parallel, sub-parallel and transverse secondary vertical fractures all along the feature within the clay contemporaneous with the primary event. Some may argue that the linear wedge-like increase in thickness of the dike with depth precludes its being of hydrothermal origin as it would require a near source magma or heat source to provide sufficient material and there is no surface expression of such a feature. We are reminded that we have only seen these dike's dynamics in a clay medium and not where it cuts through thick sequence of competent rocks. And that the lithostatic gradient increases with depth such that at a certain depth, the pressure differentials narrow towards equilibrium. Of great interest to the author is the local quarry that was first used for stone to build Rockwall's courthouse at the turn of the century. The quarry is located within the dike complex but not in association with the dikes. The quarry stone is a 3-5' thick calcareous

sandstone lense facies of the basal Marlboro Marl and rests conformably on the top of the Pecan Gap Shale. Its extent is limited to the immediate quarry area. The mineralogy of the stone is the same as the dike stone with the exception that the cementing agent is not metamorphosed, is much less dense and is highly stratified. The basal 2-3' of the stone is indurate, while the upper 2-3' is loosely consolidated. The weathered indurate stone material as well as the unconsolidated section displays a tuffaceous texture. The stratified intervals also resemble stratification found in volcanic tufts. The interval contains numerous shallow water marine fossil remains including Inoceramus, gastropod fragments and numerous worm casts. A curious iron rich in situ erratic was found by one of the author's party that was weathering from the base of the sandstone at the contact with the Pecan Gap. The object does not appear to be weathered marcasite or pyrite of sedimentary origin normally found in association with the dikes and by all appearances is either a small fragment of iron silicate from a hydrothermal vent, volcanic ejecta or a meteorite. The sandstone matrix was leached from the object with HCl to expose its frothy slag-like texture and in the process removed the black weathered glassy outer surface. Microcrystalline pyrite is present in the limonite oxidation layer surrounding the leached exterior. There is some evidence that the sample may be completely oxidized, exhibiting the original exterior structure with the interior being filled with limonite, sand and calcite, literally an oxidation cast. This same structure and mineralogy may be more indicative of a segment of a seafloor fumarole. The fragment is cracked in several places. The cracks are due to either rapid quenching or impact and do not appear to be due to dessication, oxidation or weathering. Its true origin must be determined from thin-section. If this sandstone as well as the erratic is an indication of volcanic or hydrothermal activity, we are presented with a demonstratable mechanism for the dike occurrence. If the erratic is a meteor fragment from a larger body that impacted the area, an alternate mechanism for dike emplacement exists that could explain localized possible strike slip faulting resulting from a low angle large meteor impacting the area tangentially from N-S as dictated by the omni-directional sub-parallel jointing along the exposed dike resembling a shatter envelope related to possible wrench faulting.

Concerning the mixing of igneous and sedimentary derived materials similar to what the author is proposing at Rockwall, the author is reminded of published articles on Jackson Formation diapirism in South Texas. The sedimentary diapirism is said to be related to immature methane bearing shales buried to sufficient depths to become geopressed, followed by intrusion and escape along existing faults, resulting in surface blowout and fire. This combination is said to have yielded the pyroclastic debris in evidence and is supported by Jackson age micropaleontology and palynology that came up with the material. The author does not doubt this for one second. It is the evidence that investigators missed that casts a shadow on their mechanism and sedimentary origin classification of the pyroclastic debris. In McMullen Co. Texas the following debris and related fossilized materials abound. Kaolinite beds laid down in fresh water lakes, in situ standing fossilized tree trunks buried in ash, entire petrified forests with the leaves fossilized in the upper ash and sand layers. Many of the trunks appear to have been burned. Large, nearly spherical black volcanic basaltic bombs can be dug from the hillsides. Thick montmorillonite clay beds that leach large single gypsum crystals from weathered exposures. The dessication cracks inside concretions that weather from the clay beds contain immature opaline hydrosilicates as well as well formed quartz and calcite crystals. In the Loma Alta hills area a volcanic cinder cone with basaltic ash was present until the early 1950s when the country was cleared of brush obliterating the feature. During the early 1960s a seismic crew was drilling shot holes on a ranch in this area and drilled through an 8" vein of native silver about 30' below the surface. The shallow lignite beds near the Christine area have undergone heavy mineralization and some appear to have been calcined in situ. In Karnes Co., sedimentary Uranium strip mines have revealed the presence of hydrothermal quartz and chert veins at or near the surface. All of this weathered volcanic material has been mixed in with the Jackson Fm debris and the native paleo-soils by the action of wind and water erosion in both land and near shore marine paleo-environments. Volcanic ash weathers very quickly in wet areas as this area was during that time. Since it was a limited event, little of it remains unaltered or reworked, thus confusing the origins and mechanisms responsible for the Jackson Formation diapirism.

