# Tortoiseshell
# 玳瑁甲殼

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作者簡述玳瑁甲殼之古與今，東方及西方的應用，真假辨別及交易法例等。

Tortoiseshell derives from marine turtles, not tortoises. Why then is it called tortoiseshell and not turtleshell? The reason is thought to be that when early naturalists first encountered turtles, they called them sea tortoises. For centuries the word 'tortoiseshell' has been the accepted term for the material, although it is a misnomer. Indeed, we know exactly what is meant by 'tortoiseshell', whereas 'turtle shell' could refer to the whole carapace and plastron of the animal, and include both the keratinous material and the bone and cartilage underneath.

But what exactly is tortoiseshell? It is the horny layer which grows in plates called 'scutes' and covers the carapace (the shell on the back) and plastron (the shell on the belly) of three species of marine turtle: the loggerhead, the green, and the hawksbill. Of the seven species of marine turtle, three others also have a horny outer layer on their shells, but it is never used as tortoiseshell. The scutes of the hawksbill turtle are thicker than the others and are considered the best material with which to work, so subsequently have been by far the most used. Green turtles were largely caught for food, especially for the famous Green Turtle Soup. (Fig. 1)

**Fig. 1** Young hawksbill turtle, caught for tagging.
小玳瑁，被抓來做標記。

The scutes on the carapaces of all three species have a mottled pattern of browns and yellows, and all have pale yellow plastron scutes. This is thought to be for camouflage when swimming, as predators above them see a dark image hardly discernible from the sea-bed, while predators below them see a pale image that merges with the sky. (Fig. 2)

**Fig. 2** Polished scute showing mottled pattern.
磨光的龜甲呈現斑駁紋路。

Tortoiseshell has been used for various purposes in the decorative arts. It is made of keratin -- a protein which is very common in the animal kingdom -- and is the main constituent of fingernails, fur, hair, claws, avian beaks and feathers, and so forth. It is a thermoplastic material, meaning that it can be heated and pressed or moulded to alter its shape, retaining the new shape when it cools. Further, the process can be repeated, so complicated shapes can be obtained. Tortoiseshell is also airtight and waterproof and will stick to itself if treated with pressure and heat in damp conditions. Thus several layers or off-cuts can be made into blocks for carving, or thin slices can be joined end to end to make thin sheets to be used as

veneer. Tortoiseshell can be dyed, though it is more usually backed with coloured paper to make it look green or red, or with white to bring out the mottled pattern. It takes a very good polish.

There is little very old tortoiseshell still in existence as it degrades with time and disintegrates. UV light tends to speed up the process, darkening the surface and destroying the lustre, thus the exterior of for example an old tortoiseshell card case may appear dull while the inside still retains a beautiful polish.

One of the distinguishing features of tortoiseshell is the moiré silk pattern that can be seen on tortoiseshell which has lost its lustre. This is never seen on other materials and is caused by the original growth rings reappearing. The material can be professionally re-polished to bring back the shine, but it is worth remembering that every time it is polished a small amount of material is abraded from the surface. (Fig. 3)

**Fig. 3** Moiré silk effect indicative of tortoiseshell.
玳瑁甲紋的莫爾絲綢效果。

Turtles live in warm seas around the globe, but not all indigenous people used tortoiseshell. Turtles were of importance as a good source of protein, but tortoiseshell was used only sparingly for jewellery in places like the Pacific Islands. Nonetheless records show that tortoiseshell was traded along with ivory and other items by, amongst others, the Romans who valued it highly and used it as veneer.

In Ancient China turtles were revered as steadfast, and for their longevity. 3000 years ago tortoiseshell was used as currency. Confucius mentioned worked tortoiseshell, but – apart from snuff bottles for the home market – very little has ever been used in China for decorative purposes. From the nineteenth century until the twenty-first century China produced tortoiseshell items mostly for the Western market, such as card cases, or small carved boxes. The carving was intricate and could be executed in relief due to the thickness of the hawksbill's scutes. (Figs. 4, 5)

**Fig. 4** Carved box, made in China, mid nineteenth century. Diam. 10cm.
雕刻盒，中國製造，十九世紀中葉。直徑10厘米。

**Fig. 5** Detail of intricate carving in Fig 4.
圖4中複雜雕刻的細節。

Marine turtles were abundant until the sixteenth and seventeenth centuries when Europe began to import the keratinous material for use as veneer or for the production of objets. Another use for the turtles at that time was as food on board the trading ships, where the animals were kept alive and killed as needed to provide fresh food. Together these led to the slaughter of vast numbers of turtles, to the extent that in some areas they became extinct.

In Europe the most famous of the cabinet makers using tortoiseshell was the Frenchman, André-Charles Boulle (1642 – 1732). Many people were incorporating tortoiseshell with metals in their designs but he perfected the art. Subsequently furniture with intricate marquetry of tortoiseshell, brass and silver is today usually referred to as 'Boulle work'.

