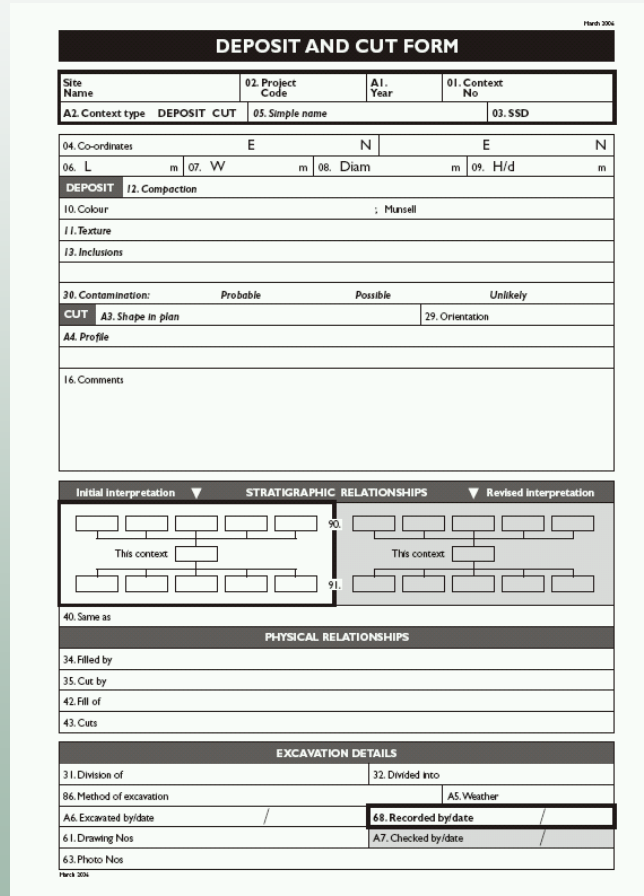
Integrating cultural and scientific heritage:
archaeological ontological modelling for the field and the lab.

Presented by Keith May

Based on research work of English Heritage staff especially Paul Cripps & Gill Campbell
and
Doug Tudhope and Thanos Zafiriu at Glamorgan University

Background to Archaeological model

- Limit the degree of minute detail
- Context record sheet modelled as CRM Information Object (E73)
- *Note Matrix*
- Model still complex enough - most archaeologists find it daunting



DEPOSIT AND CUT FORM

Site Name	02. Project Code	A1. Year	01. Context No
A2. Context type DEPOSIT CUT	05. Simple name		03. SSD

04. Co-ordinates	E	N	E	N			
06. L m	07. W m	08. Diam m	09. H/d m				
DEPOSIT 12. Compaction							
10. Colour ; Munsell							
11. Texture							
13. Inclusions							
30. Contamination:	Probable	Possible	Unlikely				
CUT A3. Shape in plan	29. Orientation						
A4. Profile							
16. Comments							

Initial interpretation	STRATIGRAPHIC RELATIONSHIPS	Revised interpretation
This context	90. 91.	This context