## CLASSICAL STRUCTURAL SETTING FOR A POSSIBLE HYDROTHERMAL EVENT

The Greater Dallas area is underlain by the continuation of the old buried Ouachita Mountain Range that runs into Oklahoma and surfaces again in Arkansas some 175 miles NE of Rockwall. Rockwall lies on the

eastern flank of this buried range. The old range turns west, south of Dallas and resurfaces as the Marathon Basin Mountain Range in West Texas. Numerous escarpments have been documented in the deep subsurface associated with this range east of Rockwall. The Balcones Fault Zone lies on the eastern flank of the predominate highs associated with the buried range and probably represents a reactivation along older buried Ouachita fault planes that continued southward instead of westward during Larimide times. This would connect the Greater Dallas area Balcones Fault System surface expression to the Precambrian basement thus forming a continuous zone of weakness/conduit for deep seated hydrothermal activity. The joint pattern relationships with an intersection to fault plane are in need of review by a competent structural rock mechanics geologist. Gulf Coast faults dip 50-55 degrees through dense carbonates and more than likely approximate the ideal 60 degree shear angle through the Paleozoic sequence. Applying the 60 degree shear angle to observed joint relationships, considering that the most easterly known joint must lie approximately 4 miles from the fault as surfaced mapped, yields a depth of over 30,000' to fault plane intersection. Hydrothermal activity is still present around the Hot Springs Arkansas area which also lies toward the eastern side of the old Ouachitas even though the Balcones heads north into Oklahoma. When one looks at the early Tertiary fault patterns one sees that they turn east, south of Rockwall, one suspects that the Balcones Zone may do the same and trend into Arkansas via Oklahoma at the same latitude as Hot Springs. Regardless of whether the Hot Springs area is associated with the Balcones, possible wrench faulting or not, the point is that it lies on the eastern side of the range and does have a zone of weakness conduit for hydrothermal activity. The predominate hydrothermal mineral present in the Hot Springs area is quartz as it is at Rockwall, thus we have a similar structural and geochemical setting match with a modern existing example available for comparative study.

The probability of a normal fault near the eastern shore of Lake Ray Hubbard that was active during Upper Cretaceous times connected to a deep basement hot spot associated with meteoric waters was mentioned by Dr. Cunliffe. High temperature-high pressure silicate rich water or magma forced its way up the fault plane to the associated joints, eventually solvating its way into the Pecan Gap Formation. The author suggests that if the mineralogy of the supposed outcrop of the Wolf City sandstone on the shores of Lake Ray Hubbard is the same as the dikes, that this outcrop may be evidence of a buried laccolith, horizontal dike or sill that spread out as a result of contact with the indurate overlying Wolf City mudstone. That such an event would have absorbed the Wolf City sand into its structure is a foregone conclusion. The absence of dikes further south of Rockwall may be due to the fact that the Pecan Gap dives into the subsurface southward, thus hiding the dikes from view. Various authors have documented dikes along the Balcones System as far south as Bastrop and Gonzales counties. There are also several examples of cold intrusive olivine/serpentine plugs and laccoliths in that area and an undersea Upper Cretaceous volcano east of Austin near Lockhart, Texas. Thus, it may well be that these vertical dike features may be present in the subsurface closely associated with old buried Balcones escarpments. These features would be difficult to document in the subsurface either from well bores or seismic. High density gravity station mapping or airborne magnetics would be required. Ellwood and Payne (1992) documented natural magnetic effects associated with the wall. Of interest to some may be the fact that the remnant magnetism of the stone was measured by the author at 40 gauss. There is little iron and virtually no magnetite in the stone. When an iron dust film was applied to the stone no magnetic field was observed. This left us with the possibility of either ionizing radiation or random oriented magnetic field. A geiger counter check yielded no counts over background so we are left with the possibility of the presence of hard magnetic minerals displaying individual domains within the stone contributing to a random field orientation. Such elements are common to alkali rich plagioclase granites. An interesting feature of these minerals is that once magnetized they do not lose their remanence as easily as ferromagnetic iron group metals. The potential ferromagnetic minerals that are suspect in this case are sphene (titanite) and brookite. Certain titanium alloys are suitable hard permanent magnetic materials. In this particular case the titanium alloy is probably in association with a crystalline ceramic material like sphene. How could these minerals exhibit a 40 gauss field strength when the earth's field as prime magnetizer averages 0.5gauss? The magnetizing or domain orienting force appears to be inherent in the rock's history. The individual magnetic domains are controlled by the mineral grain's crystallography history and magnetic susceptibility and would appear random if the material had been reworked in situ by possible hydrothermal water flow. The mechanical motion of density separating heavier grains and aligning of the crystals molecular magnetic domains within the then semi-plastic stone material by fluid and gas flow could conceivably yield enough oriented domains to achieve the measureable field prior to final cementation. When one considers that crystalline quartz and zircon are



