

# STONE ZINE 1/14

THE DIGITAL PERIODICAL PUBLICATION OF THE STONE FOUNDATION



— THE RING OF BRODGAR, ORKNEY

## Editorial . . .

SO, here it is:

## STONEZINE 1/14

The hope was to send out the second edition of STONEZINE—STONEXUS Magazine's digital counterpart—in September but the Opus 40 Restoration project and the 2013 Symposium preparations intervened.

After the Symposium I began work on it again and soon had well over a hundred pages! (Issue #1 had 68.)

The STONEZINE format is evolving. Increasing the size of photos (and decreasing the number of them per page) shows the photos to better advantage and does not increase the cost of production.

BUT it does result in an unwieldy product.

A hundred pages?

Even if some pages contain only a photo and caption, no-one, not me and probably not you, would go through that at a sitting.

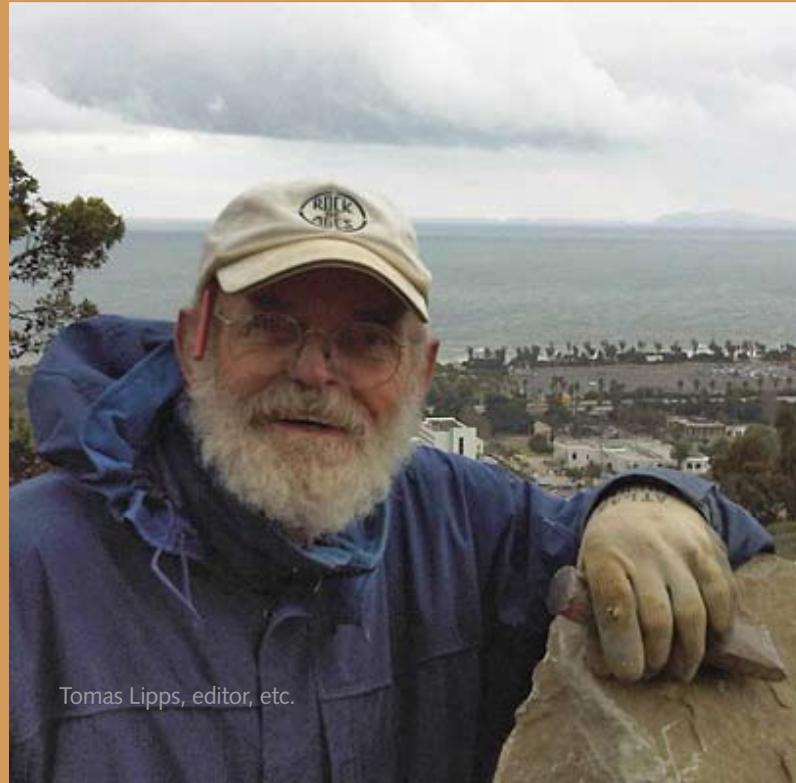
I, and probably you, would file it away and then forget it. Right?

SO, as suggested at the Symposium General Membership Meeting, STONEZINE will be issued in smaller, more digestible installments. I'm thinking at least 5 times a year: January, March, July, September, November (with Stonexus coming out in May or June.)

This will enhance connectivity between the organization and its member/subscribers which some will welcome and others, if they wish, can opt out of.

The content will vary in character: an article or a photo gallery, a 'random rubble' album, X-Files, the work of selected members, a Newsletter section. This first 2014 issue at 34 pages is more than future issues will likely be, but I don't wish to abbreviate it more than it has been already.

The original article on the stonework of Scotland appeared in STONEXUS #VI with photographs in grayscale. I am truly happy to present them here in glowing color and I hope you enjoy them too. The article extract has been much enhanced by the KAP (Kite Assisted Photography) images provided by Kieran Baxter (check out his work: <http://www.topofly.com/>)



Tomas Lipps, editor, etc.

A member who recently renewed included a donation that he designated "For Tomas' Travels." I was touched by that and put it in a special fund with that name—and I unabashedly invite anyone reading this to contribute to it.

My trips abroad, to Spain, Scotland, Japan and Ireland, have been the source of some of the best material in STONEXUS, or so I've been told. (The trip to Scotland that resulted in the article presented here was funded by one of our members.)

There are other places that I would like to go and delve into that particular culture of stonework, but lack the wherewithal to do so.

STONEXUS Magazine is sponsored by Fractured Atlas, a non-profit organization that acts as the magazine's fiscal sponsor so contributions for the purposes of STONEXUS are tax-deductible to the extent permitted by law. The more you give the more you can deduct. So, as Brendan Behan said "May the giving hand never falter."

<https://www.fracturedatlas.org/site/fiscal/profile?id=6844>

## stonetc. . .

(that's the title of the Stone Foundation newsletter) will appear as a supplement accompanying the print editions of STONEXUS, and occasionally as a page or two in STONEZINE installments.

The only news we have now to communicate can be contained in this column. There are four major items:

**OPUS 40 RESTORATION PROJECT** Phase 2 of this Stone Foundation communal project, a Master Class in Dry Stone Walling led by DSWA (UK) Master Craftsman Sean Adcock, was scheduled to commence in April. Instead, it **will take place either in June or October**, depending upon the availability of funding.

**Experienced** Stone Foundation stonemason/waller members interested in participating for a day or two in this communal project should contact [tomas@stonefoundation.org](mailto:tomas@stonefoundation.org). There will be no charge for this workshop, in fact, participants will be modestly compensated for expenses and time taken away from their work. Meals included. For a report on Phase 1 of this project, visit: <https://www.facebook.com/photo.php?fbid=656774821011090&set=a.6567747677762.1073741830.324555840899658&type=1&theater>

**STONEFEST 2014** This, the 10th such gathering of stone artisans and artists, will take place at the Marenakos Rock Center in Issaquah near Seattle May 12-16. There will be plenty of Stone Foundation members there—including me. I hope to see you there. For information about StoneFest visit: <http://stonefest.org/>

### STONWORK SYMPOSIUM 2014

Date: August 18-23

Place: Coast of Maine

Venue: SERC, the Schoodic Education and Research Center (formerly a Coast Guard Station.) It is located at the tip of the scenic Schoodic Peninsula which is now part of Acadia National Park.

Just down the coast is Mount Desert Island, the heart of Acadia National Park and the former Rockefeller Estate with its carriage roads and stone bridges (twelve of them, not two alike.)

Just up the coast is Prospect Harbor, the site of the fifth SCHOODIC INTERNATIONAL SCULPTURE SYMPOSIUM. Our gathering will occur at the midpoint of this six week event so we will have the opportunity to see seven granite sculptors at work.