40. Same as

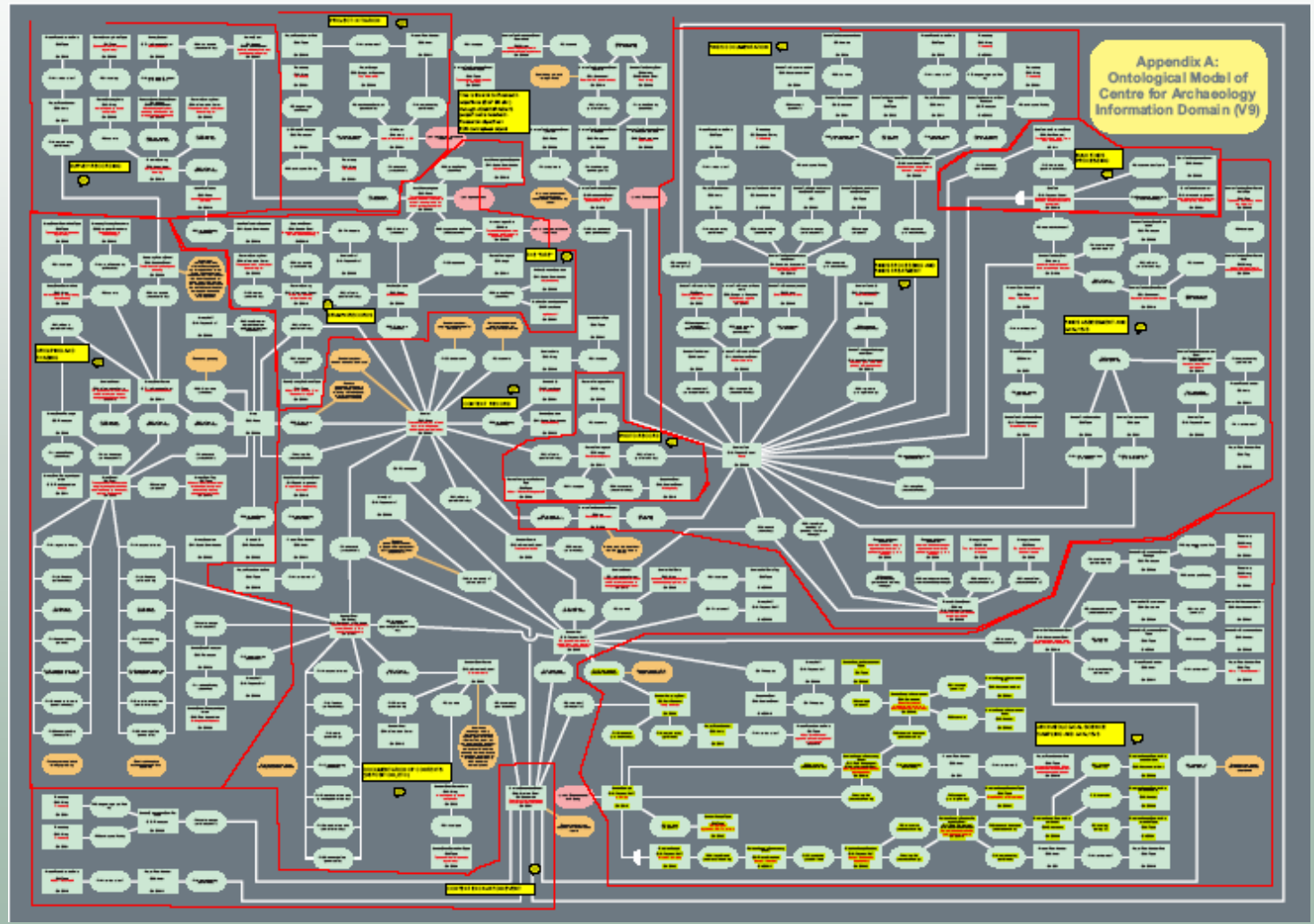
PHYSICAL RELATIONSHIPS

34. Filled by	
35. Cut by	
42. Fill of	
43. Cuts	

EXCAVATION DETAILS

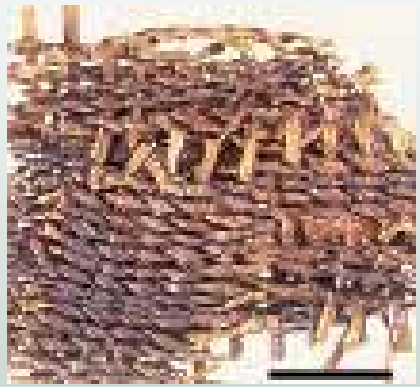
31. Division of		32. Divided into	
86. Method of excavation			A5. Weather
A6. Excavated by/date	/	68. Recorded by/date	/
61. Drawing Nos		A7. Checked by/date	/
63. Photo Nos			

CRM diagram of Archaeological Information Domain (ref: http://cidoc.ics.forth.gr/technical_papers.html)



Aims, methods & Issues of Archaeological Science modelling

- Elements of the original CfA model to be enhanced
- Approach taken was to identify common archaeological science terminologies and map to CIDOC CRM
- Recent peer-group revision of the Archaeological Science Thesaurus made this timely
- Issue of ambiguities between Finds/Environmental
- Terminologies for objects based on Ecofact/Artefact distinctions



Basketry from Roman deposits at Annetwell St, Carlisle. Scale = 1cm. *(Photograph by J Jones)*

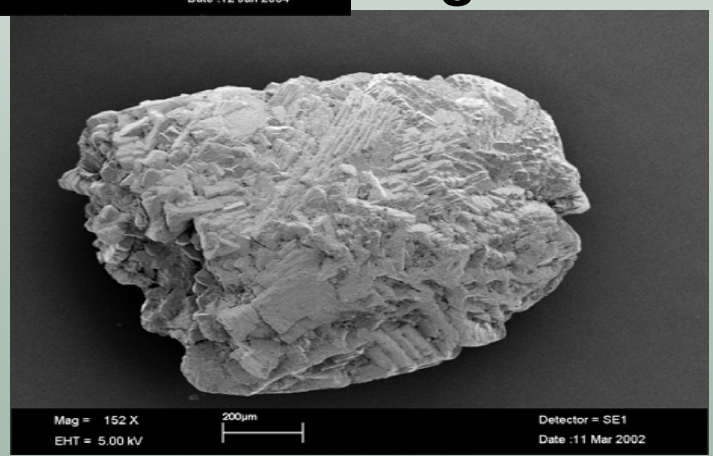
Bone-handle from excavations at Denaby Main, South Yorks. (*Photographed by J P Huntley*)

Animal, Vegetable or Mineral?

