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Abstract. The solid sky-vault is a concept, which is well-documented in myths, folklore and fairy-tales from all over the world. According to this idea the sky consists of firm material such as stone, rock-crystal, glass, or metal. Sometimes pieces of the sky break off and fall down to the earth, or shamans climb up to the sky to fetch pieces of the sky's material. The most well-known inspirations for such ideas were meteorites. From numerous cultures the veneration of meteorites and the use of the meteorites' material in cultic contexts has been handed down to us. Concerning other materials like rock-crystal or lapis lazuli, the idea of their celestial origin was inspired by their colour or, in the case of special fossils, by their star-like appearance. Because of their supposed celestial origin such objects were worshipped and regarded as very powerful instruments for several purposes: they were used for divination and meditation, for healing, as well as for the repulse of harm and other uses. In this paper, I will give an introduction to the concept of the solid sky and its material. On the basis of examples from different cultures it will be shown, how the idea of the celestial origin of these materials had influenced their interpretation and use in a religious context.

Many people world-wide understood the Earth as being vaulted by a solid sky-dome or covered by a roof-like solid platform or baldachin (eventually with several layers). This paper first gives an introduction to the idea of the solid sky. Secondly, it goes on to have a closer look on the material of which the sky is made. On the basis of examples taken from different cultures it thirdly shows, how the idea of the celestial origin of these materials had influenced their interpretation and use in magicreligious contexts.

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1. The solid sky

The idea of the solid sky is well-documented in myths and traditions from all over the world.¹ Only a few outstanding examples from different continents may represent this concept and its wide spread. In a myth from the North American Cherokee natives some men travelled to the place of the sunrise. There 'they found that the sky was an arch or vault of solid rock hung above the earth...'² A similar idea is expressed by the Siberian Chukchee. According to their belief '...the sky is supposed to touch the earth on all sides of the horizon. ...On the four corners of it, the rocks of the sky come down to the rocks of the earth...'.³ The rocky character of the sky is underlined in a Nigerian story: the children of the sky-god work in heavenly quarries to win pebbles which are the stars.⁴ For European mythology of classical antiquity the idea of a solid sky was familiar as well: when an extreme drought threatened all life on earth the god Mithras shot an arrow at the rocky sky vault and thus evoked rain.⁵

¹ P. H. Seely, 'The Firmament and the Water Above', *The Westminster Theological Journal* 53 (1991): pp. 227–40; P. Metevelis, 'The Lapidary Sky Over Japan', *Asian Folklore Studies* 59 (2000): pp. 79–88.

² J. Mooney, 'Myths of the Cherokee', From Nineteenth Annual Report of the Bureau of American Ethnology 1897-98, Part I (Washington: 1900), p. 256; more examples from the North American natives: G. Hatt, Asiatic influences in American folklore (Copenhagen: 1949), pp. 78–80; J. R. Swanton, 'Haida Texts and Myths', Smithsonian Institution Bureau of American Ethnology Bulletin 29, (Washington: 1905), p. 332; J. R. Swanton, 'Indian Tribes of the Lower Mississippi Valley and adjacent coast of the Gulf of Mexico', Smithsonian Institution Bureau of American 43 (Washington: 1911), p. 358; J. R. Swanton, 'Myths and Tales of the Southeastern Indians', Smithsonian Institution Bureau of American Ethnology Bulletin 88 (Washington: 1929), p. 141; A. Hultkranz, The North American Indian Orpheus Tradition. A Contribution to Comparative Religion (Stockholm: 1957), pp. 54, 79.

³ V. G. Bogoraz, *The Chukchee* (Leiden/New York: 1975), p. 332.

⁴ H. Baumann, *Schöpfung und Urzeit des Menschen im Mythus der afrikanischen Völker* (1936; Berlin: 1964 repr.), pp. 149f., 147, 362. More examples from Africa: R. Pettazzoni, 'Io and Rangi', *Essays on the History of Religions* (Leiden, 1954), pp. 37-42 (p. 41), also examples from Polynesia, Indonesia and Asia: p. 40–41.