**STONWORK SYMPOSIUM 2013**, Santa Fe, New Mexico

For an illustrated report visit:

<http://stonefoundation.org/symposiums/2013symp/Symposium2013Report.pdf>

# FOLLOWING THE OLD STONE ROAD—SCOTIA

STONEWORK OF THE HEBRIDES, ORKNEY AND SHETLAND ISLANDS

by Tomas Lipps



Isle of Harris, looking across to Skye (all photos by the author unless otherwise noted)

# CIRCLES OF STONES



Callanish Stone Circle, Isle of Lewis



Callanish Stone Circle, Isle of Lewis, detail

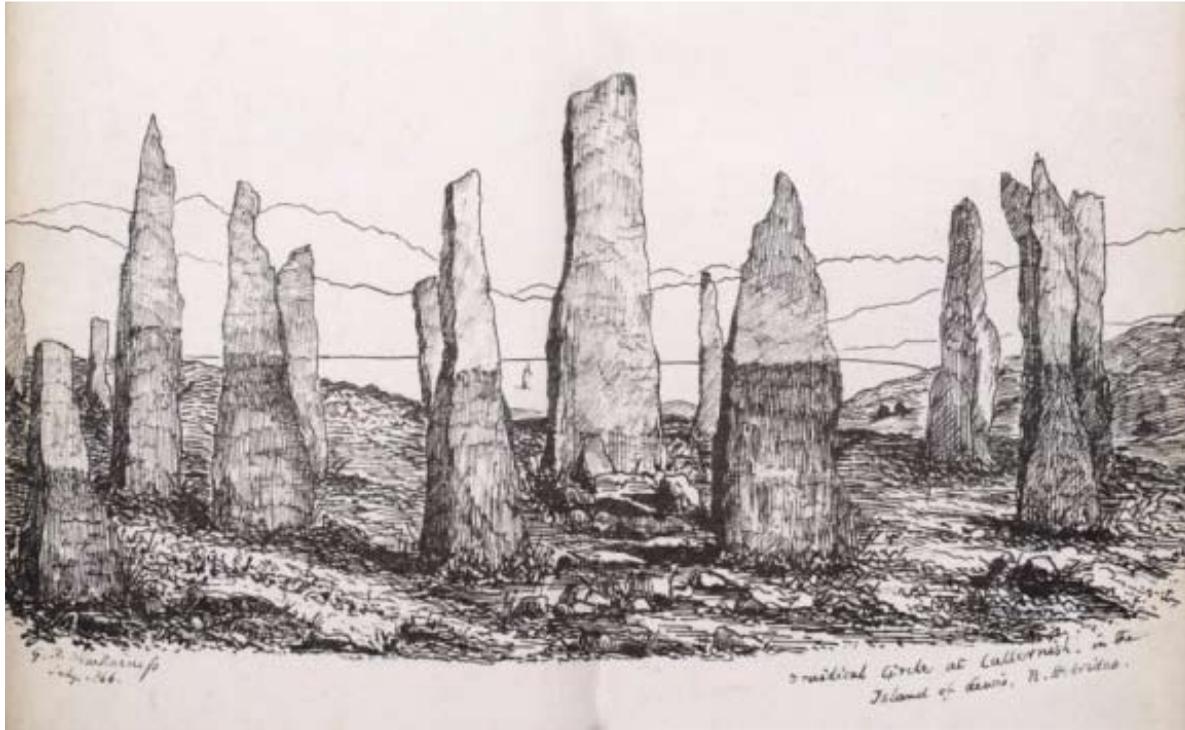
### ***The Standing Stones***

of the United Kingdom and Ireland, though silent, speak of the vision and determination of the folk who in ancient times quarried, transported and erected them. The stone circles were temples, a constellation of spiritual centers that continue to radiate an enigmatic power across the ages. Their mute, massive presence arouses admiration for the generative impulse, the immense effort and skill involved in their creation.

Two of the most notable examples in Scotland are to be found in the Hebrides and Orkney Islands. Callanish, on the Isle of Lewis in the Outer Hebrides, pictured above and on the previous page, is a remarkably concentrated, roughly cruciform grouping of upright gneiss monoliths. Three rows of stones radiate from a central circular configuration to the south, east and west and a double row forms an avenue to, or from, the north. The tallest (15' 7" high), most imposing monolith stands near the center of the circle. At its foot is a chamber tomb, presumed to be that of a later culture. Although the axes of the crossing rows align only approximately with the cardinal directions and the significant astronomical correspondences inferred by archaeologists and others are questionable, Callanish, centered on its rocky ridge at the base of a wide peninsula, is a hallowed precinct.



above: Ceann Hulavig is one of three other stone circles within walking distance of Callanish. Five large craggy boulders stand in a relatively tight circle. The fungus springing from the cow dropping in the foreground is *psilocybe semilanceata*, the so-called "magic mushroom". These grew here when the pastoral folk that inhabited the island raised these stones and might have been a source of inspiration.



above:  
View of stone circle at Callanish, Lewis.  
Title: 'Druidical Circle at Callanish in the Island of Lewis, N. Hebrides. G. R. Mackarness, July 1866.'  
Copyright RCAHMS (DP094025)

The Callanish stones came to be partially buried by an acculation of peat. Much of the peat was cleared in 1857 by Sir John Matheson, the landlord of Lewis. This excellent drawing of the Callanish stones with Loch Roag in the background was done by G. R. Mackarness, antiquarian and vicar, only seven years later and the lower, darker areas of the stones show what must have been the level of the peat before the excavation began.

RCAHMS is the Royal Commission on the Ancient and Historical Monuments of Scotland and we are grateful to them for the use of these images.



below:  
Aerial view of Callanish taken in 2004.  
Copyright RCAHMS (SC1023422)

## THE RING OF BRODGAR



*The Ring of Brodgar* is located in the interior of the Orkney mainland. It stands on a small isthmus between two bodies of water, the Loch of Stenness and the Loch of Harray. As with more contemporary temples, in the world of stone circles stylistic distinctions abound and Brodgar is as expansive as the Callanish assembly is compact. 340 feet in diameter, it was originally composed of 60 some stones. Of these, 27 remain as well as the stumps of 9 others

Even more impressive than the standing stones is the surrounding ditch that was cut into the bedrock just outside the stones, isolating the circular plane—what archaeologists call a henge, a sacred precinct—on which the stones stood. Some of the stones were quarried from the ditch itself; others are believed to have been brought from a hill 7.5 miles away.

The circumference of the ditch measures 1,250 feet. It was approximately 10 feet deep and 16 wide and was excavated with the only tools available at the time: stone and deer antlers. Imagine it, 13,000 tons of stone and earth. Access across the ditch to the henge was achieved by causeways, at the northwest and the southeast.



## STENNESS

### *A mere mile*

to the southeast of the Ring of Brodgar and connected to it by a narrow strip of land between the two lochs is, or was, another smaller and perhaps older circle of a dozen or so standing stones only four of which remain—the Ring of Stenness. The proximity of these two entities implies a relationship that will forever elude knowing.

Compared to Brodgar, the Stenness circle is of much smaller diameter although some of the stones are taller.

