AGATES OF RUSSIA

Evgenii A. Lyashenko
«Rosnedra», elyashenko@rosnedra.com

Photo: Michael Leybov.

The picturesque patterns in agates have captivated attention for thousands of years. In Ancient Egypt agate was a material for beads and carved figures of sacred scarab beatles, in Babylon and Assyria jewels and seals were made of agates (Fersman, 1962). Greeks and Romans extended agate application: besides smoothly ground spheres that were used by Roman ladies for cooling their hands in summer time, agate was carved as gemmas, statuettes and various vessels.

In Europe agate became fashionable only in 17th century after a long period of oblivion. Initially it was used for making busts of emperors and handles of sabres and daggers. In 18th century when passion for snuff-boxes and caskets was epidemic, agate became the prime stone for these. Snuff-boxes carved from one piece of agate were mounted in gold and decorated with gemstones. Beautiful plates of agate were set in the lids of golden snuff-boxes. Sometimes the whole artwork was assembled from pieces or plates of agates with different pattern and colour, and therefore became a miniature collection of this stone. Every agate is unique and beautiful in its own way, and the agate family is already an object of collection.

In the middle of 19th century the lapidary industry in Europe was flourishing. Agates from Brazil and Uruguay became valuable. At that time there were no such other widely-applied stone as an agate: it was set in jewellery, used for belt buckles, toys, chess, knife and fork handles, coffee cups, plates for dessert, vases, bowls, goblets, caskets, mortars, ironing cylinders and many more. Agates of different colours were used to compile mosaic tables and small chests, carved insets for furniture, representing fruit and leaves.

At present agates are inexpensive stone material which is in wide demand for making jewellery and souvenirs. Mass production was arranged in India and China. Brazil mainly provides polished agate plates to the world market; these agates are of incredibly bright sometime not inherent colours, from centimetres up to 1 meter across. In Russia agate is used for making caskets, cigarette-cases, boxes for business-cards and even dinner and coffee services. Agate or onyx pattern sometimes represent some sort of a natural miniature picture of macrocosm.

The biggest article made of agate is a flat dish 75 cm in diameter carved of one piece in Germany in 14th century; it is displayed in Museum of Art History (Kunsthistorisches Museum) in Vienna. The biggest sculpture is 2-metre high Buddha statue made of black agate (India, 1st century A.D.). The most expensive agate is kept in the Kaaba building in Mecca. This is black-and-white agate-onyx 24 cm across, at one time exchanged for an island. In the Cabinet des Médailles in Louvre, Paris

Agate, 10.5 x 6 x 1 cm.
Nizhnyaya Tunguska River, Krasnoyarskii Krai, Russia. VSGM-271-209 MN-52653, A. Glushkov.

Agate, 13 x 11cm.
Dzhelty, Magadan Region, Russia.
Specimen: Vyacheslav Kalachev.

Agate, 15 x 6 x 2.7 cm. Argun' River, Russia.
VSGM-357-24 MN-61475, L.P. Ishchukova.

Agate, 8.5 x 8 cm.
Sergeevskoye deposit, Primorskii Krai, Russia.
Specimen: Vyacheslav Kalachev.

Agate, 14 x 8 x 2 cm.
Bura, Argun' River, Russia.
VSGM-357-4 MN-61455, L.P. Ishchukova.

VSGM – Vernadsky State Geological Museum RAS.

they keep the biggest cameo 31 x 26.5 cm in size, carved from a five-layered agate-sardonyx. Russia can be proud of the largest collection of the ancient agate cameos which contains approximately twenty thousand items and kept in the State Hermitage in St.-Petersburg (Bukanov, 2008).

Agate is a variety of chalcedony, which forms rhythmically-banded aggregates. Coloured chalcedony containing decorative moss, sagenitic and dendritic inclusions is also considered as agate. The extreme diversity in agate appearance resulted in the creation of an enormous number of names which referred to certain varieties of agates by their shape, composition, colour, pattern or whereabouts.

