



Spring 2013

## I am a Yakhchal

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Shafer, Scott M., "I am a Yakhchal" (2013). *Student Publications*. 190.  
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# I am a Yakhchal

## **Abstract**

A description of the history and function of a traditional Iranian ice house, known as a Yakhchal, as told through the eyes of one such ice house surviving into the present day.

## **Keywords**

Yakhchal, Iran, ice house

## **Disciplines**

Cultural History | History | Islamic World and Near East History

## **Comments**

This paper was written for *History 278: History of Islamic Technology*, taught by Professor Karen Pinto in Spring 2013.

# I am a Yakhchal



Scott Shafer

Professor Pinto

History 278

April 30, 2013

*As-salaam alaykum* my friend. I do not see many travelers passing this way, especially ones who would take the time to stop and ponder an old, crumbling building such as myself. Do not let my present state deceive you. In my glory days I used to be a magnificent specimen, a masterpiece of Iranian architecture! The utmost peak of Iranian civilization! I was a perfect representation of the technical prowess and refined culture of the people who built me. But alas, my time has passed. The world has changed, and I have been left to fall into disrepair and ruin, to return to the dust from which I was made. What am I? you wonder. What is this you behold? An old mud brick dome surrounded by uneven ground and cracked toppled walls? How could I have once been such a crowning achievement of human ingenuity? You doubt me. You scorn me. As so many have done before you. You modern men have no time for me. You have left me and countless of my brethren to crumble and collapse, to fade away into a distant past. If you will listen, I will tell you my story. It is the story of an ice house and of the people and place that birthed it and then doomed it to die forgotten. It is the story of the inexorable march of time that one day will claim you as it has done me. You see, I am a Yakhchal, a traditional Iranian ice house. For centuries,<sup>1</sup> my kind has served the Iranian people, providing them with the finest of all substances in creation, ice. But out of the west has come a plague, “progress” you may call it, but death none the less. Modern refrigeration!<sup>2</sup> Alas! I am resigned to my fate. It is as Allah wills it.

We find ourselves meeting here upon the Iranian plateau, and as I am sure you know, the Iranian plateau is a rather harsh place. It is cold in the winter, hot in the summer, and always dry. The people here need a relief from it all, and what a better way to find relief than a

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<sup>1</sup> Elisabeth Beazley, “Pigeon Towers and Ice-Houses” in *Technology, Tradition and Survival: Aspects of Material Culture in the Middle East and Central Asia*, Richard Tapper and Keith McLachlan, eds., (Portland, OR: Frank Cass Publishers, 2003), p. 123.

<sup>2</sup> M. Mahdavinejad and Kavan Javanrudi, “Assessment of Ancient Fridges: A Sustainable Method to Storage Ice in Hot-Arid Climates,” *Asian Culture and History*, 4:2, (July, 2012), pp. 138-139.

refreshingly cool drink or treat, especially in the heat of the summer season. For this, the people would need a source of coolness, perhaps something that could be put in a drink or mixed with fruits and juices to make a sweet treat?<sup>3</sup> Ice you are thinking! Of course! What of it, you wonder? Ice is easily acquired and just as easily discarded. You think nothing of it in your present day. It is but frozen water! You do not appreciate the beauty of the ice, the smooth texture, the crystalline gleam, or even the wondrous natural phenomena that transpire to turn liquid water to solid ice. The physics! The effort! With your modern refrigeration you do not give ice a second thought. Why, only half a century ago such convenience did not exist. How quickly things are forgotten in the passing of the generations. Alas, my ice was pure and beautiful, wondrous to behold, and clearer than the finest glass.<sup>4</sup> I was the one who provided ice for the people of the village of Aliabad. In the summer, they were comforted by my ice. My bounty was so plentiful that even the poorest of beggars could afford it.<sup>5</sup> The people grew so fond of it, and so accustomed to its presence in their drinks, that I had even seen them partake of its goodness in the heart of the cold winters.<sup>6</sup> Yes, the people loved my ice. And why should they not. Men are creatures of habit, and the habit of ice is old.