piezoelectric dielectrics that could have easily induced a magnetic field when continuously exposed to subtle earth movements such as lunar cycle rock tides, then the process is understandable. It may be that the internal stress within the rock results in a naturally occurring piezoelectric discharge that might possibly generate an induction magnetic vector. Such a condition would obviate the need for a high magnetic susceptibility element. At any rate, the conclusion is that the magnetic domains in the individual susceptible grains demonstrate enough orientation to generate the observed field strengths. In terms of genesis of the Rockwall, in light of the stone's measureable magnetic remanence, does the supposed Wolf City Sandstone source for the dike stone possess these magnetic qualities? If not, why would we suspect that it is the source for the dike stone?

The author proposes that the presence of earlier crystallization and elevated spotted oriented concentration of magnetic mineral crystalline silt grains and associated remanence is proof of the materials igneous origins and later calcite matrix crystallization. This is in keeping with paleomagnetic igneous material crystallization and orientation with the earth's dipole magnetic field once Currie point is reached for each of the respective magnetic grains. The difference noted in this case is the randomness of the fields within the bulk material. The concentration of magnetic grains within the bulk material is higher than locally sourced sandstones could conceivably achieve or supply as is the occasional remanence hot spot orientations. The local deeper stratigraphically positioned sandstones are chiefly non-magnetic. This is a direct analogy to a typical magnetic material prior to magnetization. The molecular domains are chiefly random. When subjected to a low magnetizing force, some of the molecular domains align, while others do not, thus creating hot spots within the magnetic material which is exactly what we are seeing in this case, only at a grain size level instead of a molecular level. Within the bulk stone material we have mineral grains that have high magnetic susceptibilities, each of which displays domain alignment at a molecular level within each grain. Hot spots occur where there are greater concentrations of magnetic grains and aligned magnetic mineral grains probably resulting from grain density mechanical separation during transport. This does not occur during igneous melt solidification in this manner. Density separations within igneous melts always separate out with the heavier fraction gravitating toward the base of the melt. The minerals within the dike stone align with each other and not the earth's field due to their stronger field strength. However, the mineral silt grain fraction of the bulk stone is chiefly composed of quartz, a diamagnetic material that cannot display remanence. The grain encapsulating calcite is also diamagnetic. Most of the magnetic grains were mechanically held apart from one another by the other mineral grain fraction, hence only where localized density separations concentrated the grains within the stone do we find grain alignment and hot spots. What this is telling one is that the magnetic grain fraction (dispersed aggregate phase) formed well before the calcite matrix (cementing fraction) at a deeper level within the expanding hydrocarbon/hydrothermal upwelling pressure dome. Some of the quartz silt grain fraction is hydrothermal quartz with the balance cannibalized from sandstones deeper in the stratigraphic column. This explains why the crystal grain size is so small, literally what one would expect in a rhyolite or aplite. It also speaks about the vertical energy of transport. The seed crystal size grains never stopped moving long enough to form hydrothermal wall deposits. This phenomenon occurred as a result of the grains being electrically insulated by hydrocarbons during transport. Once the pressure and temperature dropped low enough to slow vertical transport, fractionation occurred and the metamorphosed crystalline calcite matrix formed from a zeolite like sol-gel containing the suspended silt fraction by dewatering. This is analogous to a concrete or geopolymer dispersed aggregate phase slurry solidification. The cement fraction in concrete (reactant binding sol-gel matrix) will solidify only after movement ceases and interpenetrating crystal growth and chemical bonds are given the opportunity to form. The concentrated magnetic mineral grains dispersed aggregate phase achieved orientation with one another within the sol-gel after movement ceased just prior to solidification. The magnetic grains that were mechanically separated far enough away from each other by packing order of diamagnetic grains, magnetic fields could not interact. As a result, they remained randomly oriented within the sol-gel matrix as it dewatered and solidified into its present day configuration. Since this occurred at temperatures and pressures below the magnetic grain domain orientation Currie points, no overall molecular orientation to the earth's dipole magnetic field occurred.