Within the circle is a central hearth as well as an arrangement of three other stones, two standing, one recumbent. Looking over the recumbent stone between the two standing stones, centered in view one sees the massive mound that is Maes Howe. (It is not known if this is the original placement of the stones and the mound has a much lower profile now than when it was built.)

aerial photo: Kieran Baxter



## *An astounding Neolithic revelation. . .*

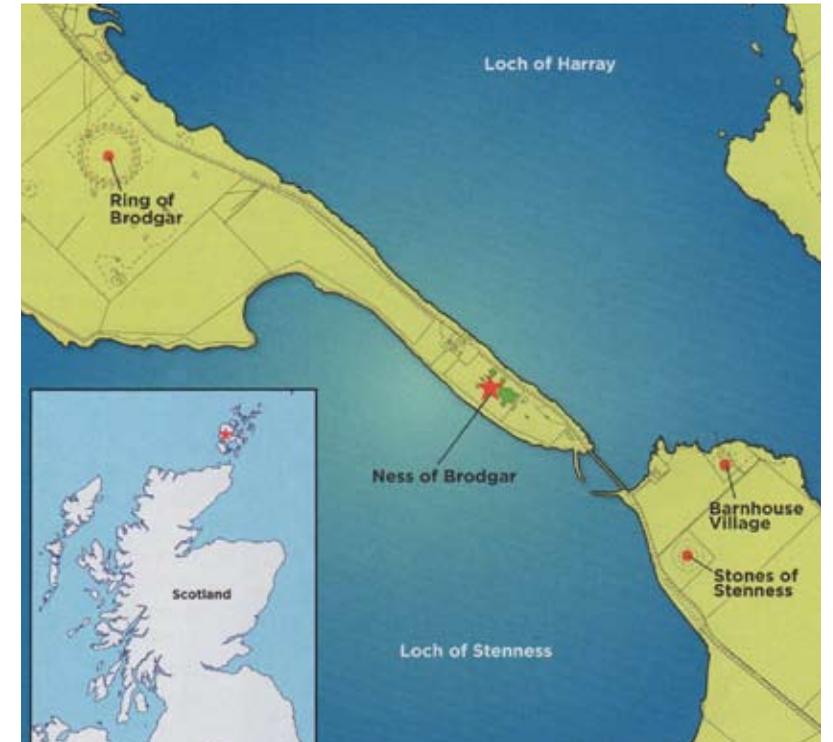
Photos on the previous page were taken in the summer of 2005. I was not then aware that preliminary excavations were already taking place on the promontory between the two sites, excavations that would over following years reveal a complex cluster of structures bounded by immense walls.

So, how interesting it was to open the January/February 2013 issue of *Archaeology Magazine* and discover an article entitled "Neolithic Europe's Remote Heart" about the discovery of the vestiges of what must have been the nexus of Orcadian 'culture' This article cannot be shared here, but I can recommend a *Smithsonian* article with links that anyone interested in this can explore: <http://www.smithsonian-mag.com/smart-news/archaeologists-uncover-massive-stone-age-complex-in-scotland-65189880/>

What has been revealed is a level of tectonic articulation and an implied, if not known, belief system far in advance of that expressed by neolithic societies elsewhere at that time (excepting, of course, Gobleki Tepi in present-day Turkey.)

The Ness of Brodgar, as it has been termed, is a complex cultural anomaly, an ancient ceremonial center that has altered previously accepted views of history. That this had evolved on the extreme northern periphery of the populated 'western' world literally and geographically inverted the accepted historical view of how culture(s) developed in northwestern Europe. A top-down, periphery-in model was, until the discovery of the Ness of Brodgar, inconceivable.

below: overview of excavations, date unknown.  
right: schematic plan view showing significant sites  
lower right: periphery wall, built 5,000 years ago.  
map and photos: ORCA, Orkney Research Center for Archaeology



# THE BROCHS



Dun Carloway, Isle of Lewis

# ROUNDHOUSES, DUNS, BROCHS AND WHEELHOUSES

## *Scotland,*

particularly the northern and western coast of the mainland and the Hebrides, Orkney and Shetland Islands is dotted with massive round stone structures, some of them tall enough to be classified as towers—the brochs. They were, archaeologists have come to agree, an indigenous architectural entity reflecting the needs, ingenuity and skills of the people who built them. Erected during the last part of the first millennium BC and the first century AD, the early Iron Age, they represent the high point of an evolving structural style peculiar to the British Isles. During the Bronze Age, habitations on the northern and western regions of the European continent were predominantly rectangular in plan; across the channel they were circular. These ubiquitous Roundhouses, as they are known, had conical thatched roofs, the supporting poles resting tipi style on the ground or, particularly in upland Scotland, on low walls of stone and earth. Over time they grew in size, complexity and height; Roundhouses became more fortress-like, what are referred to today as duns and/or brochs (from *borg*, Norwegian for fort).

Bronze Age habitations In the Hebrides and Shetland Islands were thick-walled structures, irregular in plan, an amorphous central area with contiguous individual cells. The brochs were unprecedented, an imported concept.

Archaeologists continue to debate whether the evolutionary step to the considerably more sophisticated brochs came about for defensive purposes (there is evidence of raiding by their close neighbors, the Irish Celts) or to assert social status, wealth and importance (the “castles” of local clan chieftains). There is no doubt, however, that it was achieved due to the emergence of a class of craftsmen whose skills are evident in the structures that survive. Similarities in design, technique and skill levels infer the involvement of master builders and teams of masons.