Since the distant past, the Iranian people have constructed ice houses to preserve the ice of the winter for use in the summer. The earliest of our history has been lost to the mists of time, and the most ancient of us still surviving date to the rein of the great Safavid shahs. I myself am over a hundred years old, and recall that in the time of my youth the Qajar dynasty still ruled over Iran. Much has changed in the years of my life, and the world of my youth has long since passed into memory. At our peak, my kind was constructed over the entirety of the Iranian

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<sup>3</sup> Beazley, *op. cit.*, p. 125.

<sup>4</sup> Parisa IzadPanahi et al., "Iranian Vernacular Ice-Houses: Notable Example of a Traditional Architecture in Proportion to its Climatic Conditions," *International Journal of Academic Research*, 2:6 (Nov., 2010), p. 395.

<sup>5</sup> Beazley, *op. cit.*, p. 125.

<sup>6</sup> *Ibid.*, p. 123.

world, for a love of ice extended to all the people. From your modern Azerbaijan to your present Afghanistan,<sup>7</sup> we stood far and wide to provide the ice that sustained the people in the heat of the summer.

And how did we do it you may wonder. How in this dry, foreboding landscape did I provide the ice treasured so dearly by the people? Through the genius and ingenuity of generations, the technology for the production and preservation of ice has developed to reach its magnificent peak with me and my kin. We are the final result of a process set into motion by long forgotten men in a distant past. I am the summation of the intricate workings of many parts, perfectly complied and arranged to provide perfection in the creation and storage of ice. I draw your attention first to my most distinctive and impressive feature, my “beehive” dome, which towers mightily over the surrounding countryside. You are awestruck by its size and beauty, no? Have you ever seen a more finely crafted dome? Such elegance and grace as are contained in its curves? It is so large and yet so delicate that it is a wonder it can even be standing. It is my most prized feature and the defining characteristic of the domed roof ice houses, of which I am one. It sets me apart from the less sophisticated tunnel ice houses and the primitive ice pits to which I can scarcely be compared. The production of ice may be similar for each of us, but we domed ice houses are certainly the most refined of all storage techniques. We are located all over the central Iranian plateau, at the fringes of the desert. Our massive size requires us to be placed at the outskirts of the villages, so that we might not overshadow the meeker buildings, towering over them and crowding out them out.

My dome is constructed ingeniously out of mud brick, thicker on the bottom and thinner on the top. The gradual reduction in the thickness of the dome allows my great height to be reached, as the large volume of the base provides the strength to hold up the less massive volume

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<sup>7</sup> Mahdavinejad and Javanrudi, *op. cit.*, p. 135.

of mud bricks above it. My dome is stepped to allow for workers to easily scale my sides and repair the damages incurred from exposure to the elements. Without constant repair, my mud bricks are succumbing to the onslaught of the forces of erosion, which are now slowly battering my broken body back into the earth from which I was made.<sup>8</sup> Neglected by man, soon I shall be no more. Forgotten in life, it is fitting I am gradually wasting away, a last testament to a bygone era, a single sentinel towering over the landscape of the past.

Beneath my great dome is a great pit dug deep into the earth. It is this pit which is key to the preservation of ice. The ice, once harvested, is packed into this pit. Nestled in the great depth, the cool earth insulates the ice from the heat and elements of the outer world. On top of the ice are stacked layers of reed and straw to provide further insulation. The atmosphere of the interior must be kept dry, to discourage the melting of the ice. Humidity is thus a great danger to the ice, and the size and height of my dome is the key to contest it. My dome's height allows for the stratification of the air inside into various layers. At the tip of my dome is an opening. The wind blowing over the top drives the circulation of the interior air, as the warm air rises to the top and is then drawn out, in accordance with the principle of your Bernoulli. The speed of the wind causes the air pressure above the dome to be less than that in the dome, thus setting up a pressure gradient that whisks the warm air out through the opening. With the warm air removed, the air layer above the ice remains cold, and due to the circulation never becomes too hot or humid to imperil the integrity of the precious ice stores. If any ice did melt, and there is always some loss, at the center of the pit is a dry well, to drain the water away.<sup>9</sup>

Now you are beginning to see the genius of me. You are beginning to admire my workings, to see beyond my crumbling façade and to see instead the great tradition, and the great

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<sup>8</sup> *Ibid.*, p. 136.