⁵ R. Merkelbach, *Mithras. Ein persisch-römischer Mysterienkult* (Weinheim: 1994), p. 112f. More examples from Europe: Poland: J. Kolczynski, 'Persistence of the Concept of Stone Sky in Polish Folkliterature', *Readings in Archeoastronomy. Papers presented at the International Conference: Current Problems and Future of Archaeoastronomy held at the State Archaeological Museum in Warsaw 15-16 November 1990*, ed. St. Iwaniszewski (Warsaw,

Apart from the world-wide spread of the motif of the solid sky in myths and folk-tales, it was also reflected in philosophical and scientific hypothesis. The concept of the cosmos being constituted by one or several crystalline spheres was common in the European view of the universe, from classical antiquity up to the sixteenth century.⁶

2. The material of the solid sky

In the listed examples the solid character of the sky is stressed by the fact that it is described to be rocky, but people's ideas of the material of the solid sky show a broad variety.

The solid sky (or the top of the sky) is, e.g., made of

[Group A]

- a) stone (see examples above, South America,⁷ China⁸ etc.)
- b) precious stones/glass/ice
 - lapis lazuli (Sumerians⁹)
 - jasper (Assyrians¹⁰ [three layers of the sky, made of different precious stones])
 - sapphire (Bible: Ezekiel 1:26, 10:1)
 - emerald (Iran¹¹)
 - jade (China¹²)

⁸ A. Keller, *Weltkatastrophen in frühchinesischen Mythen* (München: 1999), p. 201f.

⁹ W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake: 1998), p.167.

¹⁰ Horowitz, *Mesopotamian*, pp. 13f., 263.

¹¹ H. Corbin, *Die smaragdene Vision. Der Licht-Mensch im persischen Sufismus* (München: 1989), p. 66.

¹² Metevelis, 'The Lapidary Sky Over Japan', p. 80.

^{1992),} pp. 127–30, p. 127f. Hungary: R. Frank, 'Hunting the European Sky Bears: When Bears Ruled the Earth and Guarded the Gate of Heaven', *Astronomical Traditions in Past Cultures*, ed. Vesselina Koleva/Dimiter Kolev (Sofia: 1996), pp. 116-142 (p. 124). Germany and Austria: H. Bächtold-Stäubli, *Handwörterbuch des deutschen Aberglaubens* (Leipzig/Berlin: 1932), Vol. IV, pp. 11–13. Finland: Y. H. Toivonen, 'Pygmäen und Zugvögel. Alte kosmologische Vorstellungen', *Finnisch-ugrische Forschungen. Zeitschrift für finnisch-ugrische Sprach- und Volkskunde* 24 (1937): pp. 87–126 (p. 122). ⁶ Metevelis, 'The Lapidary Sky Over Japan', p. 81.

⁷ P. Ehrenreich, *Die Mythen und Legenden der südamerikanischen Urvölker und ihrer Beziehungen zu denen Nordamerikas und der alten Welt* (Berlin: 1905), p.

^{32.}

- 'blue stone' (Polynesia¹³)
- rock-crystal/crystal¹⁴
- glass (Asia : Obugrians¹⁵)
- ice (= crystal¹⁶) (North America: Shoshoni,¹⁷ classical Greece: Anaximenes¹⁸)
- c) metal
 - 'forged' of not specified metal (Finland¹⁹)
 - iron (Hethits,²⁰ classical Greece: Hesiod [Theogony II, 719/20; 741/742], Estonia²¹)
 - 'casted mirror' (Bible: Hiob 37:18)

[Group B]

d) eggshell²²

¹⁴ Europe: idea of one or several crystalline spheres (till Tycho Brahe); crystal sea of the Bible [Rev. 4:6] in Carolingian art: H. Sachs/E. Badstübner/H. Neumann, *Erklärendes Wörterbuch zur Christlichen Kunst* (Hanau: without year), p. 176. Australian aborigines: M. Eliade, *Schamanismus und archaische Ekstasetechnik* (Frankfurt: 1975), p. 141; Chumash natives: T. Hudson/E. Underhay, *Crystals in the Sky: An Intellectual Odyssey Involving Chumash Astronomy, Cosmology and Rock Art* (Santa Barbara, CA: 1978), p. 146.