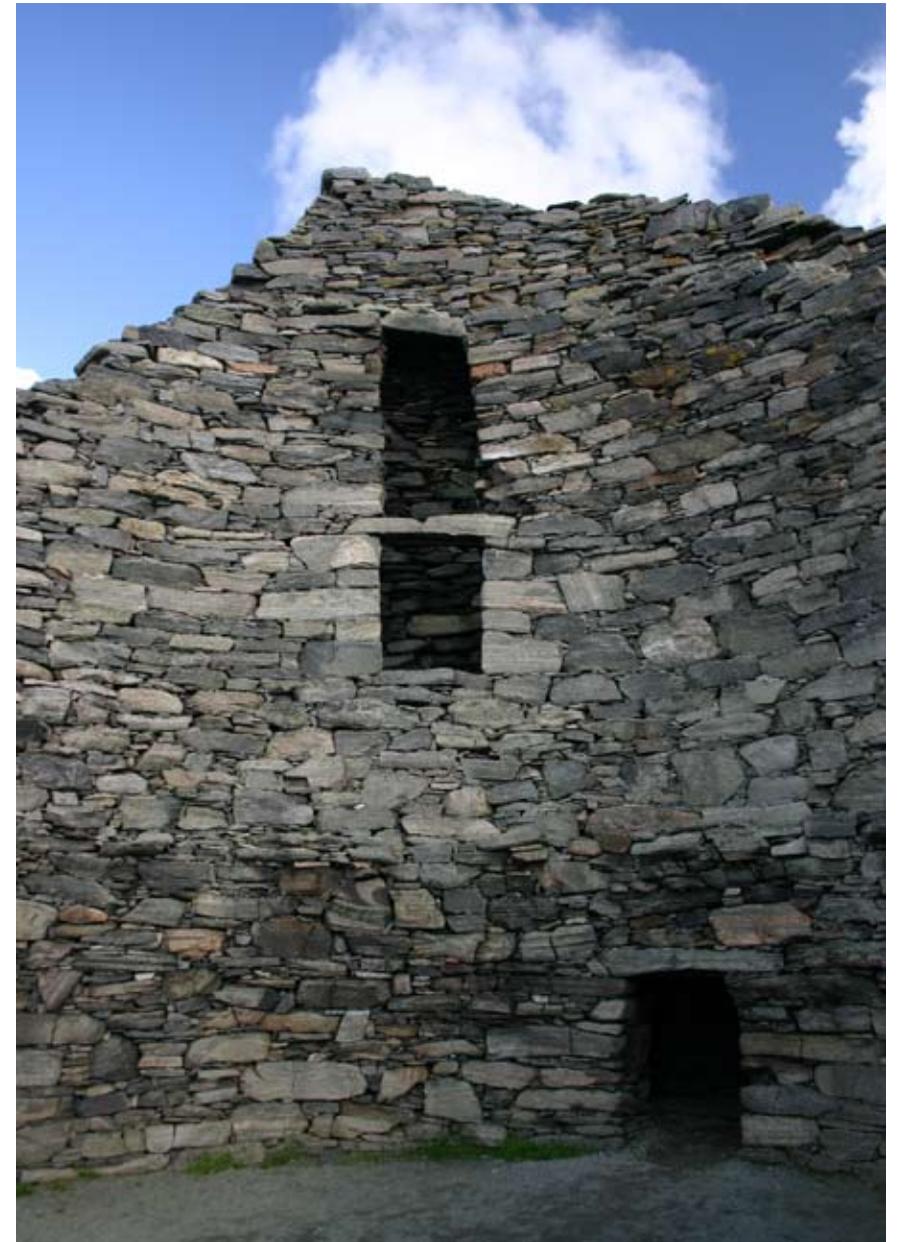
Variations abound but the elements are basically uniform. Brochs were round in plan and tapering in silhouette. Though squat, as towers go, they were an imposing feature, dominating the surrounding terrain. Mousa Broch in the Shetland islands, the only one that survives in a nearly original state (something it owes to its remote offshore location), is about 44 feet in height and 49 feet in diameter at base.

The dry-laid stone walls were immense, weighing as much as 2,000 tons and taking up fully half of the footprint of the structure. They consisted of an inner and outer wall, each 5 to 6 feet thick, separated by an intramural hollow 4 feet or so wide in which a staircase gave access to the higher levels. (This hollow, which served to ventilate the wall and insulate the interior space, is something that survives in Scottish architecture to the present day in the form of cavity walls.) The stairway, galleries and the long lintels that bonded the inner and outer walls at intervals stabilized the structure and enabled the builders to carry the stone up to where it was to be placed.

There were no windows and only a single entry which could be barred from the inside. The inner surface had at least one scarcement, or ledge, created by a setback or extended corbels on which supports for a platform or upper floor could rest. How they were roofed is a matter of conjecture and considerable debate. Most scholars imagine some adaptation of the conical Roundhouse thatched roof (see artist's rendering). The interior space contained a central hearth and cistern or, in some cases, a well or spring. The perimeter was often partitioned into “rooms,” particularly in the Orkneys where large thin slabs were available and lent themselves to this purpose. These interiors were modified considerably throughout a series of successive abandonments and re-occupations.

Drawing by Alan Braby from “Towers of the North” by Ian Armit.

# DUN CARLOWAY



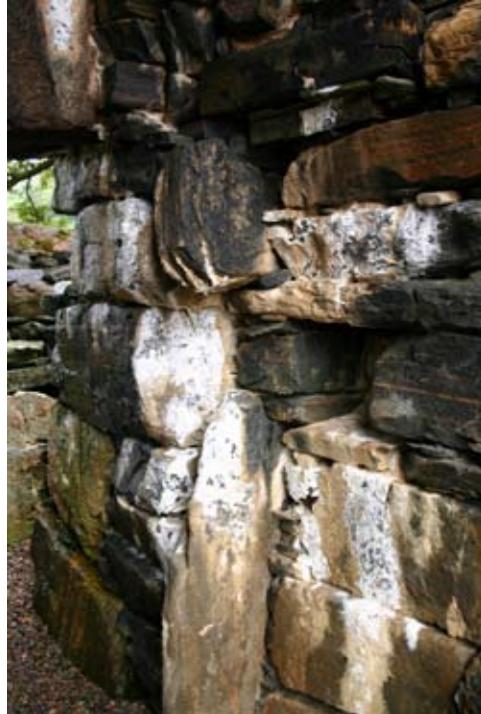
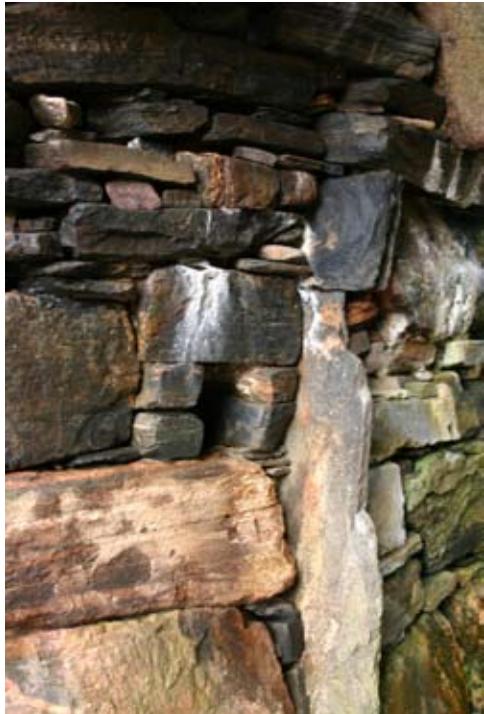
# DUN TELVE

## *Just opposite Skye*

on the Scottish mainland near the ferry landing at Glen Elg is Dun Telve, one of the finest examples of the broch-builder's art on the Scottish mainland. It is one of a pair of towers built in unusual proximity. Much of the stone from Dun Troddan, the other broch, sited further inland and on the side of a hill, was removed for use in the construction of a barracks for English soldiers in 1722. Dun Telve must also have suffered pillaging, but enough remains of both brochs to understand their original proportions, the structural scheme and the skill of the masons.

The photo on the left shows the intramural hollow between the interior and exterior walls and the row of openings which provided both ventilation and light to the galleries between the walls.

The photos below were taken from the interior and show the door-jambs and bolt-holes on either side of the singular entryway.