Of possible interest to the geophysicist, the stone apparently has an extremely high acoustic velocity value and a resonance susceptibility to low frequency acoustic noise. While Lindsey's crew was preparing the site for excavation with a bulldozer, the low frequency vibrations from the dozer set the entire in situ dike into mass resonance or cavity resonance in the surrounding area. The seismic hum was both felt through the



earth and was audible according to Lindsey. The mass resonance phenomena is similar to singing sand dunes found around the world. With respect to cavity resonance, there is much evidence within the dike complex to suggest that numerous large underground cavities are present along the individual dikes. One described as rock lined is reported to exist beneath the County Courthouse with a dual dike narrow passageway leading to it. Another was located while digging a waterwell just outside Rockwall and has recently been pumped out and re-entered. On the shore of Lake Hubbard beneath Hwy 66, a large piece of earth moving machinery was lost during highway construction, sinking 18' below the surface. It took 145,000 yards of fill dirt to fill the hole after the machinery was recovered. That same day, the same contractor that lost the piece of equipment to the cavity lost another piece of equipment to another cavity in another local location that was unrecoverable. These cavities are not due to karst topography as they are not associated with limestone. Since the author has not been in one he cannot comment in detail on their possible origin. He suggests that they are original preserved structures within the Pecan Gap, generated by the action of water or steam, with the possible aid of dissolved methane and other hydrocarbons.

## UNCONVENTIONAL GENESIS OF THE ROCKWALL DIKE SEQUENCE

There is a presently existing geological explanation for the existence of the Rockwall dike sequence that is slightly out of step with currently accepted geological theory, one that makes perfect sense and one that has been documented. It has been conceived of and reviewed in the past prior to its recent resurgence but never achieved the noteworthiness it deserved based on the weight of the evidence. We will review the evidence in light of this theory. There are many clues present at Rockwall and other areas discussed in this paper that point to this type of genesis. Beginning with Rockwall, the Pecan Gap Shale's color difference over the other Upper Cretaceous shales of this region of Texas coupled with the fact that the dikes terminate at the top of this strata. The literature states that the Pecan Gap is a bituminous shale which means it contains either finely dispersed coal particles, asphaltic hydrocarbons or possibly small quantity of residual liquid hydrocarbon content from which it gains its color. The second clue is the out of character crystallized gray to brown calcium carbonate dike stone fracture fill material and its oddball suit of alkaline metal mineral microcrystals that are normally associated with hydrothermal materials. Thirdly, the evidence of both the stone material, its surrounding cements and the formation it is contained in having been subjected to lateral and vertical movement, elevated temperatures and pressures over formation temperature and overburden pressure from below is present (Pressure fracturing with associated secondary fracturing, rolled deformation of stone material while in a plastic state, pressure solution channel features, pressure and solution formation of domed caverns in the shale that have not collapsed over time, metamorphosed cements, pyrite and limonite cement along secondary fractures, and finally a piece of a possible fumarole whose mineralogy resembles that found in deep oceanic crustal fissures where no sediment column is present and whose primary gas emission is methane and carbon dioxide.) Further south of Rockwall lie the olivine-serpentine intrusives usually found with oil reservoirs on top. The Cretaceous undersea volcano between Austin and Lockhart that contains the methane derived stone kimberlite of diamond mine fame. Finally, the Jackson formation extensive regional natural gas blowout with its associated pyroclastic and volcanic materials. All of these with the exception of the Jackson Fm. are associated with the Balcones Fault System. The conclusion to be drawn from these clues can only be mantle magma and hydrocarbons forcing their way upwards along preexisting zones of weakness during the Balcones/Laramide Orogeny times, and a later occurrence of the same phenomena, the Jackson event. Evidence?