¹⁵ E. Vértes, 'Die Mythologie der Uralier Sibiriens', *Wörterbuch der Mythologie VII.1 Götter und Mythen in Zentralasien und Nordeurasien*, ed. Egidius Schmalzriedt/Hans Wilhelm Haussig (Stuttgart: 1999), pp. 387–700 (p. 544).

¹⁶ Rock-crystal and ice could be mixed up, because according to ideas from classical antiquity as well as from old China, rock-crystal is a form of ice. Classical Antiquity: F. D. Adams, *The Birth and Development of the Geological Sciences* (New York: without year), pp. 472–74; China: C. A. Ronan, *The shorter 'Science and civilisation in China'. An abridgement of Joseph Needham's original text* (London et al.: 1981), Vol. 2, p. 360.

¹⁷ Metevelis, 'The Lapidary Sky Over Japan', p. 83.

¹⁸ W. Capelle, *Die Vorsokratiker* (Stuttgart: 1968), p. 92.

¹⁹ L. Honko, 'Finnische Mythologie', *Wörterbuch der Mythologie II Götter und Mythen im alten Europa*, ed. Hans Wilhelm Haussig (Stuttgart: 1973), pp. 261–372 (p. 310).

²⁰ K. Reiter, *Die Metalle im alten Orient unter besonderer Berücksichtigung altbabylonischer Quellen* (Münster: 1997), p. 395.

²¹ O. Dähnhardt, *Natursagen* (Leipzig/Berlin: 1907), Vol. 1, p. 68.

²² Mithraism: Merkelbach, *Mithras*, p. 221. China: Keller, *Weltkatastrophen*, p. 25; India: V. Kamp-Linfort, *Mythen von der Erschaffung der Welt* (Hamburg: 1994), p. 196, Finland p. 118.

¹³ W. W. Grimble, *Myths and Songs from the South Pacific* (London, 1876), p 58.

- e) fruit (e.g. $gourd^{23}$)
- f) parts of a body (e.g., cranium, 24 turtle-shell²⁵)
- g) fabric²⁶

These statements that people have made on the material of the sky are inspired by different ideas: for example, interpreting the sky as an eggshell or a gourd stresses both the dome-like character of the sky and the fertility and life-producing character of the cosmos. This is underlined by the fact that such ideas can often be found in creation myths. The interpretation of the sky as a turtle-shell points to the dome-like character and fertility, too, but in addition it also stresses stability and eternity. In contrast to these examples the concept of the sky being made of fabric emphasizes the aspect of the interweaving cosmic movements and references and, when being imagined as a cosmic tent, the aspect of the cosmic home with its clearly defined space and order. Thus people's different ideas of the material of the sky reflects the ideas which they had of the qualities of the sky.

Considering the above mentioned materials of the sky, there occurs an important difference among them. Those materials of the solid sky, which are summed up in group B, have the fact in common, that people had no chance to get in direct touch with them: While they used turtle-shells or gourds in their rituals they didn't handle the concrete material of the sky but an earthly copy of the cosmos. In contrast, the stony or metallic material of the sky could be touched directly, as concrete objects existed that were thought to have been broken off from the solid sky and fallen down. Objects supposed to be of heavenly origin included:

- a) meteorites
- b) stones
- c) crystals/precious stones
- d) fossils: 'star-stones' (= sea-urchins, sea-lilies), 'thunderstones' (= belemnites)
- e) artefacts: 'thunderstones' (= hand-axes or arrow-heads)

²³ Africa: W. F. Bonin, *Die Götter Schwarzafrikas* (Graz: 1979), pp. 186, 247.