## THE BROCH OF BURROUGHSTON

### *This Iron Age broch*

was built on the outlying coast of the small, green and fertile island of Shapinsay. A remarkable detail of the interior wall is shown in the photo below: The singular rounded rock is a geological anomaly in the Orkney Islands and, judiciously placed as it is in this angular context, a subtle grace note, the record of an instance of artistic sensibility on the part of an ancient mason. It must have given him some satisfaction.



# THE BROCH OF GURNESS





### ***The Broch of Gurness***

is situated on a hook of land abutting Eynhallow Sound between the Orkney Mainland and the island of Rousay. It is dated to 01 AD.

Like Midhowe, its neighbor broch across the Sound, the broch's inhabitants began at some point to stand the large sheets of stone on edge to enclose spaces. The excellent photo here, taken from a camera suspended from a kite, shows the broch and the armature of its peripheral community. Much of the stone in the extended walls probably was scavenged from the broch itself.

# MIDHOWE BROCH



## *Midhowe Broch*

on the southwest coast of the island of Rousay just across the Eynhollow Sound from the Broch of Gurness, lies between two unexcavated neighbors, North Howe and South Howe brochs. It is well positioned defensively on a jutting stone cape that deters access on three sides (the natural channels separating it from the shoreline to the north and south were augmented by excavation.) On the fourth, landward side, the broch was protected by ditches and ramparts. As can be seen in the photo above the shore was an excellent source of building stone, a coastal quarry.

Midhowe is unusual from an archaeological perspective. The 'broch era' is considered to span 800 years or so, from the late Bronze Age to the early Iron Age, from 700 BC to the first century AD. The Broch of Gurness, its counterpart across the Sound, was excavated to reveal for display what is a fairly late stage of development whereas Midhowe was systematically excavated down to its Neolithic layers, revealing many phases of construction. To read about the Midhowe excavation and how it relates to the history of broch building in general, visit: <http://www.orkneyjar.com/archaeology/dhl/papers/howe/index.html>





above: Brochs were often surrounded with ramparts, one or a series of walls fronted by ditches. Within these ramparts and outside the walls of some brochs a village of small irregularly formed habitations and enclosures for animals was built along a connecting lane (Gurness and Midhowe, shown here, are two examples).

An area of disagreement among archaeologists and anthropologists is whether the villages were constructed at the same time as the brochs or later—when the population had grown, the social organization had altered and the need for defense (or status) had lessened whereupon the towers, or at least their upper levels, were dismantled for building material.

below: This modern (1930s) sea-wall was built to protect the broch from the sea. The vertical orientation of the stones though strange to some eyes is a style of stonework much used for harbour walls and sea walls in Scotland and, to a lesser degree(?) in Ireland. The upper section is mortared onto the body of the wall and seems to be an afterthought designed to deflect the force of the waves back on themselves. Evidently the spandrel brace stones intended to integrate the two sections have been effective.



# BROCH OF CLICKIMIN





### *A Bronze Age farmstead*

on an islet just off the southern shore of a small lake on the Shetland mainland evolved over successive occupations into an impressive broch settlement. Later, similar to the history of such settlements in the Orkneys, the broch structure

was reduced in height and the stone used in the construction of peripheral habitations. The quality of masonry here is excellent, both that of the ancients and that done during the reconstruction in the 1950s.



aerial photo: Kieran Baxter

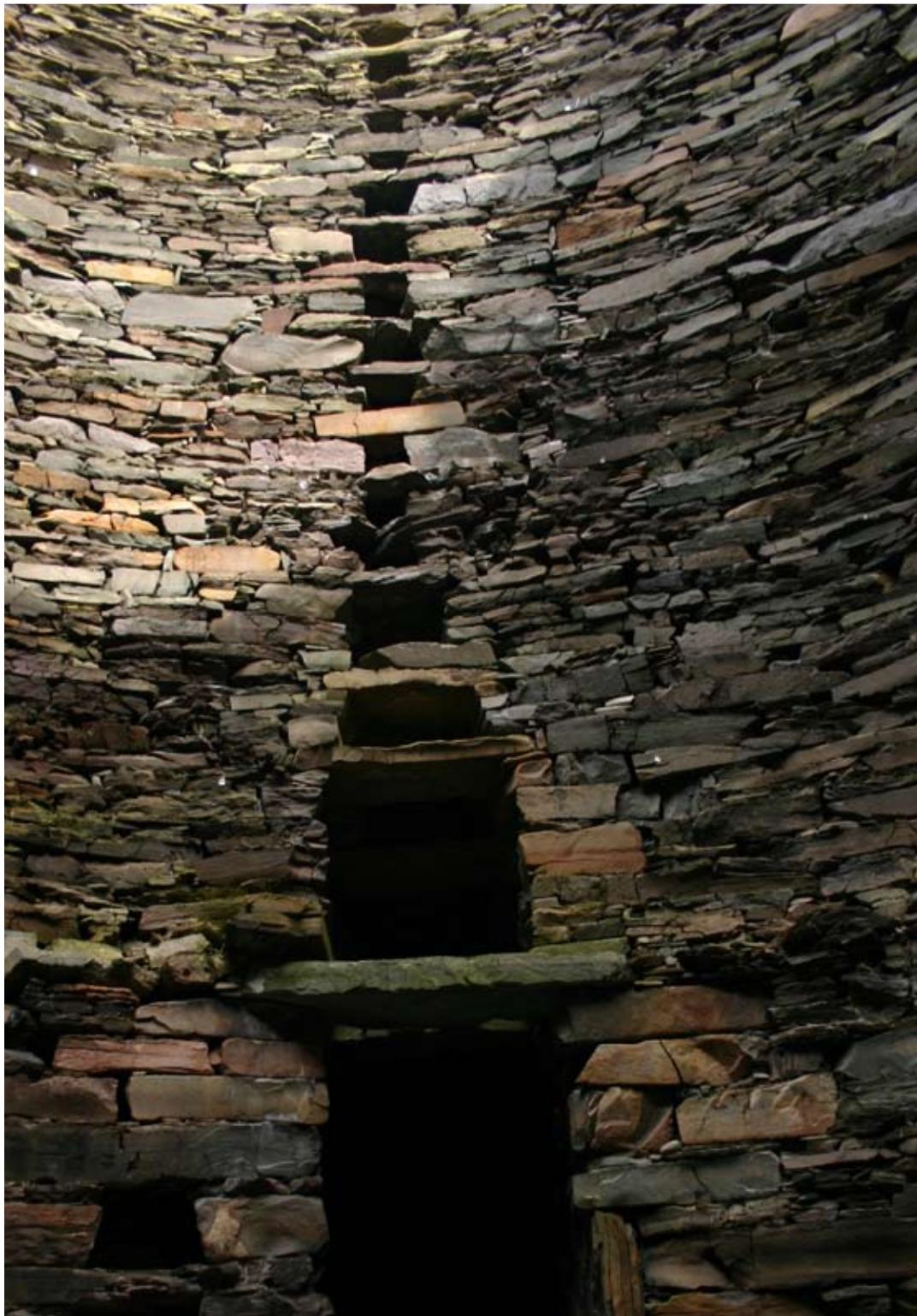


above: The window in this picture, one of two on the lakeside wall, is unique in broch architecture and may indicate a lapse of historical authenticity during the reconstruction in the 1950's, except for the entryway, no other brochs are known to have had openings in the outer wall.

left: The structure in the picture on the left is known as the "Blockhouse". Built immediately inside the only entryway it doubtlessly had a defensive purpose and is said to predate the broch itself. The cell seen on the left side of the structure had no access except from above. Storehouse? Dungeon?

