



### HOW WERE THE MASCOTS MADE?

Charles Sykes was an artist and sculptor. Wearing his sculptor's hat, more likely beret, he could, and probably did, make sculptures in any of several materials. Most sculptors these days, and probably in 1911 also, use clay. Once the work is completed, it is dried and used as a pattern, perhaps after being heated to a high temperature (fired), with or without glazing, for permanence. But this makes only one. If the artist wants copies, she/he must make a mould from the original work, then replicate this mould with whatever material is required.

I do not know what originals Sykes made in the first instance, but he knew he would have to make many copies, so I am confident that he used bronze to replicate his original clay, wax or plaster original. To make a copy of his 'original' he would have used the lost wax method, also known by the French term 'cire perdue', probably because it sounds more exotic.

In this procedure, the original is either sculpted in wax, or replicated in wax from a jelly mould of the original, and the wax is then refined so as to be exactly what is wanted in the reproduction. Sykes would have mounted his wax 'original' on a flat plate, surrounded it with an open-ended cylinder, then mixed up a heat-resisting type of plaster and poured it around the wax pattern. When the plaster had set, he would have placed the cylinder in a furnace, and heated it to first melt out the wax, then completely dry the plaster, then raise its temperature to perhaps 500° Celsius.

He would now have a hot, hollow, heat-resisting mold, and could pour molten metal, usually bronze, into it to occupy the space left by the melted wax. When the metal solidified



## The Spirit of Ecstasy

— Part Two —

by

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and cooled he could chip away the plaster and recover an exact copy of his wax pattern or sculpture. He would then polish and finish this casting to the exact shape and condition he wants the subsequent copies to be. Now stage two: He mounts the finished art work, in bronze, on a board and surrounds it with an open-ended cylinder. He now pours around this 'master pattern' a flexible mould material, as before. It must be flexible, because the mascot cannot possibly be removed from, say, a plaster mould, without damaging the mould, because of the many undercuts. (An exception is, as I explained earlier,

Above: The 2004 Rolls-Royce Centenary Phantom with a solid silver Spirit of Ecstasy.



The Whisperer, which can be withdrawn from a two-part mould.) Nowadays he would use natural rubber, or a silicone or urethane rubber, poured around the pattern and allowed to set. But back then, he would have used a jelly mold.

The 'jelly' Sykes would have used is called a 'reversible hydrocolloid', which is a mixture of water and a colloid such as gelatin or the seaweed extract agar-agar. These colloids are flexible but solid (a gel) at temperatures below 40° Celsius, but become fluid (a sol) when heated. Gelatin is sold as the dessert Jello (US) or Jelly (elsewhere) but is too soft at normal room temperature to make a good mold. The tougher and higher melting temperature agar-agar is sold at Asian grocery shops, or you can pay much more and get the same thing from Dentists Laboratory Suppliers as 'duplicating material'.

You melt the 'gel' to make a 'sol', pour it around the mascot pattern and, when it cools to a gel, remove the cylinder and, with a sharp thin blade, cut the gel into sections and remove them from the mascot pattern. You may need to remove several sections to free the pattern. Now comes the clever bit. You re-assemble the sections by sliding them back into the cylinder, which provides support. They will fit perfectly, and you may not even see where you made the original cuts. You can now melt wax and pour it into the mould. When the wax cools and becomes solid, you can remove it from the jelly mould as an exact replica of the mascot pattern. If you are careful, you may be able to use the same jelly mold several times and make several wax patterns.

You now tidy up your wax pattern, removing fins and bubbles, refine the wax inscriptions (R-R Ltd, 6.2.11, Charles Sykes, Reg. U.S. Pat.

1: The mascot is mounted on a board. The tapered pot can be fitted around it. 2: The pot is sealed around the mascot, ready for the melted jelly. 3: The melted jelly is poured around the mascot. 4: When cooled and solid, the jelly is removed from the pot and the mascot cut out. 5: The jelly is cut into sections to free the mascot. Next the sections are replaced in the pot. Melted wax is then poured into the mould cavity. When cold, the wax mascot replica is removed from the jelly mould. It will be slightly smaller than the mascot. 6: The original mascot and the wax pattern.