²⁴ Kamp-Linfort, *Erschaffung*, p. 111 (Germanic peoples, cranium of the giant Ymir); B. C. Sproul: *Schöpfungsmythen der östlichen Welt* (München: 1993), p. 209 (India: head of Purusha), p. 245 (China: head of the god P'an Ku).

²⁵ Keller, *Weltkatastrophen*, p. 205.

²⁶ R. Eisler, Weltenmantel und Himmelszelt (München: 1910).

Objects such as these enabled human beings to get in direct touch with the heavenly material and its supernatural power. Holding it in their hands they could participate in its special qualities. This article focusses on the cultural impact of those materials of the solid sky, which were directly accessible to human beings, that is on stone (including crystals, precious stones, special fossils and artifacts) and metal (Group A). What are the qualities of these materials, according to ancient beliefs, and how did people use them?

3. The cultural impact of the material of the solid sky

For many people, meteorites were the most obvious objects of heavenly origin and therefore were venerated.²⁷ In classical antiquity there existed the cult of the 'baitylia',28 so-called 'animated stones', which were reported to come from the sky and are supposed to have been meteorites. In several sanctuaries of ancient antiquity supposed meteorites have been housed as the central object of worship.²⁹ One example was the stone of Emesa, which was dedicated to Helios, or the stone in the temple of Pessinus, which personified Cybele, the mother-goddess and goddess of fertility.³⁰ To some of these stones magical powers were ascribed and even the ability of prophecy.³¹ From several of them, it is reported that they were clothed, that is they were treated like persons.³² The most famous of the meteorites venerated in antiquity is the black stone in the wall of the Kaaba at Mecca, said to originate from heaven, or paradise.³³ Comparable importance of a meteorite for the welfare of a community was attached to the Uwet meteoritic iron in southern Nigeria.³⁴ Examples of worship of supposed meteorites is documented from elsewhere. For

³⁴ Burke, *Cosmic*, p. 226.

²⁷ J. C. Burke, *Cosmic debris* (London, Berkeley/Los Angeles CA: 1986), pp. 218-27; H. A. Newton, 'The Worship of Meteorites', American Journal of Science Forth Series 3, no. 13 (1897): pp. 1-14.

²⁸ W. Fauth, 'Baitylia', Der Kleine Pauly. Lexikon der Antike in fünf Bänden, ed. Konrat Ziegler/Walther Sontheimer (München: 1975), Vol. 1, pp. 806-08.

²⁹ Burke, *Cosmic*, pp. 219–21; Newton, 'Worship', pp. 4–14.

³⁰ Fauth, 'Baitylia', pp. 807–08.
³¹ Fauth, 'Baitylia', p. 806.

³² Fauth, 'Baitylia', p. 807.

³³ Newton, 'Worship', p 4; the meteoritic character of the stone is disputed controversially (discussion see Burke, Cosmic, pp. 221-23), but in the context of this paper it is not important whether venerated stones were actually meteorites or not, but only, that people believed them to be of heavenly origin.

example, the Iron Creek meteorite had been highly valued by North American natives as a 'medicine-stone'. When it was removed by Europeans in 1860 catastrophic consequences were foreseen (which actually happened a few months later).³⁵ The Pawnees included meteorites, which they thought to be the children of the highest god, in some of their ceremonial-bundles. The meteorites, frequently being '...the principal sacred items in the bundles',³⁶ were supposed to send general welfare, bodily and spiritual health, or fortune of war to their keepers.³⁷ In Pawnee thinking, the belief in the animated character of these stones is even more explicit than in the one of classical antiquity, and there are accounts of dreams of the 'person' of the meteorite.³⁸ Some North American meteorite burials, in which the stones were wrapped in cloth like a human being, seem to underline this extraordinary aspect.³⁹