Agates are formed from the low-temperature silica solutions, filling cavities in rocks of different origin, and inheriting the shape of the former. Most often the cavities are represented by the gas bubbles within basic or intermediate lavas and tuffs altered by post-volcanic hydrothermal processes. Less so by various leaching fissures and complex-shaped cavities within acidic rocks, and by leaching cavities within sedimentary carbonate rocks. Deposits of agates occur in basalt sheets and placers related to these are the most important source of agates.

On the surface agate looks like an average cobble. But after cutting and polishing it reveals amazing patterns – amusing, fancy, exciting pictures. Sometimes on the cut one can see landscape-like patterns: either forest and mountains, lake and sky with clouds, or sea-storm and fabulous underwater world. There are no two identical agates in nature, their patterns and colours are unlimited and unique, and this makes agates so attractive to collectors. Agates with cavities are not infrequently, they are incrusted with rock crystal, crystals of smoky quartz or amethyst that form fantastic druses overgrown with calcite, zeolites, gypsum, barite, sulfides etc. crys-

Important agate deposits of Russia.

tals. Agates with other minerals inclusions such as flakes, needles, ramifying threads, and also brecciated agates look especially spectacular. Sometimes agates occur with thin transparent 'shell' and cavities filled with liquid. Upon shaking these natural capsules one can hear splashing inside.

In 18–19th centuries Russian lapidaries used agates from Transbaikal, Transcaucasis, Crimea and Turkestan. Until the 1930s there were no agate deposits discovered on the territory of the modern Russia. At present many of the known localities and deposits of agates were found during intensive gold mining in the 20th century. The most interesting agates for collectors occur on Northern Timan, Eastern Transbaikal, Far East, North-East of Russia and also in the Moscow region. In this paper we overview mainly large deposits of agates.

Nenets Autonomous District

In the basin of Indigirka river flowing in the northern part of Timan range there occur well-known **Norther Timan deposits of agates** famous for their bluish-grey colour, concentric banding, and fine sharp moire pattern. Patterns in Timan agates are characterized by their large diversity: bastion-like; oculiform; flat-banded chalcedony onyxes with contrasting white and bluish-grey layers. Green moss agates also occur there. The colour bands normally range from pale-grey to blue, sometimes from beige to brown and almost black, individual specimens contain red layers. There are geodes with quartz and amethyst druses overgrown by later minerals. In sections, agates may reveal multiple conducting canals; conduits for mass-exchange of agate and environment.

Agate-bearing basalts of the Norther Timan were studied in 1962 by A.I. Salov and later by B.P. Sitnikov, M.A. Apenko and others (Kievlenko, 2001; Fishman, 2006).

Volcanic host rocks consist of several subhorizontal basalt flows. In the lower part they are generally comprised of massive basalts with pillar jointing, the middle part basalts are amygdaloidal, and the upper part are porous basalts and scoria. Hydrothermal post-volcanic mineralization is represented by filled pores, amygdules and fissures. Agate-bearing areas are from hundreds to thousands of square meters in size and 4–10 m thick. Agate secretions are related to the middle part of the agate-bearing horizon, and chalcedony to the lower part Monomineral (quartz-chalcedony and calcite) amygdales are predominantly typical of the lower part and polymineral amygdales for the upper part. Most amygdales are from 1 to 5 cm in size, but some can be as big as 20–40 cm and more. The most abundant shapes are cone-, loaf-like and tubular.

Iyevskoye (Levoiyevskoye) deposit is located 30 km to the south-west of Indiga village in the upper reaches of the Levaya Ievka river. At the deposit there are two types of hydrothermal mineralization: amygdales and veins. The maximum thickness of the agate zones are 10 m, the agate content in the zone is 5 per 1 m^2. The average size of amygdales is 10–12 cm, rarely 40 cm or more. The composition is agate, chalcedony, chalcedony-quartz, chalcedony-calcite-quartz.

Belorechenskoye deposit is situated in the middle course of the Belaya river, 50 km to the south of Indiga village. The agate zones extend up to dozens of meters and 5–7 m thick. The dominant amygdale shape is cone-like. Sizes range from centimeters to 20–25 cm. Small amygdales (up to 10 cm) mostly contain agates or calcite, the larger ones are polymineral (contain agate, chalcedony, quartz, amethyst, calcite, chlorite, goethite, heulandite, opal and mordenite). Agates are mostly concentrically-zoned,