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The pharmaceutical use of Lapis Lazuli in the Ancient East

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Technically, lapis lazuli is a rock, since it is made up of an association of several different minerals.[1] The main component is lazurite, an aluminosilicate belonging to the feldspathoid sodalite group of minerals and possessing a somewhat varied composition. Its distinctive intense marine blue to violet blue colour (with lighter blue and green varieties also known) means that it has sometimes been confused with the copper carbonate, azurite, especially in older literature. It is typically metamorphic in origin, the bulk of geological occurrences being related to the contact metamorphism of limestones, dolomites and evaporates. The rock has been the subject of several brief overviews.[2] Historically significant deposits were located in Badakhstan (northern Afghanistan and referred to in 13th century accounts by Marco Polo), Pamir (Russia), the Atlas Mountains (North Africa), Latium, Vesuvius and the Albano mountains (Italy). Significant quantities of the rock were probably produced in Iran during the 13th and 14th centuries, according to some medieval Arabic sources. Extraction was carried out by means of fire-setting, right into the early 19th century.[3] Lapis lazuli was highly valued in Mesopotamia and the Mediterranean region as a decorative building stone, a symbol of dignity, in various ritual and magical contexts, in votive offerings, as royal gifts and tributes, and as stones in a wide variety of items of jewellery.[4] It was also the base material for the production of the artists' pigment, ultramarine,[5] and used in the dyeing of cloth. The intense blue colour is believed to be a function of the complex chemistry of the various oxides of sulphur in the crystal lattice.[6]

The objective of the present paper is to examine, for the first time, the historical use of lapis lazuli as a geopharmaceutical material. Further papers in this series are intended to trace the use of lapis lazuli within the western European and Arabic medical traditions until its elimination from the materia medica at around 1750.

Ancient Egyptians

Traded with Afghan suppliers, probably via Turkey, lapis lazuli was employed by the ancient Egyptians from pre-dynastic times onwards for the production of beads, scarabs, amulets and other small objects, as well as a colouring agent.[7] It seems that colours were deeply symbolic; the blue of lapis lazuli was associated with joy, delight and tranquillity – it was the colour of heaven.[8] Used extensively in the tomb of Tutankhamun (18th Dynasty pharaoh reigning from circa 1332–1333 BC), lapis lazuli was used for the eyebrows, eyelids and kohl marks on the death mask of the young king whilst a lapis substitute, Egyptian Blue, was used for the decorative stripes on the nemes or headcloth of the gold mask, and also to provide the inlay on the plaited false beard. This use of the authentic lapis emphasises a connection with the eyes in Egyptian culture.

Egyptian medical writings are mostly found on stelae (stone or wooden blocks) and ostraca (shards of pottery or clay tablets), as well as specialised medical papyri. Amongst the latter, the Ebers Papyrus, now held by the University of Leipzig, is the most extensive. The 20m-long scroll contains 110 pages and was supposedly found between the legs of a mummy in the Assassif area of the Theban necropolis on the East bank of the River Nile. It is believed to date from 1534 BC, having been written during the reign of Amenhotep I, second pharaoh of the 18th Dynasty. Two recipes in the papyrus refer to the use of lapis lazuli in treatments of the eye.[9] Recipe 378 recommends 'real' lapis lazuli (i.e. not the Egyptian Blue synthetic glass equivalent) mixed with green and black eye paints or 'kohls' (based on malachite and galena respectively), crocodile dung and two rather obscure herbal components in a milk base. The mixture was applied to the outside of both eyes to 'eliminate stasis of water', a condition believed to be cataracts. Recipe 390, this time to 'eliminate blood vessels in both eyes' (presumably dilated conjunctival capillaries or conjunctivitis) recommends applying a 'ductile dough' comprising equal parts of green and black kohls, lapis lazuli, ochre and honey to the eye surfaces.