BROCH OF MOUSSA



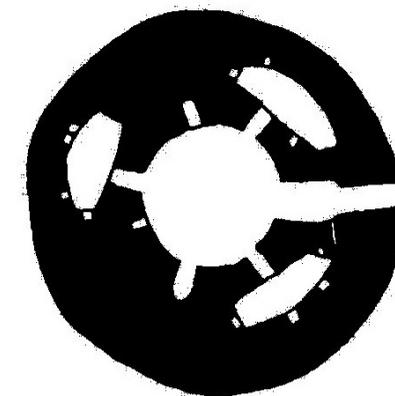


### ***Mousa Broch***

is the only broch that survives reasonably intact. This has much to do with its remote location on a small island off the eastern coast of the Shetland mainland. It is, or was, one of a pair; little remains of the broch on the other side of the sound between the island and the mainland.

Mousa Broch is about 40 feet in height and 50 feet wide at base—the interior space is 20 feet in diameter. There is a stairwell in the intramural cavity that goes all the way to the top of the structure. The openings in the inner wall, shown in the photo at the left, presumably serve to ventilate the wall mass.

Like other brochs, Mousa fell into disuse in the first few centuries AD, but entered recorded history in the 12th century when it served as a refuge for a pair of Viking lovers. As told in the Orkneyinga Saga, a certain Erland abducted or eloped with Margaret, the mother of Earl Harold Madadson. Earl Harold pursued the couple and besieged the broch but the lovers were secure in their stoney keep, resisted the siege and later married.



schematic plan view at ground level  
diagram by Libby Mulqueeny from  
Towers of the North by Ian Armit

aerial photo: Kieran Baxter

# WHEELHOUSES

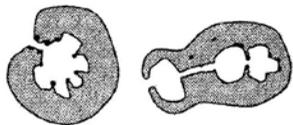
*The Broch Building 'Era'* terminated during the 1st Century AD. This happened earlier in the Hebrides and Shetlands than in Orkney. To meet the needs of a changing social structure and create discrete social and storage areas, the Orcadians continued to use the readily available thin sand-stone slabs as partitions. In the Hebrides and Shetlands, however, given the nature of the native stone, a distinctly different vernacular form of habitation evolved: Wheelhouses. These seem to be more sophisticated versions of the Bronze Age Roundhouses that preceded the brochs on those islands, the irregular contiguous 'nodes' of the Roundhouse morphing into a ring of cells centered on the hearth, something quite unlike the Orcadian "apart-ments".



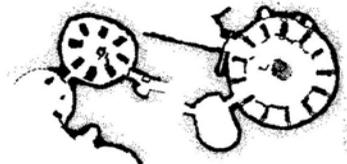
Bronze Age Roundhouses,  
Isle of Lewis



Iron Age Wheelhouses,  
Shetland



Diagrams by Libby Mulqueeny.  
from *Towers of the North* by Ian Armit.



Imposed onto the round footprint like the spokes of a wheel radiating from a hub (the open space around the central hearth) were regularly spaced radial walls defining a number of bays. These walls, thin at the base, were incrementally widened by corbelling to arch over the bays and, to an unknown extent, the central area. Archaeologists presume that this was roofed with the conventional conical thatched structure. But, speaking as a stonemason, couldn't, wouldn't, the builders have used their demonstrated skills and ingenuity to create a corbelled dome? With each corbelled ring in place, the structure is secure and the urge to continue is strong. These savvy craftsmen had intuited the form of a catenary arch and an arch, a segment of a dome, yearns for completion. Unlike a broch, the structure being thus covered could, with its low profile and ample base, absorb the lateral force exerted.



The value of an oculus, a hole for smoke to exit and light to enter, would be apparent to those builders. Such a dome, though, would be the first part of the structure to disintegrate. Therefore, as no Wheelhouses have ever been discovered entire, there is no proof that this happened—or, that it didn't.

However it was covered, this, the ultimate version of the Roundhouse, was a departure from the impracticalities of the broch. The low profile took it out of the wind and, nestled into the earth as it was, the Wheelhouse must have been a cosier place to live. Its less impressive exterior silhouette and more impressive interior space reflect

a significant alteration in attitude and life style. The schematic and practical manner in which space is articulated is evidence of a structural intelligence at work.

Architecturally, the brochs represent the high point of the Roundhouse lineage; the Wheelhouses were its crowning achievement. Ahead lay abandonment and from two dissimilar sources, Roman and Viking, the advent of rectangularity. The age of the broch had passed, but it was a significant moment in tectonic history.

above: Wheelhouse, Jarlshof, Sumburgh, Shetland



Just a stone's throw from the wheel-house pictured on the previous page is another stone-built habitation, the residence of a rock wren.

# SKARA BRAE

*Over five thousand years ago,* a band of agriculturalist/fisher folk took up residence at a place a short distance from the sea on the northwestern coast of the Orkney mainland.

The stone peculiar to this locale may have attracted them; at the very least it facilitated and probably inspired the construction of their habitat.

The Old Red Sandstone Igneous, as it is known in contemporary geology, is ideally suited to the purpose. The nature of the material here—its strength and the regularity of the slab, flagstone, sheet, and tablet forms that readily separate from the matrix—enabled the builders to articulate their domestic environments with relative ease, forming in the process a vernacular building style capable of considerable sophistication. Skill and imagination are evident in the elemental features of this style: the ubiquitous central hearth, the clay-caulked cisterns, a drainage system, the 'dressers,' voids in the masonry of the walls for display and storage, the 'closet' beds and chairs and the covered passageways that linked the separate habitations.

The site hosted a series of occupying groups during a period of perhaps a thousand years before its ultimate abandonment. Then for four thousand years the settlement lay forgotten—and preserved—beneath a mound of sandy soil that accreted around and over it. To 19th century Orcadians this mound was known as *Skerrabra*.



In 1850 a particularly fierce storm struck the coast and the sea, higher now and closer to the site than originally, stripping away the ages-old covering to reveal the presence of the ancient village. Early excavations, conducted by amateurs with more enthusiasm than discretion, later proved detrimental when in 1925 another storm damaged the structures from which the protective blanket had been removed. In building a seawall to protect the remainder of the site, more

habitations were discovered; and a few years later, serious archaeological work commenced. The result is a well organized and cogently presented site that constitutes an x-ray view of Neolithic life.

