

Geology fact sheet:

Amber



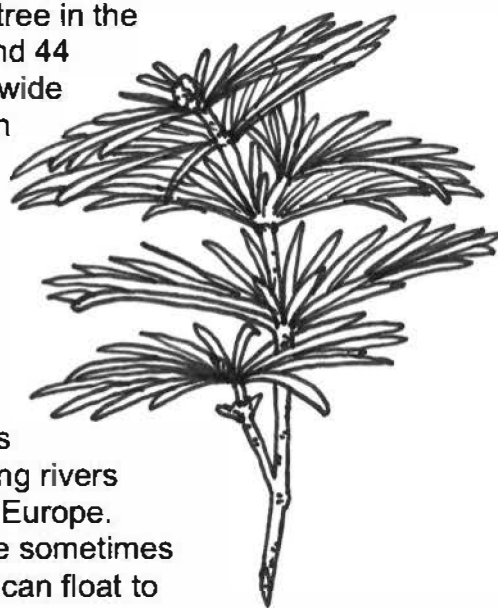
The beaches of Norfolk are particularly interesting, and a patient beachcomber will discover many things to identify and learn more about. All kinds of objects can be found washed ashore by the wind, waves and the tide. A walk on the beach after severe weather can often be very rewarding – the first remains of the West Runton Mammoth were discovered in this way.

Each item found can be examined and identified. There are four main categories of common finds on the beach:

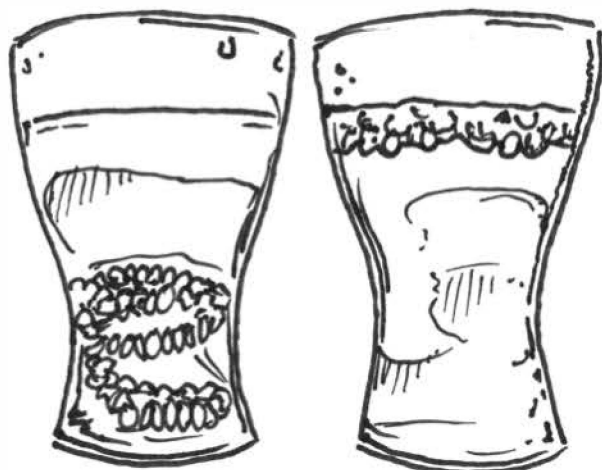
- Fossils – such as belemnites and echinoids from about 80 million years ago, and fragments of bone, antler and tusk from about 700,000 years ago
- Pebbles – such as flint, chalk, clay ironstones and erratics (a rock which has come from elsewhere)
- Finds of more recent origin such as shells, cuttlefish 'bones', hornwrack, seaweeds, whelk egg-cases and mermaids' purses
- And semi-precious stones such as jasper, carnelian, jet and amber

Amber is a fossil resin from several species of pine tree in the family *Sciadopityaceae*, which grew in Europe around 44 million years ago (during the Eocene Epoch). Worldwide they are now all extinct except for one species which survives in Japan – the Japanese Umbrella-pine (*Sciadopitys verticillata*). The most significant amber-bearing deposits are on the Baltic coasts of Russia, Bulgaria, Lithuania and Poland.

Fragments of amber are sometimes washed up on the Norfolk coast by the sea, usually after easterly winds, and can be mixed with bryozoa and seaweed thrown up by spring gales. This amber was transported from the Baltic Region by westerly-flowing rivers during the Ice Ages and deposited all over Western Europe. Old river deposits now lying under the North Sea are sometimes disturbed during gales and pieces of ancient amber can float to the surface.



A branch from the Japanese Umbrella-pine, Sciadopitys verticillata



An amber necklace in fresh (left) and salt water (right)

Amber is one of the few varieties of organic 'gemstone'. The most common varieties of organic gems include amber, pearl and coral.