A casting of three wax patterns, mounted on a bar sprue. The original wax patterns were coated with a refractory, then surrounded by a block of casting sand to provide support. After wax burnout, molten metal was poured in to produce the castings shown here.

Off., Trade Mark Reg.) using a sharp point, then invest the wax in heat-resisting plaster, burn-out and cast in the alloy of your choice. You now have a **replica** of the **master**, which is, itself, a **replica** of the original sculpture.

#### PROBLEMS

**Y**ou knew there would be some. When you pour investment around your wax pattern, you can get bubbles. These will be reproduced in your casting as little beads of metal and you will have to cut them off. The investment can crack when heated, and the molten metal will fill these cracks, leading to 'fins' on your casting, which must also be removed. The investment expands a bit when heated but not enough to compensate for the shrinkage of the cast metal as it cools, so your replica mascot will be a little bit smaller than your master, usually 2–6%. In industry, casting dimensions are important, and patterns are made so that the finished product is the size required. This is not important for a car mascot.

The molten metal you pour into the casting must be hot enough to flow and fill the mould but not so hot that the volatile components in the alloy cause porosity or a poor surface on the casting. Nor should the 'melt' be too cold or it will solidify before the mold is completely filled and your mascot may be headless or have clipped wings. There are plenty of other problems but you get the idea. Replica mascots are difficult to make. Jo Phillips said they had failures.

Then the castings have to be polished, and probably electroplated, unless the alloy used is acceptable in

its polished state. An unskilled polisher can easily erase much of the fine detail of the original, and you will come across many mascots that have lost details of face, toes, drapery and hair, through overzealous polishing by an inconsiderate or incompetent polisher before being replated. Fingers and toes are especially vulnerable, and are the first details to be polished away. A really good mascot will have distinct fingers and toes.

The technique described can reproduce very fine detail, even a fingerprint on the wax, if a good investment is used. But it does not lend itself to mass production. Thus, in the 1930s, when demand for mascots exceeded production capacity, Jo Phillips, who was then supervising the work, said that they made some mascots

Many mascots have lost details through over-polishing. This is a typical example. Use only skilled operatives if you want to have your mascot re-plated.



The Crewe employee, photographed here in 1960, is holding a semi-polished upright Silver Cloud casting, and an unfinished kneeling Silver Dawn or Silver Wraith unpolished casting. The first is probably stainless steel. The second appears to be stainless steel, but some were chromium-plated brass.

using sand-casting techniques. She did not explain the system but it probably used resin-bonded molding sand, a faster technique but which produces a coarser and less attractive metal surface requiring more finishing.

#### CASTING SHRINKAGE

**I**t is an unavoidable property of nearly all things that they expand when heated and shrink when cooled. The wax used for investment casting contracts quite a lot as it cools, so when Sykes made his patterns in the jelly mould, they were a bit smaller than his original master. (The jelly mould did not also shrink as it cooled, but the reasons are too involved to discuss here.) When the wax is surrounded by the plaster-bound investment, the mould cavity actually gets a little bigger. This is called setting expansion and is a good thing because it adds to the expansion of the mould when it is heated to casting temperature, say 500°C. This expansion partially compensates for the shrinkage when the melted metal becomes solid at a high temperature and cools to room temperature. For mascots, this doesn't matter but if your dentist is making dentures or crowns, the metal replica must be exactly the same shape as the wax pattern or the denture or crown won't fit. Your dentist arranges things so that the mould expansion matches the wax and metal shrinkage. So does R-R when they make jet engine turbine blades. But they have many more constraints, and now make superbly accurate jet engine turbine blades with internal cooling passages, which give thousands of hours of faultless service



Post-WWII the Rolls-Royce company refined investment casting techniques for jet engine production. From left to right: an accurate wax pattern is made; it is sprayed with one of several refractory coatings; the sprayed pattern is surrounded by casting sand, the wax burnt out and replaced by molten metal and the solidified metal recovered; the metal casting, probably stainless steel, is polished.

under extreme temperatures and forces.