As with any profession, sometimes the scientific breakthroughs come from outside that profession and professional territorial imperatives block scientific progress. Geology is not immune to this malady. Enter the picture Cornell's Professor Emeritus of Astronomy, Dr Thomas Gold and the Abiogenic Theory of Genesis of Hydrocarbons and coal. Geologists wrestled with this years ago and came to the conclusion that the majority of oil, gas and coal were the products of biogenesis. The weight of the evidence that Gold presents suggests that we were premature in our conclusion. Additionally, Dr Gold has found evidence that both the genesis and evolution of life on the planet itself originated within the protected environment of the deep earth in the form of anaerobic bacteria extremophiles whose food chain was water, rock minerals and upwelling hydrocarbons, thus life itself is both dependent on and a function of deep hydrocarbon generation.

Dr Gold as well as Russian high temperature and pressure organic chemists have demonstrated to this authors satisfaction that biogenesis alone cannot account for the chemistry of hydrocarbons and that their genesis, like that of diamond dictates pressures and temperatures found at 150km down, within the earth's mantle. Gold further states that hydrocarbons are only degraded by biological action to the state of that found within present hydrocarbon reservoirs of sedimentary origin. Gold further demonstrates that all the carbon on the planets surface originated from upwelling hydrocarbons and is only recycled by life. First, the "deep hot biosphere" oxidizes some of the upwelling hydrocarbon (energy source), chiefly methane to water and carbon dioxide, uses a fraction of the hydrocarbons in building amino acids and enzymes ( structural and functional building blocks for life that are both used in situ and carried up with the hydrocarbon soup). The chief gas generated by life that is carried up with the methane and heavier hydrocarbons is carbon dioxide. Carbon dioxide along with water and sunlight are the three ingredients necessary for photosynthesis, without which all surface life would cease for lack of an energy source. It is also the second ingredient in limestone and carbonate cements, like that of Rockwall. Gold states that the fracture and fissure filling carbonate cements associated with deep hot hydrocarbon upwellings from the mantle are always of a peculiar crystalline form and not at all like limestone. Couple this with the quartz sand picked up along the way and the silt sized hydrothermal mineral crystals that formed from the accompanying hot high pressured aqueous fluids, the rolling and pressure solutioning and you have the peculiar out of place and context Rockwall dike stone. The pressure solutioning that created the channels in the stone generated the fractures and gave the less porous and permeable Pecan Gap Shale it's bituminous mineral content and color. Likewise these same high pressure and temperature aqueous solutions and dissolved methane and carbon dioxide responsible for creating the fractures and odd dike stone and structures would have generated the preserved dike rock lined pressure dome cavities in the shale. Basically all the pieces of the Rockwall mystery fit together nicely in light of Gold, et al's theory and proof.

Moving on to the oilbearing olivine/serpentine intrusions and the Kimberlite bearing igneous intrusion; These features possess roughly the same timing as Rockwall, occur downthrown to and in a line some miles east of the main Balcones fault scarp and all possess the same upwelling mantle derived primary event hydrocarbons and intrusives. It appears that a larger overall geological picture is emerging complete with mechanisms for the central Texas region. The Jackson Formation event is Tertiary, further east but parallels the older set of features. This event stretches from deep south Texas around the coast, to the Mississippi salt basin and as such cannot be the result of sedimentary gas reservoirs blowing-out along a regional depositional fault. The amount of gas and pyroclastic debris blown out far outstrips the reserves of the suspected culprit reservoirs. Having personally reviewed the pyroclastic debris and determined it to be of volcanic origin, and having been around blown out and burning gas wells this author knows that these pyroclastics did not originate from Jackson Formation gas reservoir blowouts and associated mud diapirism catching on fire at the surface. There also exists an old theory in geology that may have merit, that states that salt dome stocks may be cored with volcanic plugs based on gravity surveys. If this could ever be proven, the mantle derived hydrocarbons could be demonstrated to be the source for our salt dome hydrocarbon reserves. The domes could as well be cored with deep-seated upwelling hydrocarbons. Gold gives accounts of rippling earth effects associated with deep gas upwellings and correlates it with the cause of earthquakes and the underlying mechanism for continental drift. When one finally grasps the potential and gravity of Gold's concepts, petroleum geology and geology as a whole has renewed meanings for the practitioner. The Swedish government drilled a 6km well bore into the Siljan ring complex (an ancient meteor crater in the Precambrian granite shield that never had a sediment column overlying it) on Gold's recommendations and encountered everything Gold's theory suggests. The oil, gas, deep extremophyle bacteria consuming oil, gas and generating carbon dioxide, hydrogen sulfide, magnetite and organic compounds that have to date not been identified because they were too difficult to work with due to their foul organic smell (amino acids, proteins, enzymes?). One could claim that the deep seated bacteria generated the oil and gas. If so what was their energy source and what were they doing at that depth? One could claim that this is the result of a chondrite meteor impact but this supposition implies that all the carbon on earth is a result of carbon meteor impacts or that all water on earth results from comet impacts. People sometimes forget that meteors, comets and planets possess like origins--swirling gas and dust clouds condensing into solid masses and undergoing density separations due to increasing gravitational pressure and resulting thermodynamic influences. Further example can be extracted from Gold's publications.