A limestone ostracon at the Metropolitan Museum of Art (New York) contains a prescription for hysteria comprising lapis lazuli, 'green stone' (malachite), a fumigant ('Ki-bu'), one herbal component ('Ssyt') and raisins, all mixed together in a jug of wine.[10] Hysteria was supposedly caused by internal movement of the uterus. According to Plato (circa 428–348 BC),

> The womb is an animal which longs to generate children. When it remains barren for a long time after puberty, it feels wroth, it goes about the body, closing the tissues for the air, stopping the respiration, putting the body into extreme dangers.[11]

The resulting characteristic and uncomfortable sensation of having a mass embedded in the oesophagus or trachea (globus hystericus) is a psychological disorder allied to anxiety, and still little understood today.[12]

Assyrians

The kingdom of Assyria (late 25th century–605 BC) was located in the area of present-day northern Iraq. The capital city of the Neo-Assyrian Empire was Nineveh situated on the opposite bank of the River Tigris to present-day Mosul, and razed to the ground by besieging Medes and Babylonians. Towards the end of its existence, Nineveh was home to the famous library of Ashurbanipal (685–circa 627 BC), the last of the Neo-Assyrian strong kings. Excavation of the mound-ruins of Kouyunjik begun in 1847 by Sir Austen Henry Layard (1817-1894) yielded (in 1849) a collection of between 20,000 and 30,000 cuneiform tablets from Ashur-banipal's library, the bulk of which made their way to the British Museum. Amongst these is a range of medical texts, first studied by Reginald Campbell Thompson (1876-1941).[13] Here, lapis lazuli is recommended

crushed in curd or ghee (an unclarified butter) as an eye ointment in cases of ocular complaints caused by 'the Hand of Ghost'.[14]

One tablet (K.4120; Fig. 1) also blames dazzling of the eyes on Hand of Ghost, and prescribes lapis lazuli plus a mixture of other geological and herbal ingredients, finely crushed together on copper and applied continuously to the eyes as an ointment in 'suet of the kidney of a black ox'. [15]

Amongst the various remedies for oral complaints, one cuneiform tablet recommends the amuletic use of lapis lazuli, hung on a thread around the neck, together with similar beads of cinnabar, iron oxide and alabaster.[16] 'If the hand of a ghost seizes on a man, and his ears sing', the recommended treatment was to crush lapis lazuli together with myrrh, powdered arsenic, 'green stone' (perhaps verdigris or malachite) and, bound together with cedar oil, use it to anoint the ear lobes as well as inserting it into the ear itself in order to effect a cure.[17] Together with another 26 stones, including magnetite, carnelian, coral and jasper, lapis lazuli was recommended for 'emplacement of the intense pain of hand of ghost', and if bound to the site of the pain, alleviated the symptoms.[18] If powdered lapis lazuli, haematite, plus a range of other stones and botanical ingredients (many of the identities of which are currently obscure) were continually rubbed in a solution of oil upon the temples, neck and eye sockets of a patient whilst reciting an incantation which is translated as 'The pointing of the evil finger of mankind', disease was guaranteed to be removed.[19]

The combination of incantation with the magico-medical employment of lapis lazuli, (together with a range of other geological and herbal ingredients) was also used in cases where a frightening array of symptoms indicated that 'a roving ghost' afflicted the patient. The symptoms included pain in the breast, scalp and temples, roaring in the ears, numbness, shortness of breath, depression, chills, a crushing sensation in the chest, shortness of breath and persistent vomiting; the patient was perceived as specifically being under the Hand of Marduk, the somewhat capricious Babylonian deity who was deemed to exercise control over humanity.[20] The rather complex incantation, recited whilst holding the patient's hand (which held a representative figurine) and prostrated before a specially consecrated potter's pit, invoked Ea, the Sumerian and Akkadian God of creation and father to Marduk, to exorcise the sufferer from the influence of the God.[21]