Charred plant remains

Animal bone

Earthworm granule



Archaeological Science Thesaurus Key Fields

Object Type – Animal Remains

Material Type - ?Tooth

Modification State - None

Aspect (feature) -Pathology

Investigative

Technique – Stable Isotope Anl

Recovery Method – Hand retrieval

E.G. Animal Bone

Class	Broad Term	Narrow term	2nd narrow term	3rd narrow term
ECOFACTS				
	ANIMAL REMAINS			
		HUMAN REMAINS		
		INVERTEB RATES		
			ANNELIDS	
			ARTHROPODS	
				CLADOCERANS
				CRUSTACEANS (DECAPODS)
				INSECTS
				MITES
				OSTRACODS

Mapping of Arch thesaurus to CRM Issues to consider

- Granularity – ie What level of mapping to go to?
- Do we need to maintain balance of the current granularity of the model?
- Did existing Artefact modelling (eg. pots & coins, etc) suffice for Ecofacts?

‘Method of Recovery’ -term

Level of mapping – a Granularity issue?

Thesaurus term '**Method of Recovery**' (E55 Types of E7 Activity) but includes the terms:

- 'Block-lifting' (ie. sampling a block of soil for micro-excavation)

  - mapped to CRM as E80: Part Removal

- ‘Floatation’ (ie. dissolving a soil sample in water and collecting different seeds, etc that float off) is more akin to

  – mapped to CRM as E81: Transformation

Archaeological Context as 2 entities – a Representational (identity) issue?

Context as a spatial entity - E53 Place

(e.g. pit cut)

(Cls(E1.CRM_Entity))

- (Cls(E53.Place))
  - (Cls(**Context_Class_EHE0007**))

Context as a physical entity - E18 Physical Stuff

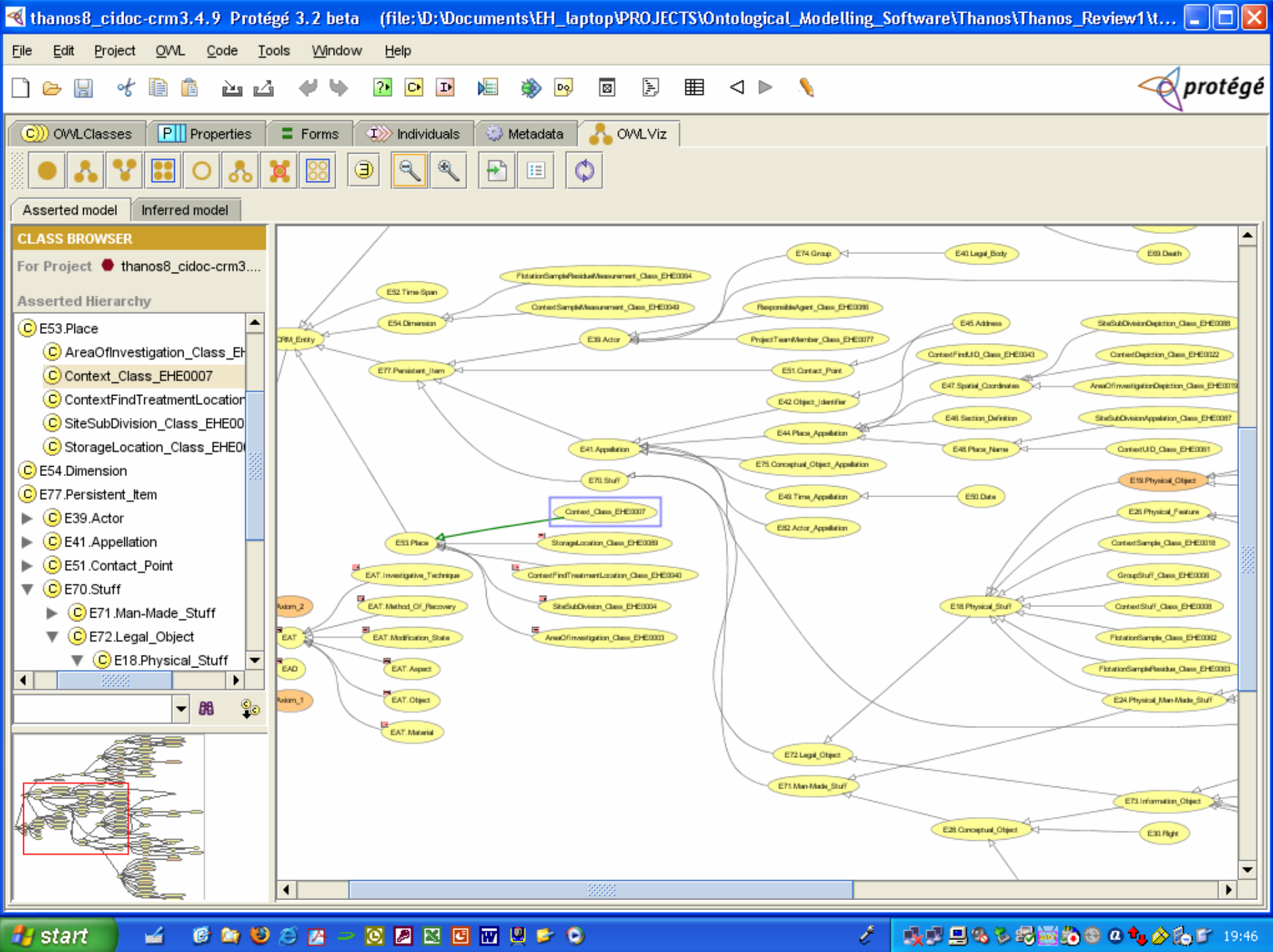
(e.g. pit fill)