But no one cares much whether a replica mascot is a little bit smaller than the original master. How would anyone know without accurate measurements? Replica mascots are always a bit smaller than the master, the usual shrinkage being from 2–6%, and this would apply to Sykes mascots, which you now know are REPLICAS of REPLICAS of his ORIGINAL mascot. Thus, ALL R-R mascots are replicas, except that many were made by Sykes. The difference is that non-Sykes replicas will be slightly smaller than the Sykes replicas. But, if well made and finished, they can be as good as he would have made.

#### MASCOT SHAPES AND SIZES

**'C**ire Perdue' is a great technique, but wax patterns become soft in hot weather and can relieve stresses, droop a bit, or be distorted by careless handling. Jo Phillips mentioned this in her lecture. So the wings of one mascot may droop or bend more, compared with another made using exactly the same techniques. Thus making exact measurements of wing width and height of what are essentially individual castings is of limited use to identify, precisely, mascots which are obviously different but have, for example, about the same width and height of wings or which should be identical but which have different measurements. There is yet another area for difference, and that is the thickness of the base of the mascot. The base is invariably the part of the mould through which the wax is

poured, and it is usually poured taller than is needed. Thus the base of some otherwise identical mascots can be somewhat thicker than others. Therefore, for purposes of comparison, measuring mascot overall height may be misleading. This is especially so in the case of 20hp mascots. Joe Fildes suggests this as an explanation for the various heights of these mascots. It is for these reasons that I do not place absolute faith in the mascot size diagram on page 8232 of *The Flying Lady* 06-5 and page 8290 of 06-6. It should be used as a guide only and not an absolute size standard. You may not find a suitable category for your mascot, even though it is a genuine Sykes.

#### THE 'NOSE TO TOES' MEASUREMENT

**A** part from the above variations, it is difficult to measure the base-to-head, head-to-wingtip, and base-to-wingtip measurements shown on the diagram without parallax errors, especially when tire-kicking at meets and using a pocket tape for measuring. For this reason I offer my own simple measurement of mascots. It is easy to do,

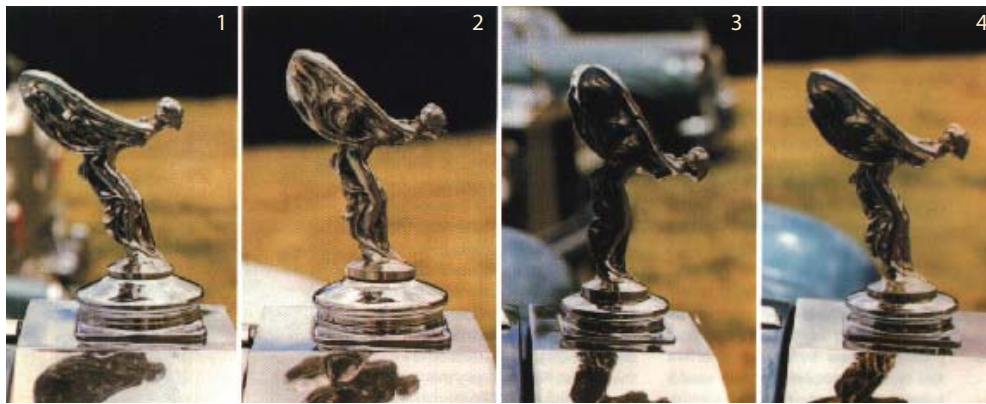
This mascot has retracted. The feature is a recent addition to Rolls-Royce motor cars, and should greatly reduce the incidence of mascot theft.



permits reasonably accurate comparisons and is more or less immune from wax pattern distortions. I suggest readers use it when discussing mascot sizes with colleagues or potential buyers or sellers. Measure the distance from the tip of the Spirit of Ecstasy's toes on her left foot to the underside of her nose, the **'nose-to-toes' measurement**. This also works for the kneeling mascot, except that the measurement is horizontal, not vertical.