A meteorite might not only appear to someone as a person, but it might directly transfer its supernatural power to a human being. According to the Siberian Buryats a meteorite transmitted its power to a special liquid in which it was dripped; the person who drunk this liquid incorporated the power of the stone and thus became a shaman.⁴⁰ Maybe it was a reminiscence of such ideas that prompted Russian people to eat pieces of the Novo-Urei-meteorite as if they were the host.⁴¹

There were also instances of confusion between meteorites and the socalled 'thunderstones' and 'thunderbolts', objects that were thought to have fallen from the sky during thunderstorms or to have been thrown down by an enraged god.⁴² Thunderstones may be quite different objects: on the one hand they might be fossils, such as belemnites or sea-urchins, on the other hand they could be artifacts like arrow-heads or hand-axes (often from Neolithic times). For many cultures, 'thunderbolts' were the attributes of sky-gods. Thus, being manifestations of the sky-god himself

³⁵ Burke, *Cosmic*, p. 225.

³⁶ V. D. Chamberlain, When stars came down to earth. Cosmology of the Skidi Pawnee Indians of North America (Los Altos: 1982), p. 146.

³⁷ Chamberlain, *Stars*, pp. 145–50; J. R. Murie, *Ceremonies of the Pawnee. Part I: The Skiri* (Washington: 1981), pp. 67, 70.

³⁸ Chamberlain, *Stars*, pp. 147, 149.

³⁹ Burke, Cosmic, p. 224.

⁴⁰ W. Schmidt, *Der Ursprung der Gottesidee* (Münster: 1955), Vol. XII, p. 643f.

⁴¹ H. Y. McSween, *Meteorites and their parent planets* (New York: 1987), p. 145.

⁴² Burke, *Cosmic*, p. 227; Adams, *Birth*, pp. 112–24.

or of his will, they were sometimes regarded as threatening objects,⁴³ which people didn't dare to touch or which they handled only very cautiously. A stone-axe from Nigeria, for example, was wrapped in cloth, decorated with shells and covered with the blood and feathers of chickens which had been sacrificed to this object of supposed heavenly origin.⁴⁴ More frequently thunderstones were interpreted as spending fertility, luck and health provided by the sky-god. They were used as amulets against many kinds of evil, including to protect the home from being struck by a lightning.45 Often 'thunderstones' and 'star-stones' were not clearly separated. 'Star-stones' were special fossils of star-like appearance, such as fossilised sea lilies and sea-urchins, thought to have been fallen from the solid firmament, and believed to incorporate supernatural power as well as protecting and curing qualities. A prescription from the seventeenth century testifies the use of star-stones as remedies: grinded star-stone mixed with water was said to protect you from the plague, improve the state of your blood and lungs, and prevent you from having a stroke.46

Apart from meteorites and thunderstones, which seemed to demonstrate the solid character of the sky, crystals and precious stones were sometimes believed to be material of the sky because of their colours and their qualities of transparency and reflection. These characteristics and their heavenly origin made them extremely suitable to serve for different kinds of divination, meditation, healing and especially to serve as a kind of 'burning glass', reflecting what happens on earth. Consequently, magicians and shamans were eager to acquire crystals as important mediums of their abilities. Such convictions can be seen in the belief of the Maori of New Zealand: they were convinced that their highest god, Io, 'makes use of a magic stone to know what is going on in the world'.⁴⁷ This inspired their priests to use crystals themselves for the purpose of divination. The crystals were supposed to have their origin in the sky. 'This is how they come to reflect what happens on earth and why

⁴³ C. Rätsch/A. Guhr, *Lexikon der Zaubersteine aus ethnologischer Sicht* (Wiesbaden: 1992), p. 58f; H. Balfour, 'Concerning Thunderbolts', *Folk-Lore* XL, no. 1 (March 1929): pp. 37–49, and *Folk-Lore* XL, no. 2 (June 1929): pp. 167–72 (p. 46).

