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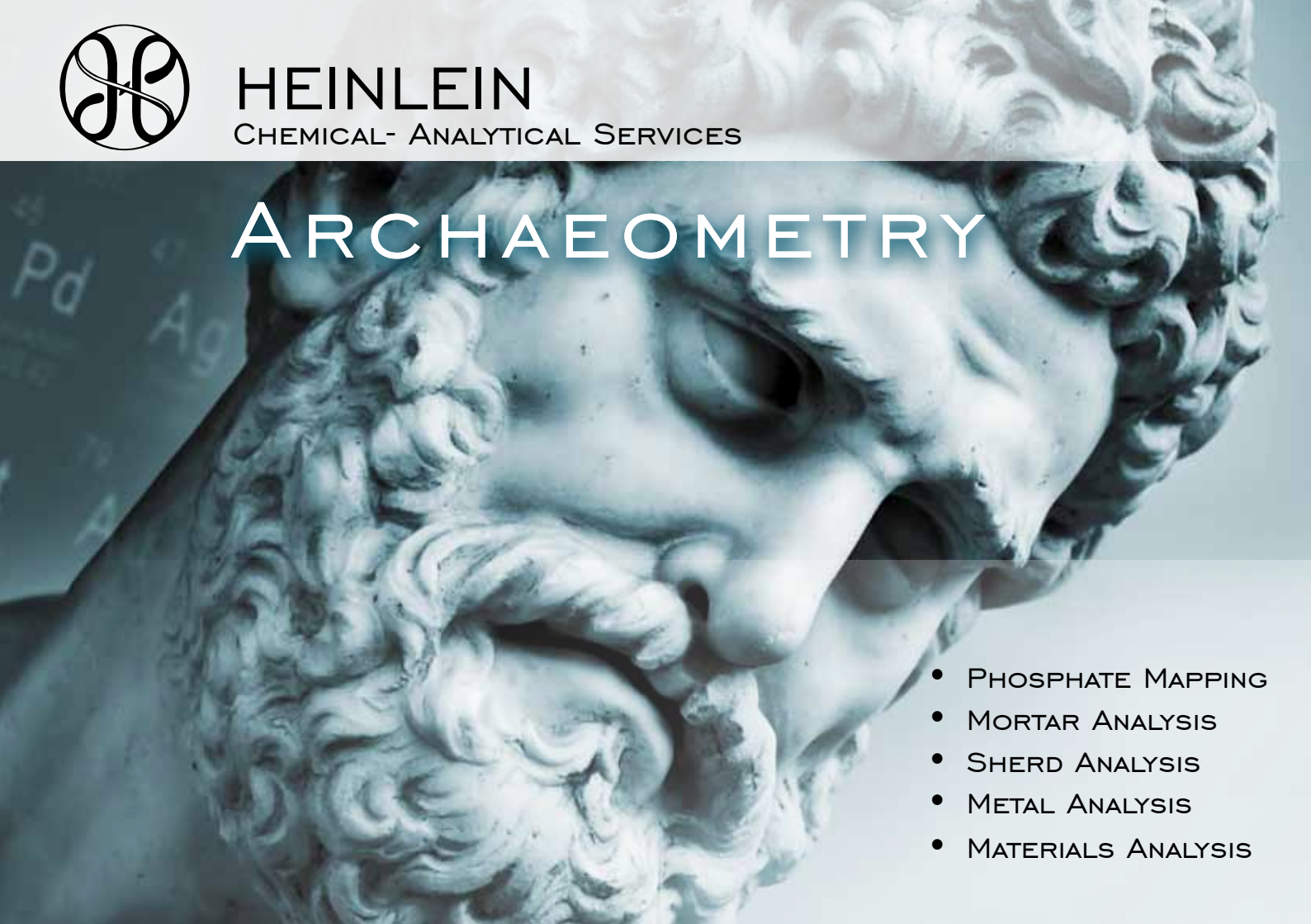
Chemical- Analytical Services