NATURAL OR CONSTRUCTED FEATURES?

Although this author has constructed a case for natural occurrence, the Rockwall dike system has long been known for its resemblance to construction as opposed to most sand dikes that do not display staggered joint stone masonry features. Various linteled portals and archways complete with arch guiding springer stones have been documented along the wall. Many of the openings are in fact square and resemble windows or conduits for water. One lintel that was excavated and brought up from a water well in 1949 had what appeared to be an ancient script on it that is roughly in a straight line across the stone. What is more interesting is that a copper coin like object erratic artifact found in cuttings from an augered water well in 1870 in Illinois at a depth of 125' had two humans portrayed on it and the exact same script etched around the edge of the object. This object is now in safe keeping at the Smithsonian. The Pleistocene strata the coin was brought up from dates to 200,000-400,000yBP by superposition. The early 1900s discovery of the dike stone lined passageway within the city of Rockwall that lead to the underground vaulted chamber beneath the town square mentioned before presents a geological enigma. No one has supposedly entered this feature since. Lindsey is currently negotiating with the property owner under whose land the entryway lies on in order to gain access to the supposed chamber. One of the geology professors at UT Arlington stated that some of the dikes appear to have been repaired or built on to. Whether this could be attributed to early settlers or a Pre-Columbian peoples is a question for archeologists. Most of the features can be explained away geologically such as the constant elevation of the top of the wall's relation to the relatively flat top of the Pecan Gap formation. Others have no readily available solutions. That an early population could have constructed dwellings from the material or even recombined the weathered material into a sort of geopolymer is not questioned. There is evidence all over the old megalithic building world for cast instead of cut stone. Many of the more rectangular stones do display casting features common to cast ferrocement and plaster materials. All of the mortar between the stone joints looks as though a trowel was used to spread the mortar bed and butter the stones. The resemblance is uncanny. More often than not, nature creates things that confound the wise. Truth is much more strange than fiction and certainly more entertaining. As geologists we are conditioned to working from the standpoint of uniformitarianism and not catastrophism. Catastrophism could yield an equally good argument for an intelligent marine civilization wall construction. We may find for example that the trigger for the Larimide Orogeny is related to a Cretaceous low angle meteor impact with the Rockwall event being only a peripheral feature. The age of the dike emplacement is in alignment with the Larimide event.

The age of the shale the dikes lie within is not in question. Neither is the fact that it was laid down in shallow marine seas as was the case for the underlying and overlying sediments and that the material has not been disturbed. Timing on the dikes appears to be near basal Marlboro Marl. But it does not mean that people would not have utilized the feature by digging into and gaining access to their shelter through a protected preexisting access in the wall or have been involved in mining a particular mineral from specific localities along the wall. The Pecan Gap shale is certainly competent enough to support an underground dwelling or mineshaft. We know from examples of hand built underground tunnels in South America and Iraq that early man had a preference for this type of dwelling.