⁴⁴ Ibid., p. 170.

⁴⁵ Burke, *Cosmic*, p 227f.; Balfour, 'Thunderbolts', pp. 39, 45–48.

⁴⁶ Rätsch/Guhr, Lexikon, p, 156.

⁴⁷ Pettazzoni, 'Io and Rangi', p. 41.

also they are endowed with powers of reminding and suggesting'.⁴⁸ For instruction of the priest's pupils, 'one of the stones was put in the pupil's hand, while the pupil took the other into his mouth; for the stones had, among other properties, that of sharpening the wits, especially the memory, for purpose either of learning or of teaching'.⁴⁹ In similar manner the shaman-priests of the North American Chumash, who imagined the celestial beings to reside in heavenly houses of crystal,⁵⁰ used rock-crystals to visualize the different aspects of the cosmos.⁵¹ The medicine-men of the Sea Dayak in Borneo used pieces of quartz, '...in which they see a reflection of their patient's soul and thus learn where he is'.⁵² Iranian Sufism of the twelfth to fourteenth centuries envisaged the celestial vault as topped in the northern pole with a rock of emerald.⁵³ For the mystic this rock of emerald was the aim of the spiritual voyage to completion. Step by step he had to pass the different layers of his own soul, at the same time step by step ascending to the rock of emerald and to spiritual perfection. In this concept the rock of emerald forms the keystone of the spiritual life as well as of the cosmos. These examples show the high importance of crystals and precious stones of supposed heavenly origin for the purpose of healing, transfer of knowledge, divination and meditation.

Summary and conclusions

Objects of supposed heavenly origin were understood to incorporate special qualities of the solid stony or metallic sky: mere power in its frightening as well as in its comforting aspect, fertility, knowledge and spiritual abilities. How could all these aspects be ascribed to a solid material like stone or metal? In ancient thinking stone as well as ore was a living substance.⁵⁴ as it has been shown, e.g.. in the 'animated' meteorites, or as it is most evidently in the well-known idea of the *petra genetrix*, the birth-giving stone. The spirited character of stone, in combination with its steadiness and seemingly eternity, makes evident

⁴⁸ Pettazzoni, 'Io and Rangi', pp. 41–42.

⁴⁹ Pettazzoni, 'Io and Rangi', p. 40.

⁵⁰ Hudson/Underhay, Crystals, p. 146.

⁵¹ Hudson/Underhay, *Crystals*, p. 49.

⁵² Pettazzoni, 'Io and Rangi', p. 42.

⁵³ A. J. Wensinck, *The Ideas of the Western Semites Concerning the Navel of the Earth* (Amsterdam: 1916), p. 5; H. Corbin, *Die smaragdene Vision. Der Licht-Mensch im persischen Sufismus* (München: 1989), p. 66.

⁵⁴ J. Chevalier/A. Gheerbrant, A dictionary of symbols (London: 1996), p. 932f.

that the stony sky was not simply a rough material, but could even be thought to be identical with a god – such as Jupiter.⁵⁵ It might be understood as contradictory to speak of the persistence of the sky and simultaneously of pieces of it breaking off and falling down. But, according to ancient belief, stones didn't fall from the sky as a consequence of erosion. Being divine themselves, they were either sent to Earth as means of revelation and as threats or gifts of the deities, or they came down to Earth by own impulse. Alternatively, outstanding individuals, such as shamans, could try to get hold of a piece of the sky. In each case it meant that acquiring a piece of the solid sky was an extraordinary circumstance offered by the celestial beings. It enabled people to participate directly in their gods and to profit from their powers.

⁵⁵ G. St. Hopkins, *Indo-european *deiwos and related words* (Philadelphia, PA: 1932), p. 39.

Barbara Rappenglück 331