Plasma Fields Dagger Pin

Nickel, sterling silver

Dimensions: 90 mm x 35 mm x 15 mm

Mass: 16.5 g

Plasma Fields Dagger Pin Image © Green Vale Gallery

Inspiration:

Professor Steven Cowley

Steven Cowley's work in plasmas and nuclear fusion inspired a pin in the ancient British jewellery form of a dagger. The decorative handguard is of twisted sterling silver wire, resembling the modelled magnetic field of a rotating tokamak plasma, which some of his work has focused on[1]*. This shape, as a stylised letter "C", also refers to his own name, and the recurrence of "C" in the names of institutions he has been involved with during his career (including Culham Centre and Corpus Christi College). The dagger blade has been forged from a rod of ferromagnetic nickel donated by Norman Heckenberg. The two different materials were fused together with the aid of a silver alloy of lower melting point. Heating and acid-cleaning during the making process resulted in bluish iridescence due to oxide layers on the nickel, and rusty-coloured patches on the silver, which have been allowed to remain to accentuate the ancient form.

Materials:

Nickel, sterling silver

Method:

Nickel rod (donated by Norman Heckenberg) was forged into the shape of a sword blade. A sword cross-piece and handguard was fashioned from silver - sterling silver rod was pulled through a square hole in a steel plate to make square wire, then twisted, and formed into a near-circle. The cross-piece and a pin of sterling silver were soldered to the nickel base.

Results:

In forging the blade from nickel, part of the rod was left in its original round form to represent the sword handle. The stylised dagger form with letter "C" expresses Cowley's (career) identity at various times. The heating and acid-cleaning associated with the soldering process resulted in iridescence on the nickel and rusty-coloured patches on the silver. The pin has a rough surface finish, these features accentuate the ancient form, and reference Cowley's work that shows astrophysical plasmas invariably exhibit turbulence.

Box made from salvaged Australian native timbers by Gary Field for Labpunk and AIP Congress 2014. (Huon pine lid and Tiger myrtle body).

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[1] "Multiscale gyrokinetics for rotating tokamak plasmas: II. Reduced models for electron dynamics", IG Abel, SC Cowley, New Journal of Physics vol 15 February 2013