The arrival of Homosapiens, sapiens on the scene has been pushed back from 30,000 years to over 120,000 years. One radiometric age dating specialist's career was ruined by archeologists in Mexico for age dating diagnostic ash falls by four methods at 250,000yBP that sandwiched a bed containing advanced stone tools commonly associated with Homosapiens sapiens. This 250K figure is a date match to mitochondrial and recombinant DNA regression "common mother" studies performed on our species by biologists. During the early to mid 90s a Turkish archeologist unearthed 3-100'+ long fossilized wooden boat hulls complete with bituminous caulk that dated to 100,000yBP. This author is well aware of the pitfalls of radiometric dating that give anomalous dates, however, in the case of the boats, the wood and caulk was fossilized. If this date stands, these boats are the work of our species. From Arizona to Wyoming there have been repeated reports and rumors complete with photographs of finds of the buried skeletal remains of a 7-9' tall CroMagnon species that have not been subjected to dating. Similar finds of 7-13,000y old tall mummies with fine curly red hair have been unearthed in South America that were definitely not from Amerindian stock. A similar recent report from Utah of finding red and blond haired mummies in a burial vault, complete with metal tools makes one wonder if CroMagnon's sudden appearance on the middle eastern scene, 100,000+ yBP, is not the result of an American seafaring species dispersion into Europe and the middle east. Civilizations have a tendency to rise and fall over the span of several thousand years that can be attributed to any number

of conditions. This author keeps seeing this 125,000 yBP date thrown out on old finds related to what appears to be a beginning date for an intelligent civilization. Either the dating is wrong or we are in for a good dose of revisionist history over the next few years. How could a civilization flourish from this time period and disappear without a trace. This interglacial period is immediately prior to the onset of the last ice age. A rapid cooling would have certainly reduced their numbers and caused movement to the tropics. The amount of deposition along the Gulf Coast for instance would have buried a near coastal city beyond reach over the past 100,000 years. Along the western seaboard earthquakes would have reduced their cities to unrecognizable rubble long ago. The rise in sea level since the last meltdown would have inundated coastal cities beneath 400' of water and left few remaining traces. Metal objects with the exception of gold or platinum would have oxidized many thousands of years ago. Ferrocement construction would have turned to dust by now. Only natural stone or geopolymers would survive, and we do see these products all over the globe, sometimes under water. The massive stone structures in South America have been identified with reasonable young cultures, but there is every possibility that these younger cultures only inhabited the cities left by a culture from the remote past. Dr. Davidovits's correlation of organic ring chemistry to silicates leading to the discovery of geopolymers promises to rewrite much of our present understanding of geochemistry, concerning cold process silicate and carbonate cryptocrystallization and the times it takes once the ingredients are mixed in their proper proportions. If the right ingredients are present, cementation may not take millions of years to accomplish but a matter of hours, without the aid of slaked limes and clays, by the mechanism of geopolymerization. Previous work in geochemistry noted the similarity of clay mineral ring structure and organic ring compounds in relation to biogenesis, but failed to see the chemistry of geopolymerization.

Another of Davidovits discoveries concerns the ability of certain organic acids to soften or dissolve rock, including igneous rock. Many researchers in geochemistry have also noted the presence of these same organic acids in igneous rocks that are of apparent inorganic origin. The author is unaware if geochemistry has utilized these acids in cold crystallization experiments of pseudo igneous materials similar to those observed at Rockwall. Geochemists have isolated these same organic acids in hydrocarbon deposits and have conjectured that there may be a correlation to oil formation even though Gold states the opposite.. If this is the case, then an inorganic cold process for the rapid synthesis of oil from mineral, carbon and water may be awaiting a lucky researcher that could yield the beleaguered oil industry an inexpensive sustainable supply of hydrocarbons for future generations. German chemists generated a successful diesel substitute with coal dust suspended in water and hydrated by massive amounts of hydroelectric power before the great war. Another German chemist, Dr. Peter Plichta synthesized low temperature and pressure stable higher silane oils that mirror the chemical structure of hydrocarbon but pack many times the caloric punch of like structure hydrocarbons. Like hydrocarbon genesis at great depths, the author can see parallel generation of the higher silane oils that coexisted with the mantle hydrocarbons. What impact would these silica forming oxidized silane oils have on rock genesis for geochemistry, rock mechanics and seismology if their formation at depth could be documented?