Tortoiseshell piqué work also combines tortoiseshell with metals, usually gold and silver. Here the tortoiseshell is the base and – using heat and pressure – small strips or studs of metal are inserted in patterns. Mother-of-pearl is sometimes added as well. The most delicate work was produced in France and Italy in the eighteenth century. (Fig. 6)

**Fig. 6** English piqué work jewellery, mid nineteenth century.
十九世紀中葉的英國珠寶。

The popularity of tortoiseshell was not constant. It became very fashionable again in Victorian England where it was made into a huge number of things, often incorporating silver. Tortoiseshell-backed dressing table sets, lorgnettes, small boxes and other items were so popular that the turtle populations of the world were even further decimated, the slaughter only being stopped with the CITES* trade bans in 1975.

Other countries used even more tortoiseshell than the United Kingdom, notably Japan, where it became part of the culture of the country. Called 'Bekko', Japanese workmanship of the hawksbill turtle's tortoiseshell is undeniably some of the most magnificent, using elaborate moulding and inlay techniques, and often incorporating lacquer.

Tortoiseshell was used as the classic material for two things: spectacle frames and hair ornaments. Today these items are frequently made to resemble tortoiseshell, but are made of plastic.

Tortoiseshell has been copied in plastic since the earliest ones came on the market. The most frequently used was celluloid (cellulose nitrate) as it made a convincing imitation. Another material used to imitate tortoiseshell was horn, bleached to a pale colour and a mottled pattern painted on the surface. (Fig. 7)

**Fig. 7** Lid of horn box, painted to imitate tortoiseshell.
牛角盒蓋，仿玳瑁彩繪。

True tortoiseshell is best identified by sight, using a 10x lens and transmitted light. The mottled pattern is caused by microdots of pigment, laid down by the turtle in the material as it forms, layer upon layer, year after year. Thus, it penetrates the material and can be seen as tiny, slightly fuzzy-looking dots. It is not possible to replicate this in plastic which will display swirls or blobs of colour with definite outlines. Nor can it be copied by painting horn, as the paint does not penetrate the material. (Figs. 8, 9)

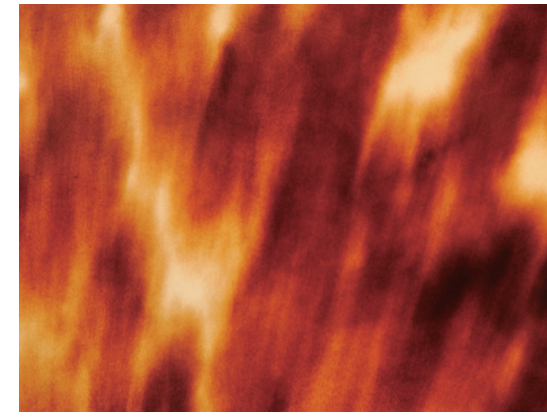

**Fig. 8** Tortoiseshell magnified to show fuzzy spots of pigment which make up the mottled pattern.
玳瑁色放大顯示構成斑駁圖案的模糊色素點。

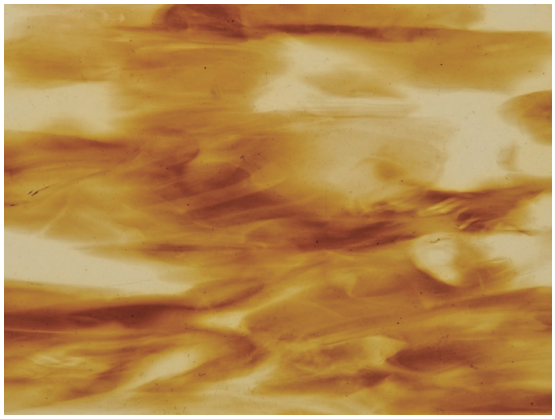

**Fig. 9** Plastic imitating tortoiseshell, showing swirls of colour.
塑料仿玳瑁色，呈漩渦狀。

There is a lot that we still do not know about turtles. To begin with, they live almost entirely at sea. Until conservationists started tagging them, we had no idea that turtles could swim thousands of miles, or that they only nest every two to three years, and that they can nest four or five times in a season. All these variants completely skew the numbers when trying to count the animals. Plus of course, we only count the females as the males almost never come ashore. We know that hatchling survival rates are extremely low and that the animals are very vulnerable for the first two years of their lives.

The earliest turtles were in the oceans 250 million years ago and their descendants have survived to this day – even outliving the dinosaurs – though in much smaller numbers than 300 years ago. Their survival is important as today it is realised that they play a significant role in the eco-system of the oceans.

All marine turtles are now covered by CITES* trade bans, and though a few are still being illegally caught and their scutes used for tortoiseshell, they are mostly protected. Today turtle populations in many parts of the world are slowly recovering.

Every country has its own domestic laws governing trade in items made from tortoiseshell, which in most cases need to be of a certain age to be legally traded. As it is usually impossible to certify the exact age of an item, most online auction sites ban the sale of tortoiseshell altogether. Nonetheless it is always available, with descriptions such as 'faux tortoiseshell' or 'vintage horn' used to make it sound legal.

**Fig. 10** Japanese dish, lacquer on tortoiseshell. Meiji period. Diam. 28.5 cm
日本料理碟，上漆玳瑁，明治時期，直徑28.5 厘米。

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