Ancient Indian sources

The *Rasaratna Samuccaya* is a 13th century alchemical treatise from the late Tantric Period, named after the Hindu and Buddhist scriptures produced at the time. Written by Vagabhatacarya, this work explains the preparation and properties of mineral drugs.[22] The best quality lapis lazuli is taken to be that showing flecks of associated iron pyrites, also known as 'golden fly'. One possibly contemporaneous description of the rock recounts that 'lapis lazuli must be regarded as genuine and auspicious, which is without white flecks, is blackish

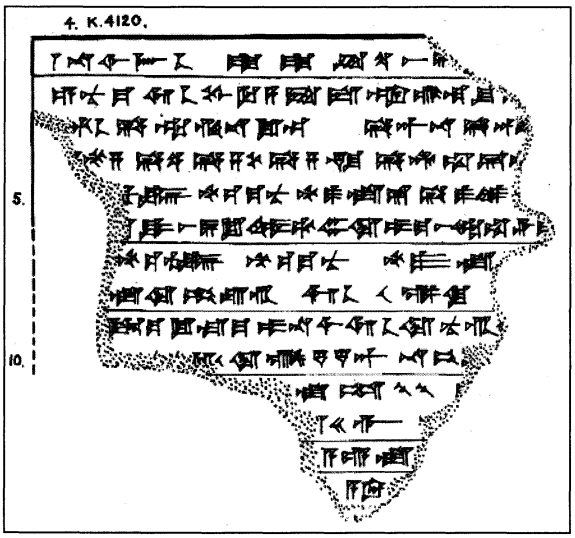

Figure 1. Figure 1. Assyrian cuneiform tablet (British Museum K.4120) from the library of Ashurbanipal at Nineveh (*circa* 620 BC), after Campbell Thompson (1923, plate 12 fig. 4).

or dark blue, smooth, heavy, pure, shining and like a peacock's neck'.[23] Incorporated into the specialised eye ointment, '*suma*', lapis lazuli was prepared by boiling in a mixture of cow's urine, lemon juice and salts prepared from various herbs for a period of six hours in a specialised earthenware pot (*Daula yantra*). Alternatively, the lapis lazuli could be oxidised to a red colour by a complex process involving mixing and grinding with sulphur and lemon juice, fashioned into the form of a tablet which was dried in the sun before being fired seven times in a specialised arrangement of two conjoined clay pots. This could then be used to treat 'aggravated bile', haemorrhoids, tuberculosis, jaundice, coughing and 'illnesses produced by humors of mucus and wind'. Furthermore, a paste or '*pishthi*' could be made for the treatment of dysuria, tuberculosis, jaundice, coughs, haemorrhoids, diabetes, insomnia, restlessness and neurosis. This involved grinding the stone with apple juice for a period of 14 days, stirring the mixture for three hours per day for three successive days, allowing the mixture to settle and then pouring off the supernatant apple juice. After drying and a further period of grinding, the paste was taken orally with honey, rose petal jam and *murabba* (a sweet jam pickle) of Indian Gooseberry (*Phyllanthus emblica,* formerly *Emblica officinalis*).[24]

Generally referred to as *Rājāvartah*, lapis lazuli also has the following synonyms: *Nilāśma*, *Nrpapalah*, *Suvarnadhātu*, *Rājādrī* and *Āvarta-manih*. In Ayurvedic medicine, it is traditionally believed to alleviate problems in each of the three humours or *doshas*. Based heavily on the *Rasaratna Samuccaya* cited above, plus the 13th century *Dhanwantari nighantu* and the 17th century *Raja nighantu*,[25] it is commended as having rejuvenating, nourishing, appetising, digestive and aphrodisiac qualities, and employed for urinary disorders,

tuberculosis, haemorrhoids, anaemia, hiccough, vomiting and even alcoholism![26]

Chinese and Tibetan sources

Geopharmaceuticals figure strongly in Traditional Chinese Materia Medica[27] but, possibly rather surprisingly, references to lapis lazuli are quite sparse. *Liu-li* is taken by some authorities to refer to lapis lazuli, whilst others think that the name applies to rock crystal (quartz).[28] Those identifying it and its synonyms as lapis lazuli indicate that the powdered mineral, or water in which the stone was dipped, was used to cure fevers and inflammation of the eyes.

