Gwaith Celfyddyd ac Enamel Oes yr Haearn: Darganfod a Dadansoddi

Mae astudio celfyddyd 'Geltaidd' ar waith metel yn dal i fod yn hanfodol i'n dealltwriaeth o bobl Oes yr Haearn yn Ewrop (tua 700 CC - OC 60). Roedd pobl ar draws Ewrop, o Iwerddon yn y Gorllewin i'r Môr Du yn y dwyrain, yn arfer celfyddyd *La Tène* o ddiwedd y bumed ganrif cyn Crist ymlaen. Roedd y gelfyddyd hon yn wahanol i gelfyddyd glasurol ardal Môr y Canoldir gan ei bod yn defnyddio elfennau naturiolaidd mewn cyfuniadau dychmygol ac mewn arddull rydd. Oherwydd dosbarthiad daearyddol arddulliau cynnar *La Tène*, cred llawer o ysgolheigion mai'r Celtiaid oedd yr arlunwyr - pobl a rannai'r un ieithoedd, yr un patrymau cymdeithasol a chredoau crefyddol paganaidd tebyg i'w gilydd. Yn ddiweddar, cododd dadl pan heriwyd y farn hon gan rai sy'n credu nad yw'r gwaith metel hwn yn arwydd o unffurfiaeth Geltaidd ar draws Ewrop. Yn hytrach, dadleuant fod

Darganfyddiad diweddar: darn o harnais wedi'i enamlo, diwedd Oes yr Haearn, o'r Allt-wen
Recent discovery: the enamelled Late Iron Age harness piece from Alltwen

Iron Age Art and Enamels : Discovery and Analysis

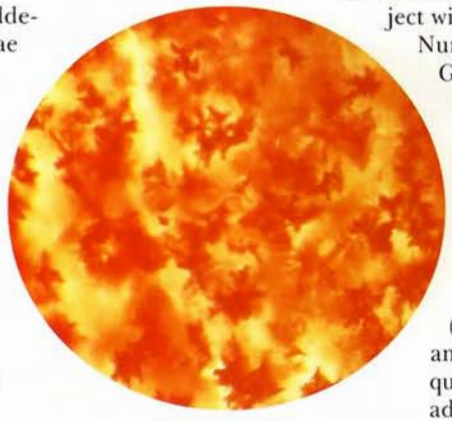
The study of 'Celtic' art styles on metalwork remains fundamental to our understanding of the peoples of the European Iron Age (*c.*700 BC-AD 60). *La Tène* art, as it is more properly known, was adopted by people across Europe, from Ireland in the west to the Black Sea in the east, from the late 5th century BC onwards. This was a form of art distinctively different from that of the classical Mediterranean world, employing naturalistic elements in imaginary combinations and in a free flowing style. This European distribution of early *La Tène* styles has led many scholars to assert that they were made by the Celts, a people who shared common languages, societies and similar pagan religious beliefs. Recently and controversially, such a view has been challenged by those who prefer not to see the metalwork as signifying a Celtic uniformity across Europe; they argue that similar metalwork styles indicate the long distance communication of ideas, without reflecting one common ethnic identity. Moreover, during the later Iron Age, British metalworkers

arddulliau tebyg yn dangos fod syniadau'n cael eu trosglwyddo dros bellter maith ac nad ydynt yn golygu mai pobl o'r un dras ethnig oedd yn gyfrifol amdanynt. Tua diwedd Oes yr Haearn hefyd, datblygodd pobl Prydain eu harddulliau celfyddydol arbennig eu hunain i addurno gweiniau cleddyfau, tariannau, taclau ceffylau a drychau. Canfuwyd llawer o eitemau cain yn arddull *La Tène* yng Nghymru, gan gynnwys 'dysgl' Cerrigydrudion (Conwy) (y credir erbyn hyn mai helmed seremoniol pennaeth ydyw),dau fogail tarian yng nghasgliad Tal-y-llyn (Gwynedd) a phlac cilgantaidd yng nghronfa ddefodol Llyn Cerrig Bach (Ynys Môn). Mae pob un o'r rhain i'w gweld yn Amgueddfa ac Oriel Genedlaethol Caerdydd.

Techneg a feistrolwyd gan weithwyr metel Prydain o'r drydedd ganrif cyn Crist ymlaen oedd rhoi enamel coch ar waith metel i'w addurno. Math o wydr ydyw mewn gwirionedd, ac yn wahanol i enamel cyffredin, nid oedd yn cael ei osod ar y gwaith metel trwy ailddoddi'r ffrit. Yn hytrach, câi ei osod trwy dorri darnau i'w siâp, yna eu meddalu'n ofalus â gwres a'u gwasgu i'r pantiau a baratowyd ar eu cyfer ar y darnau metal. Yn ddiweddar, canfuwyd darn o gêr ceffyl wedi'i addurno yn arddull gelfyddyd *La Tène* ddiweddar Prydain, gydag olion enamlo coch, yn yr Allt-wen ger Pontardawe (Castell Nedd - Port Talbot), ac fe'i prynwyd ar gyfer y casgliad cenedlaethol. Mr D. Richards a ddaeth o hyd i hwn wrth gloddio sylfaen ar gyfer estyniad i'w dŷ. Mae'n debyg fod y darn yn dyddio o 50 CC - OC 50, a'i fod yn perthyn i ryfelwr neu bennaeth pwysig. Mae'r cynllun yn llifo'n rhwydd ac mae'n cynnwys pantiau ar ffurf ffaniau a'r lleuad. Rhiciwyd yr wyneb er mwyn mewnosod gwydr coch.