<sup>9</sup> Beazley, *op. cit.*, p. 126.

men, who made me. But I have so far left out a key part of the story. The storage of the ice seems so simple to you now, but where, in this hot, dry environment, did the ice come from? From where did such great quantities originate? Look at my walls and the uneven ground. Right here is where the ice is from. It is well known that the Iranians excel at irrigation, and have turned this inhospitable waste into a garden of bounty. The genius of many through history has been applied to this undertaking and all manner of techniques and devices have been employed. In this respect, I am no different from a cultivated field. I must be irrigated the same as any crop. My fields do not grow plants, however, but ice. These walls behind me are the key. You see them? How could you but help to notice them? Even in their present, pitiable state of disrepair they still reveal the mighty work and craft of a great people. These walls guard against wind and sun, and shelter what once was a shallow pool behind them. My tallest wall is built along an east-west axis, of rammed earth,<sup>10</sup> with the pool excavated along its north side. The purpose for this is two-fold. In the winter it protects against the prevailing winds of the south, and also guards against the rays of the low hanging winter sun. The wall's great height provides large fields of shade for the growing of the ice. Sheltered furthered by walls along its east and west sides, the shallow pool is thus the perfect location for ice production. Lined with baked tiles, the pool was insulated from the ground and made watertight. Before a cold winter's night, the pool would be flooded with water carried by qanat from far distant aquifers. The shallow body of water combined with its large surface area is ideal for the loss of heat from the water to the cold winter air. With the wind defeated, the perfectly still water would freeze and in the morning, shaded from the sun, a thin layer of ice would cover the pool. How magnificent, how magical it seems, the changes wrought under the winter moon. The next night, the process would be

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<sup>10</sup> Hans E. Wulff, *The Traditional Crafts of Persia: Their Development, Technology, and Influence on Eastern and Western Civilizations*, (Cambridge, MA: The M.I.T. Press, 1966), p. 108.

repeated, and another layer of water would be flooded onto the ice. When the ice was sufficiently thick, it was then broken into many pieces and carried into the pit under my dome. There it would be packed down and watered so that it would freeze together again. Once my pit was filled, and to great fanfare and celebration, the people would seal my doors, locking my ice away for the summer. Then I awaited the day, when the summer came and the warm weather returned, and the people grew hot and uncomfortable, desperately in need of a refreshing drink. They would then come, and a great festival would ensue, with music and bonfires, with the greatest revelry man has ever known. They would open my sealed doors and from my frigid innards they would withdrawal my magnificent ice.<sup>11</sup> The finest, most delicious ice in all the world! They would no longer suffer the deprivations of the summer heat, no longer thirst while toiling under the summer sun. From the richest noble to the lowliest peasant, all would partake of my bountiful stores. The summer would pass comfortably, and the people of Aliabad were never at want for ice.

They still enjoy their ice. They still partake of its comfort and powers of refreshment in opposition to the summer sun. But there is no longer any gaiety. I hear no music, no fanfare. The seasons come and pass, and I grow weary and old. My body decays and crumbles. My mud bricks return to the dust from which they were crafted. I am the end of a tradition, the end of centuries of history. Who will remember my passing? Who will remember my brethren and me? Even now, while our once mighty forms which towered over the countryside slowly wither away, we our forgotten. Men care nothing of my ice anymore. With the coming of modern refrigeration, my world ended. The beauty, the magic, the essence of natural ice is forgotten. With the divorce of modern men from the toils and tribulations of the elements, with their ubiquitous preponderance of ice, they lose the meaning of it all. With the meaning of ice

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<sup>11</sup> Beazley, *op. cit.*, pp. 126-130.

forgotten, how could my meaning stay? Without the essence of ice, I lose my purpose. Time moves on, and I am left behind. Fate. It is as Allah wills. Thank you for indulging an old Iranian ice house, an old Yakhchal. Carry on my story and my memory, and do not forget the meaning, the essence, of ice. Maybe in that way a little of my history, and the years and centuries, the many thousands of souls that shared in it, will live on, and not all will be lost to the dust of this field. *Ma'a as-salama* my friend.

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