One of the most venerated of the Tibetan Mahayana Buddhist pantheon is the Medicine Buddha, Bhaish-ajyaguru Vaiduryaprabha, or the Healing Master of Lapis Lazuli Radiance. Represented pictorially in the distinctive deep blue of lapis lazuli, wearing the robes of a monk and sitting cross-legged holding a myrobalan stem in one hand, he is revered as the source of the Tibetan healing arts, embodying the teaching of the Four Medical Tantras. These tantras are ascribed to the teaching of the Lord Buddha at the age of 72, and one tradition holds that they were translated into Tibetan by Vairocana during the 8th century AD. An alternative view is that the Tantras were gathered together and presented by Yuthong Yonten Gonpo II (1126-1202), one of a family lineage of royal court students and practitioners of traditional Tibetan medicine. Derived from this historical base, lapis lazuli is known by a number of synonyms in Traditional Tibetan Medicine, and esteemed for curing cases of poisoning, disorders of the lymph and leprosy. According to one text, it is even able to cure grey hair![29]

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'What the Dickens!' The Out-patients pharmacy at the Middlesex Hospital, London

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Wandsworth, London

In 1979 I was the staff pharmacist in charge of the out-patients department pharmacy at the Middlesex Hospital, London. The out-patients department was in a brick building in Cleveland Street. (See figure 1). It was a separate building from the main Middlesex Hospital in Mortimer Street. The out-patients department and the main Middlesex Hospital were connected by a myriad of underground passageways that allowed the movement of people, supplies and trolleys along narrow tunnels.

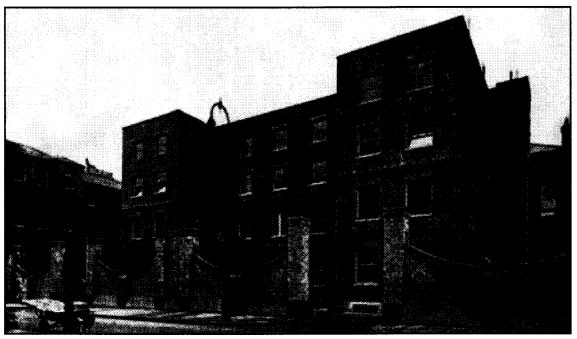

Figure 1. The out-patients department of the Middlesex Hospital in Cleveland Street.

The out-patients pharmacy was underground, beneath the out-patients building in Cleveland Street. Patients called in for their medicines, after seeing the consultants and registrars in their clinics in the out-patients block. The pharmacy had a reception area with seating for patients to wait. The dispensary led from the reception area. There was an area within the dispensary for the staff to have their tea-breaks and lunch. I don't recall where the toilet facilities were. I left this position at the end of 1979 and thought little of the place except for nostalgic memories with contemporaries.

I knew that the Middlesex Hospital had become part of University College Hospital NHS Trust in 1994.[1] The Trust had sold the Middlesex Hospital site for housing, offices and retail outlets to fund the University College Hospital Private Finance Initiative.[1] The Middlesex Hospital was then demolished in 2008 after anger and outcry.[2] Worse still, the new building works had been delayed and only the hospital's listed Chapel remained intact in the middle of a building site.[3]

In 2013 I visited the Middlesex Hospital site in Mortimer Street and found building works well underway, with completion dates predicted for 2014. I walked along Cleveland Street towards the Middlesex Hospital out-patients department expecting to find demolition or building works. To my amazement the out-patients building was still there. The perimeter wall was boarded by a wooden fence and workmen were busy.