(Cls(E1.CRM_Entity))

- (Cls(E77.Persistent_Item))
  - (Cls(E70.Stuff))
    - (Cls(E72.Legal_Object))
      - (Cls(E18.Physical_Stuff))
        - » (Cls(**ContextStuff_Class_EHE0008**))

Protégé modelling

- Rather than append to existing PDF diagram
- Opportunity to model in Protégé
- DELOS based work by Tudhope & Zafiriu at Glamorgan Uni.
- Using RDF supplied by Detlev Balzer


thanos8_cidoc-crm3.4.9 Protégé 3.2 beta (file:\D:\Documents\EH_laptop\PROJECTS\Ontological_Modelling_Software\Thanos\Thanos_Review1\t...
File Edit Project OWL Code Tools Window Help
protégé
OWLClasses Properties Forms Individuals Metadata OWLViz
Asserted model Inferred model
CLASS BROWSER
For Project thanos8_cidoc-crm3....
Asserted Hierarchy
E53.Place
AreaOfInvestigation_Class_EH
Context_Class_EHE0007
ContextFindTreatmentLocation
SiteSubDivision_Class_EHE00
StorageLocation_Class_EHE0
E54.Dimension
E77.Persistent_Item
E39.Actor
E41.Appellation
E51.Contact_Point
E70.Stuff
E71.Man-Made_Stuff
E72.Legal_Object
E18.Physical_Stuff
E74.Group
E40.Legal_Body
E69.Death
E52.Time-Span
E54.Dimension
E39.Actor
E77.Persistent_Item
E45.Address
E51.Contact_Point
E47.Spatial_Coordinates
E42.Object_Identifier
E44.Place_Appellation
E41.Appellation
E48.Section_Definition
E48.Place_Name
E75.Conceptual_Object_Appellation
E70.Stuff
E49.Time_Appellation
E50.Date
E82.Actor_Appellation
Context_Class_EHE0007
E53.Place
StorageLocation_Class_EHE0039
ContextFindTreatmentLocation_Class_EHE0040
SiteSubDivision_Class_EHE0034
AreaOfInvestigation_Class_EHE0033
E19.Physical_Object
E26.Physical_Feature
E18.Physical_Stuff
E24.Physical_Man-Made_Stuff
E72.Legal_Object
E71.Man-Made_Stuff
E73.Information_Object
E28.Conceptual_Object
E30.Right
start
19:46

Protégé modelling – pros and cons

- Existing model complex enough but accessible
- Protégé networking – a whole further project at EH
- More to be done – integrating thesauri
- But how much use to the wider ontological community?

Next - modelling for STAR project

(STAR – Semantic Tools for Archaeological Resources)

- Finish Protégé modelling
- Review the mapping/modelling based on the requirements for Raunds Excavation data
- Begin work on integrating modelling with FACET tools
- Demonstrator testing search & retrieval on Raunds excavation data and grey literature reports
- Attempts to record Research Questions along with data to aid structuring of data and reporting
  – may complement the natural language methods shown yesterday