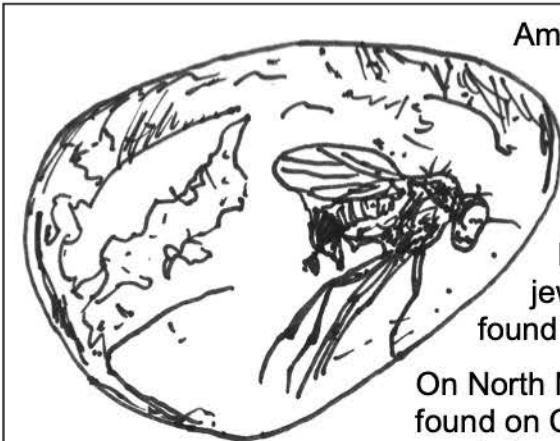
Unlike most other coloured stones, amber has an amorphous rather than crystalline structure. Amber has a very low specific gravity, which means that it is exceptionally light. Amber's low density allows it to float in salt water.

Amber's formation process began with the transformation of tree resin into copal. This change was triggered when overlying sediments created high pressure and temperatures. The exposure to heat and pressure repelled organic compounds called terpenes – which can cause deterioration and decay. Over time, the resin eventually hardened and became fossilised amber.

Many trees produce resin today as well as in the past, but most do not actually produce amber. Most resin deposits degrade after prolonged exposure to sunlight, rain and extreme temperatures. However, Umbrella-pine resin is very resilient and resistant to decay.



Fresh Umbrella-pine resin oozing down the trunk



A rare find: a fly trapped in Baltic amber

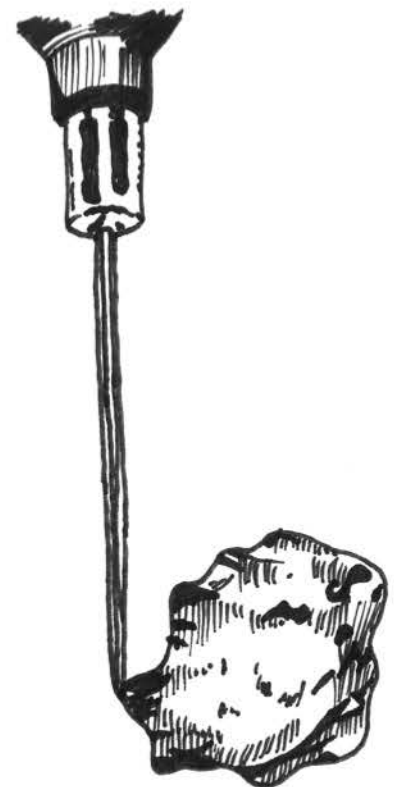
Amber can contain insects, spiders and other invertebrates, and even sometimes small lizards and other vertebrates! They were trapped in the resin when it was oozing down the trunks of ancient pine trees. Because of its softness and colour, amber has long been carved into ornaments and jewellery. In Norfolk, amber beads have been found that were carved at least 3,600 years ago.

On North Norfolk's 'Deep History Coast' amber can be found on Cromer beach, although larger quantities turn up at other locations, such as Southwold in Suffolk.

Genuine amber can easily be confused with several other similar-looking materials. Carnelian (sometimes spelled cornelian) is a brownish-red or amber-coloured mineral commonly used as a semi-precious gemstone. Carnelian is a variety of the mineral chalcedony coloured by impurities of iron oxides. It is commonly found on Norfolk's beaches, but it is hard, cold to the touch and will not float in sea water.

Unfortunately, synthetic resins and plastics can be found on our beaches too, and if discoloured, they can look very like real amber. Unlike natural carnelians, they are often as soft as amber, are warmer to touch and will float in sea water. Here are two simple ways to tell if a substance is real amber, or a synthetic material:

- The substance can be warmed up by rubbing it with a cloth or your hands. Real amber has a faint resinous odour resembling the of pine or turpentine. Synthetics will give out a chemical smell.
- A hot needle can be touched on the surface of the object – artificial materials will give off an unpleasant smell. Whereas, natural amber smells of pine, rosin or incense.



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