There has been a long standing debate in geology concerning the origins of carbonates, evaporites and salt centered around the materials balance of these solutes in sea water and the fact that no large scale depositional mechanism of this type exists at present. Since much of this type of deposition is related to the timing of continental drift and periods of high crustal activity, it is postulated that these types of rocks are fast depositional sequences, supplied by large scale sea floor hydrothermal and igneous activity products related to sea floor spreading and/or worldwide catastrophic events. Catastrophic events are called on because the current heat convection cell mechanism postulated for drift falls short of being able to accomplish the observed. The author will propose an alternate mechanism in a side paper. The geopolymer discovery offers sedimentologists a mechanism for accomplishing the impossible in a short period of geological time. It also offers paleoentologists an explanation for mass species die-offs and rapid burial with excellent preservation observed at different points within these sequences as well as why few microfossils are observed in massive salt sequences. The drift related Triassic age opening of the Gulf of Mexico by observed basin and range type down-warping mechanism is the ideal basin setting for large scale igneous and hydrothermal events capable of generating the volumes of minerals, carbon dioxide, heat and conditions necessary for rapid evaporite and carbonate deposition and cementation that produces the observed ringing of the Gulf continental shelf and margins with massive salt and carbonate sequences. The Gulf of Mexico almost resembles a large collapse caldera. With this in mind consider the possibility of a

Cretaceous age civilization at Rockwall that now is not as old as we previously thought, having been inundated by pyroclastic debris and sea level changes related to the proposed mechanism. The possibility becomes less far fetched. The possibility of how an intelligent species may have appeared during this time is covered in a separate paper on speciation mechanisms. There are certain examples published in Cremo and Thompson's book entitled "Forbidden Archeology" that the profession should not take lightly. These seemingly out of place, out of context examples may be real. The age of the earth is presently in question by as much as 38% due to flawed basic theoretical assumptions behind radiometric dating. This problem is compounded when we consider the possibility that our chemical precipitate depositional sequences may have occurred very rapidly and interference from deepgenesis hydrocarbons and silane oils. New scientific discoveries in the field of electrolysis formed electron charge cluster and far UV-X-ray laser physics related to bombardment of radioactive elements with these technologies has resulted in a near 100% reduction in radioactivity by transmutation in less than 30 minutes of exposure time. When one considers that a lightening bolt produces massive quantities of charge clusters and that we now have identified mechanisms related to sferics that produces coherent UV radiation at the surface of the planet, constantly, we have a real problem. This may point to an explanation as to why we do not see the correct corresponding quantities of daughter decay products that should be in association with the radioactive elements in the geologic record. If this is the case, most of our dating techniques must undergo radical revision or be relegated to the scrap heap. It is good when examples like Rockwall appear that test our abilities and cause us to question our basic Newtonian Mechanistic assumptions that have not been modified for over 150 years. Physics had to abandon this approach at the turn of this century, opting instead for relativity and quantum mechanics in order to further their understanding of matter and the universe. These two theories are currently undergoing radical revision behind the scenes because of new discoveries that do not fit that paradigm. We would do well to embrace the new physics to help us explain things that we have swept beneath the rug for too long before we lose all credibility.

There are many remaining mysteries within the earth sciences related to the known, much less the unknown. Much of what we have been taught and have accepted as fact is flawed and in need of reexamination. One has but to read geologist Richard Milton's book "Shattering The Myths of Darwinism" to realize how much we have dogmatically and unquestionably accepted on faith. We are at a turning point in our understanding, either we seek acceptable solutions based on measurable, demonstrable fact or suffer the consequences. As a science, we are not alone. Virtually every science is undergoing the same growing pains. The hard physical sciences are having to abandon or severely modify accepted theories that are 100 years ahead of the old Newtonian mechanistic paradigm geology is based on. A rigorous study of all possible catastrophic mechanisms is needed.

This author would like to see the geological and archeological community offer support to Mr. Lindsey's efforts. He is a Harvard Design School trained architect with many years of experience and a likable gentleman that appreciates and respects the findings outside support may have to offer. Even though the popular press has recently made astounding claims for this site, these views are not shared by Mr. Lindsey. He has approached the project out of curiosity to ascertain the truth, not for financial gain. The site would make for an exciting Cretaceous intelligent sauroid theme park and should be developed in that manner to enhance tourism in the area. Mr Lindsey has no interest in that, however. He has spent his own time and money in his quest, with nothing to gain from it but personal satisfaction in a job well done. The area has much to offer in the way of thesis and dissertation mapping projects for geologists and may harbor economic minerals in quantities sufficient to mine as metal sulfide cemented dike sands have been noted within the Rockwall dike complex. His address and phone number is as follows:

## THE AUTHOR

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