Dadansoddi'r samplau gan ddefnyddio Microsgop Sganio Electronig
Analysing the samples using a Scanning Electron Microscope

Ar ôl canfod y darn hwn, roedd angen ei ddehongli yn ei gyd-destun diwylliannol ac mae hyn wedi ysbrydoli project ymchwil ehangach yn yr Adran Archeoleg a Nwmismateg, gyda chymorth yr Adran Ddaeareg, ar arteffactau Cymreig o Oes yr Haearn - rhai wedi'u henamlo a rhai wedi'u haddurno. Pa mor debyg (neu wahanol) i'w gilydd oedd y traddodiadau gwaith metel a gwaith gwydr yn ne a gogledd Cymru? A oedd Aber Afon Hafren yn gwahanu gweithwyr metel de Cymru a rhai de-orllewin Lloegr ar ddiwedd Oes yr Haearn neu yn eu tynnu at ei gilydd? Beth sy'n digwydd i'r 'enamelau' (gwydrau) hyn ymhen amser, a sut y mae hyn yn effeithio ar y gwaith dadansoddi? Dyma rai o'r cwestiynau y bydd y project yn mynd i'r afael â nhw.



Crisialau dendritig o gwprit yn yr amgaen wydr
Dendritic crystals of cuprite within the glass matrix

Mae'r eitemau a astudir yn cynnwys canfyddiad 'Lesser Garth' (Caerdydd), sef dolen gyfrwy ag arni gnapau, Cawg yr Wyddfa (Gwynedd) ag arni lun tebyg i gath, a rhai darnau o gêr ceffylau o Gasgliad Blaendulais (Castell Nedd - Port Talbot), yn ogystal â'r darn newydd o'r Allt-wen. Cymerwyd samplau bach iawn o enamel o wahanol fannau ar yr eitemau a'u gosod a'u sgleinio ar sleidiau microsgop, gan addasu dull a ddatblygwyd yn gynharach ar

developed their own distinctive insular styles to decorate sword scabbards, shields, horse fittings and mirrors. Wales boasts many fine metalwork discoveries decorated in *La Tène* art styles, including the Cerrig-y-Drudion (Conwy) 'bowl' (more recently thought to be the ceremonial helmet of a chieftain), the two shield bosses in the Tal-y-Llyn (Gwynedd) hoard and the crescentic plaque in the Llyn Cerrig Bach (Ynys Môn) ritual hoard, all of which are on display at the National Museum & Gallery Cardiff.

A technique mastered by British metalworkers from the 3rd century BC onwards was the application of red 'enamel' to decorated metalwork. It is in fact a type of glass which, unlike conventional enamels, was not fused onto metalwork by re-melting the frit. Instead, it was applied by cutting pieces to shape; which were then carefully heat softened and finally pressed into the prepared recessed areas on the metalwork. Recently, a horse harness piece decorated with a late insular *La Tène* art style, and augmented with areas of red enamelling, has been discovered at Alltwen near Pontardawe (Neath-Port Talbot), and purchased for the national collection. The Alltwen find was made by Mr D. Richards whilst digging the foundations for an extension to his house. Probably dating to 50 BC-AD 50, this piece was used as a form of high status martial display, by a warrior or leader on horseback. The flowing design incorporated negative recesses shaped in fan-like and lunate forms, which were surface scored, to take the red glass inlay.

This new discovery, and the need to interpret it within its cultural context, has inspired a wider research project within the Department of Archaeology & Numismatics, assisted by the Department of Geology, on Welsh enamelled and decorated artefacts from the Iron Age. How similar (or different) were the metal and glassworking traditions in north and south Wales? Did the Severn Estuary act as a barrier, or as a cultural focus for metalworkers between south Wales and south-west England during the later Iron Age? How do these 'enamels' (glasses) decay, and how does this distort analytical readings ? These are some of the questions which this project is seeking to address.