#### POST-WWII MASCOTS

**P**ost-WWII mascots were not made by Sykes and his daughter but by Rolls-Royce. The company's first mascot was a version of Sykes' kneeling mascot, then they produced the first small standing mascot for the Silver Cloud series. The illustration on the previous page shows a picture of moulding sand blocks, each containing three Silver Cloud mascot wax patterns fed by a common sprue. The wax patterns were prepared by injection moulding wax into a six- or perhaps seven-part precision mould, then carefully trimmed, refined and sprued by skilful wax ladies. The sprued patterns were then sprayed with a refractory coating, surrounded by a block of casting sand as a support, then burnt out and cast in the 'cire perdu' manner. Each casting would be cut off, then finished and polished, and the sprue metal recycled in new castings. The kneeling mascot was fitted to the Silver Dawn and Silver Wraith, and differs from the Sykes original in that there is no date 26. 1. 34 on the right side of the base and no Sykes signature on the left side. But the underside of the right wing is stamped



These photographs by Martin Bennett show how the shape varied over the years. 1: 1957 Silver Cloud; 2: 1963 Silver Cloud III; 3: 1974 Silver Shadow (note the narrower width of the radiator compared with the next photograph of the Silver Shadow II); 4: 1978 Silver Shadow II.

“TRADE MARK REG” with no period after REG and the underside of the left wing is stamped “REG US PAT OFF,” again without periods. This differs from the Sykes mascot, which has periods where appropriate after each under-wing inscription and is hand-written, not stamped. In addition, the Sykes mascot has more artistic sculpting of the draperies and face, a more realistically shaped foot and gently waved hair. The hair on the RR version is mechanical, with many grooves, and looks ‘ribbed’.

With the passage of time and improvement in manufacturing techniques, R-R embraced the shell-casting technique for their mascots, probably because of their renowned expertise in fabricating jet engine turbine blades. For this technique, the wax pattern is sprayed with an adhesive, then coated with a heat-resisting powder, either by spraying or immersion in a fluidised bed of powder. The process is repeated several times until a satisfactory ‘shell’ is formed. The shell, with wax pattern inside, is then, if necessary, surrounded by moulding sand for support and the casting is made. This saves on expensive investment and is faster. The illustration on the top of the opposite page shows the steps involved.

I am indebted to Martin Bennett for an excellent display of how the R-R Company’s Silver Cloud and Silver Shadow mascots differ in the illustration above. The bases of the mascots have a similar slope but differ slightly in thickness. But the figures differ in their stances. The first looks straight ahead, the second looks down

slightly, the third looks at the road a few feet ahead and the fourth looks ahead again. The wing and head angulations are 1, level flight, 2, diving down slightly, 3 diving steeply and 4 more or less resuming level flight. And you thought all mascots were the same! None of them have any under-wing inscriptions.

Silver Shadow mascots after 1972 and Silver Spirit mascots have, stamped on the rear of the vertical surface of the base: “ROLLS ROYCE MOTORS LIMITED”. The latter also have a more steeply sloping base. The latest mascot, for the Goodwood Phantom, is significantly different from all earlier mascots. It is much smaller than any Sykes or Rolls-Royce mascots, does not have much detail, has, proportionally, very thick wings in comparison with previous mascots, and has no inscriptions. Its most easily identified feature is a very wide and curved base. It is said to be computer-designed and, in my view, looks a little mechanical. Early and most later Sykes

mascots have the appearance of works of art, but the latest R-R mascot, in my opinion, does not. The publication *Celebrating the 100<sup>th</sup> Year Anniversary of Rolls-Royce Motor Cars* says that the Goodwood Phantom mascot “acknowledges Eleanor Thornton even more closely than before . . . and the new techniques allow an even closer likeness, enhanced from period photographs.” I, and perhaps others, cannot see her likeness in the Goodwood Phantom mascot. Nevertheless, this mascot will still attract thieves should the owner fail to retract it when leaving the car. In mascot automatic mode, this occurs when the doors are locked. In mascot manual mode, the owner can choose to leave the mascot visible, or retract it, at will, even while driving.

Post-WWII mascots were, from 1947–1965, bolted to the radiator cap. But in the 1970s health and safety considerations required the Company to provide spring-loaded mascots to limit the damage caused by colliding with an unwary pedestrian. This was good for pedestrians, but even better for thieves, because a strong one could break the mounting chain and make off with the mascot. This spring-loaded mascot was replaced by a spring-activated retracting mascot for Silver Spirits sold in the EEC, which solved both problems. Purchasers elsewhere had to wait until around 1985 before their Silver Spirits were delivered with this feature.

*For further details about references, sources and background information please contact the Author or the Editor.*

Phantom Spirit of Ecstasy