For a video 'fly-in' derived from kite aerial photography combined with laser scan data and live action footage go here: <http://vimeo.com/77421581>



*The masonry* in this photograph is inferior judged by either Neolithic or contemporary standards. Note the unchecked vertical joints that extend through several courses in the facing wall. These stones have been stacked, not woven together, as they have been elsewhere.

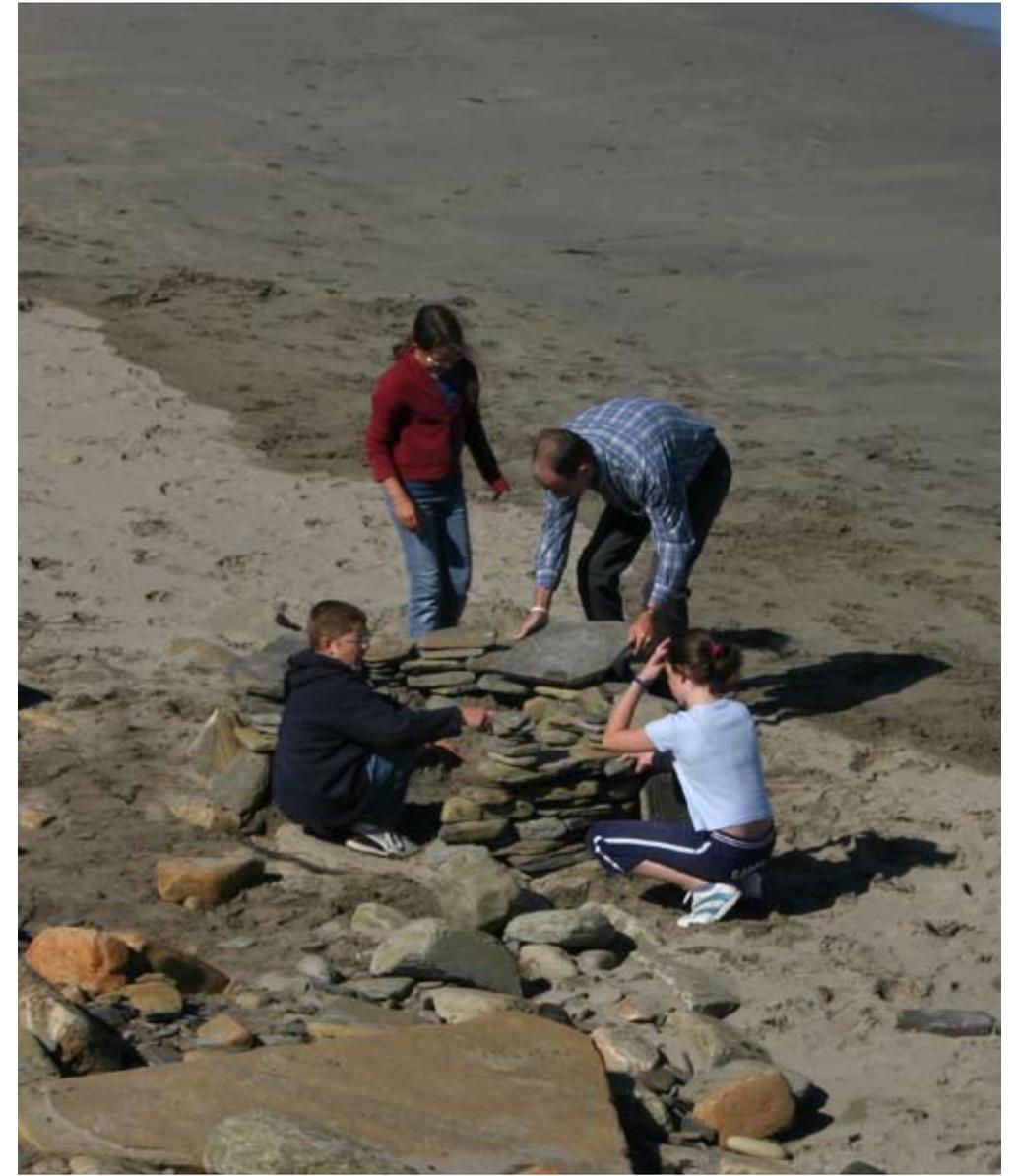
The corner of the right-hand end of the wall and the passageway leading to a neighboring habitation is, however, quite well built. This is most likely evidence of a more recent reconstruction effort by someone who knew what he was doing. The work it abuts was done by someone with less savvy and skill whether it was done 50 or 5,000, years ago.

This calls attention to an ethical dilemma confronting the restoration mason: to effect a truly authentic reconstruction requires incorporating characteristic flaws in the work, perhaps the very flaws that necessitated the reconstruction.

Archaeological authenticity sometimes involves such a suspension of one's own aesthetic and structural standards.



Entrance to an underground hobbit-like habitation. One wonders how these were roofed.



The appeal of this material to the constructivist nature, developed or latent, is demonstrated by the activity of this family on the beach just below the Skara Brae site.



## KIRBUSTER FARM MUSEUM

### *From Neolithic Skara Brae*

to this traditional 16th century croft house less than five miles away is an immense temporal leap, but the central hearth and *neuk* (stone bed-chamber) are features that would have been familiar to residents of Skara Brae.

Later, in the 18th century, a bedroom and parlour were added and byres built for the farm animals with which the family would earlier have shared space. The conical structure is not a miniature broch, but a kiln for drying malt to make ale.

The farmstead was occupied until 1961 and later turned into a museum that provides an insight into how Orkney islanders have lived for centuries in their wind-swept world.



*Peat-incense drifts towards the roof-vent,  
much of it lingering, milder than acrid  
coal-smoke, sweeter even than wood.*

*Like the stoic love  
of the last family here, this fire  
is at the centre of the room,  
founded against a grand old stone.*

*Peat lies to hand in the neuk.  
A settle and an Orkney chair tall-backed  
and deeply curved like a half-barrel  
drew children, wife and husband  
into the sooty circle of love.*

*Soft flesh beneath this carapace,  
far safer than any ancient turtle,  
slept in a bed of three stone sides and roof  
wrought from the very cliffs of Yesnaby.*

*Gales sigh against these walls.  
"I'll huff and I'll puff,"  
sighs the dog-tired wind.*

*The boot of God  
could stamp on this  
and it would stand.*



—James Graham, Scotland



The typical Skara Brae homestead habitation with central hearth, 'dressers,' niches, cistern(s) and *neuks* (nooks or bed-chambers.)