The selected artefacts include the Lesser Garth (Cardiff) bossed terret, the Snowdon Bowl (Gwynedd) with its cat-like motif, and selected horse equipment from the Seven Sisters Hoard (Neath-Port Talbot), in addition to the new Alltwen piece. Tiny samples of enamel were taken from discrete locations on the artefacts; these were mounted and polished on microscope slides, adapting a method previously developed for the examination of small geological samples. Quantitative elemental analyses of samples were conducted using a Scanning Electron Microscope with energy dispersive X-ray analysis (with the

gyfer archwilio samplau daearegol bychain. Gwnaed dadansoddiad meintiol o'r elfennau yn y samplau gan ddefnyddio Microsgop Sganio Electronig sy'n gwneud dadansoddiad pelydr-X wrth wasgaru ynni (gyda chymorth Mr P. Fisher, Prif Dechnegydd) o'r Adran Gwyddorau Daear, Prifysgol Caerdydd. Yn ogystal, astudiwyd adeiledd yr enamelau trwy olau a drosglwyddir a golau atodol, gan ddefnyddio microsgop sy'n polareiddio.

Mae'r dadansoddiad o'r enamelau hyn yn dangos mai gwydrau calch soda ydynt yn bennaf a bod ynddynt dipyn go lew o blwm a chopr hefyd. Y copr, ar ffurf crisialau cwprit dendritig mawr mewn daliant yn yr amgaen wydr, sy'n rhoi lliw coch llachar i'r gwydr ac yn ei wneud yn afloyw. Byddai'n dipyn o gamp dechnegol i'w gynhyrchu a byddai'n rhaid sicrhau rheolaeth ofalus dros gynhwysion y gwydr a gwres y ffwrnais. Gwelir diraddiant gwahaniaethol yr enamel ar ddarn yr Allt-wen yn amlwg gan fod y lliw'n newid o goch llachar i oren ac yna brown. Credir mai canlyniad cynhesu ac ocsideiddio'r cwprit yw'r newid yn y lliw gan fod hynny'n peri newidiadau cemegol a ffisegol yn ei adeiledd gyda'r dendritau'n torri i lawr fwyfwy. Mae'n bwysig nodi i ni ganfod wrth archwilio'r microadeiledd bod llawer o wahaniaethau yn y math hwn o wydr. Roedd angen nifer o samplau o bob eitem, a mwy nag un dadansoddiad o bob sampl, er mwyn canfod yn union beth oedd y cyfansoddiad o ran yr elfennau oedd ynddo.

Mae'r canlyniadau cyntaf yn dangos fod eitemau wedi'u henamlo o dde Cymru yn eithaf tebyg i rai o dde-orllewin Lloegr ond bod yr enamel ar gawg yr Wyddfa, o'r gogledd, yn wahanol iawn i'r lleill. Yr awgrym yw bod gwahaniaethau rhanbarthol yn y ffordd o wneud y gwydrau hyn a byddwn yn ymchwilio ymhellach trwy wneud profion ar ragor o eitemau wedi'u henamlo. Bydd ein canlyniadau'n ychwanegu at y gwaith dadansoddi a wnaed gan staff yr Amgueddfa Brydeinig ar ychydig enghreifftiau o eitemau enamel. Gobeithio y bydd y project ymchwil hwn yn helpu i ysgogi rhagor o brojectau ymchwil dadansoddol gan yr Amgueddfa ei hun ar gasgliadau archeolegol Amgueddfeydd ac Orielau Cenedlaethol Cymru yn y dyfodol agos.

Mary Davies (Cadwraethydd Archeolegol) ac Adam Gwilt (Cynhanesydd Diweddar), Adran Archeoleg a Nwmismateg; Michael Lambert (Cynorthwyydd Ymchwil), Adran Ddaeareg, Amgueddfa ac Oriel Genedlaethol Caerdydd

help of Mr P. Fisher, Chief Technician), based at the Department of Earth Sciences, Cardiff University. Additionally, the structure of the enamels was studied, through transmitted and incidental light, using a polarising light microscope.

Analyses of these enamels indicate that they are primarily 'soda-lime' glasses which also contain relatively large proportions of lead and copper. It is the latter, in the form of large dendritic crystals of cuprite suspended within the glass matrix, which are responsible for the brilliant red colouration and the opacity of these glasses. Their manufacture is technically advanced and can only be achieved by careful control of both the ingredients of the glass and the furnace conditions. The differential degradation of the enamel on the Alltwen piece can readily be discerned by the alteration in its colour from bright red through to orange and brown. The colour changes are probably a result of heating and oxidation of the cuprite which results in the chemical and physical alteration of its structure, with the dendrites increasingly breaking down. Importantly, examination of their microstructure has highlighted the high degree of inhomogeneity of this type of glass. Multiple samples from each artefact, and more than one analysis of each sample, were necessary to give an accurate representation of elemental composition.

Preliminary results indicate that enamelled artefacts from south Wales correlate reasonably well with those of south-west England; however the enamel on the Snowdon bowl from north Wales is markedly different from the others. This hints at regional differences in the manufacture of these glasses, an idea to be pursued in the future by testing further enamelled metalwork finds. Our results will add to the limited number of British enamelled artefacts analysed by staff in the British Museum. We hope that this research project will help to stimulate provision for further 'in-house' analytical research projects on the archaeological collections of the National Museums & Galleries of Wales in the near future.

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