Contemporary dry stone wall, Skara Brae visitor center

## BOOK REVIEW

# ANCIENT MOONSHOTS

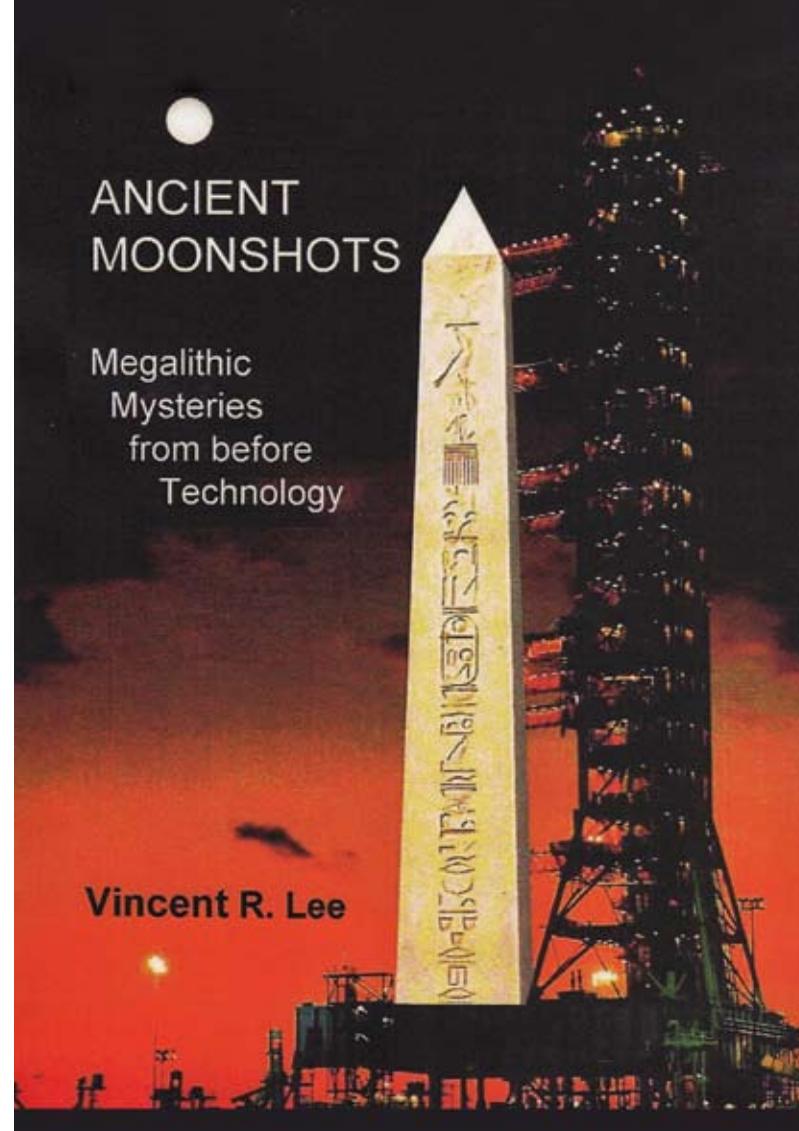
by Vincent R. Lee

Modern humans tend to look condescendingly on the accomplishments of earlier civilizations, imagining vast masses of brutally exploited slave labor (or even extra-terrestrial intervention) as the sole means by which enormous monuments could have been created. More thoughtful observers have questioned this view, and in this book Vincent Lee tackles it directly. He takes four megalithic projects from antiquity on both sides of the Atlantic and discusses how the ancient engineers might have planned and executed their efforts. Since, as Lee notes, all were works in progress, “they offer us the exciting prospect of going back in time and attempting to finish the job ourselves.”

By way of introduction he takes us on a tour through the qualities of stone itself, suggests the means by which Bronze Age people could carve them, and proposes a startling array of possibilities for raising, lowering, tilting and transporting them. He also discusses the physical forces mega-builders had to contend with.

Then he walks us step-by-step through his four ancient projects, delving for clues among such diverse sources as Egyptian hieroglyphs, Spanish chroniclers and the wall of the Temple Mount in Jerusalem, while considering evidence still visible on the ground. He offers both known methods and research conducted by others, and some realistic theories of his own that he has actually replicated in practice. Through detailed and careful analysis, he proposes practical methods of shaping, moving and erecting some of the most colossal and ambitious ancient megaliths, some of which he calls “maxiliths”, since they are literally the largest stones humans have ever attempted to cut and move from one place to another.

The author sees these ancient achievements as problems comparable to our modern effort to put humans on the moon. When we consider the technological limitations they faced—working without iron, steel, pulleys or wheels—it’s hard to disagree. And one thing he urges us to understand is that these works were the result of ingenuity, perseverance and technical prowess, not brute force and slave labor.



His mightiest examples stand at the enigmatic site of Baalbek, in modern Lebanon, and, of course, in Egypt. At Baalbek three carved limestone blocks weighing 900 tons each lie fitted side by side (to say nothing of a partially finished wall composed of twenty-four 400-ton blocks), while two even larger blocks of 1,200 and 1,500 tons never made the final journey from the quarries. These stones are rivaled in size by the unfinished obelisk at Aswan in Egypt, which would have weighed almost 1,200 tons had it been completed; the Pharaoh’s masons ultimately discovered an unsuspected crack in their chosen rock, and had to abandon the project.

The much more recent works of the New World Inca civilization were modest by comparison, their largest construction blocks being in the mere 300-plus tons range. But what their structures lacked in scale they more than made up for in virtuosity. Where the Old World mega-builders cut strictly rectangular planes, interchangeable and relatively easy to fit together, the Incas cut enormous blocks of stone in infinitely eccentric shapes, and fit them so perfectly against the adjacent blocks that—as generations of travelers have noted in awe—an old-style razor blade cannot slip between the joins. And they were fitted thus not only at the surface, but throughout the entire joint—an excruciating technical challenge for which Lee proposes an ingenious solution. It may be unproven, but it is a vast improvement on rival theories involving trial-and-error, templates, or hypothetical rock-melting substances.

Lee’s other example is the so-called “giant” among the moai statues of Easter Island. Mostly carved and finished but, like the Egyptian obelisk, still attached by a keel to its bedrock, it would have been the largest by far of all the moais ever erected. Unlike the other builders in Lee’s selection, the Easter Islanders suffered the additional handicaps of very limited manpower and material resource—so how did they propose to detach this behemoth from the bedrock, move it across the island and erect it, finally standing six stories high, on a coastal *ahu*, or platform?

Lee does not duck these hard questions, and offers a thorough account of how each challenge might have been overcome. We can be grateful for his clear, jargon-free prose and equally expressive sketches and diagrams; his book should be required reading for undergraduates across a range of disciplines.

His approach steadfastly locates these ancient engineering feats within the human capabilities of their time and place. They were fiendishly difficult to pull off, and the most challenging of them sometimes failed—as the stranded Egyptian obelisk, the Giant of Easter Island and the abandoned blocks at Baalbek attest; the author stresses that “the devil is in the details”.

Indeed, but he can sometimes be outsmarted—and without otherworldly interventions.

Peter Frost, author and lecturer, Cusco, Peru

ADD END UM . . .



*Gluteous*

*Igneous*