Archaeometry



- Phosphate Mapping
- Mortar Analysis
- Sherd Analysis
- Metal Analysis
- Materials Analysis

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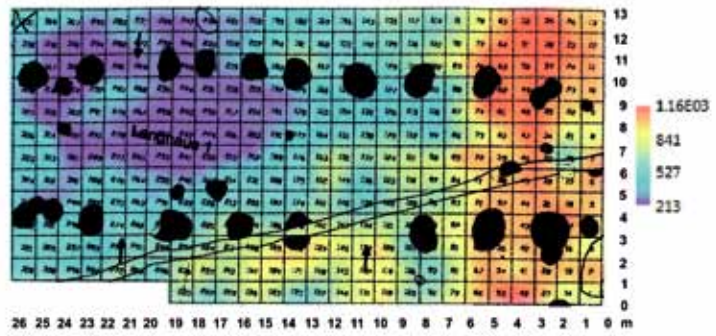
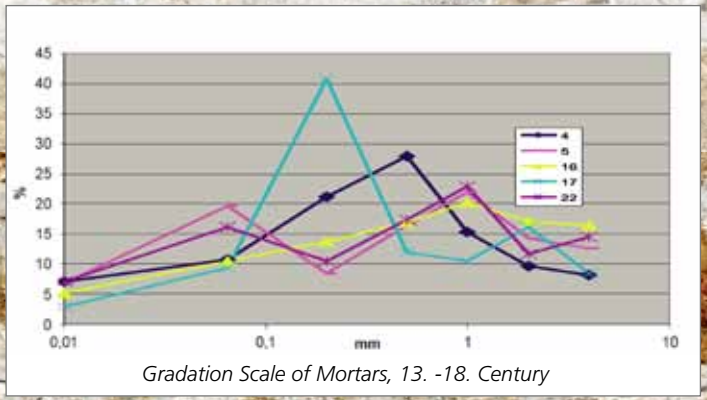


Phosphate Values of a „Long House", Lower Saxony, 10th. Cent. AD

Phosphate Mapping

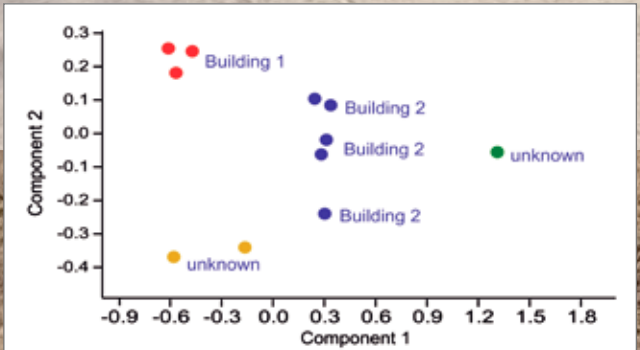
The historical remnants of early rural settlements can nowadays be "chemically seen" as traces of phosphate bound to minerals in the soil.
How?
Wherever human habitation occurs there is the inevitable discarding of waste: food remnants, fecal matter, cattle and other animal dung, and last but not least human remains in burial places. Eventually micro-organisms solubilize these substances and degrade them to phosphate, which in turn is incorporated into the soil inorganic matter. This phosphate accumulates and remains in the upper soil layers for thousands of years up until the present time. Through chemical means, it can be detected and from this we are able to reconstruct the layout of long decayed housing and other settlement structures.



Gradation Scale of Mortars, 13. -18. Century

Mortar Analysis

Mortar is a mixture of burnt limestone and sand/gravel obtained from a sand pit. When a church was built in say the 13th century, its construction materials would have been those available locally at the time. Several hundred years later when perhaps it was decided to add aisles to the church building, there were other limestone and gravel pits in use which had limestone of a different quality (hydrated lime and cementing material) and sand of another gradation scale. Mortar analysis enables us to identify these materials and therefore to date the different stages of construction.



Attribution of Sherds to Areas by PCA- Analysis

Metal Analysis

In the process of excavation, metal items in an advanced state of corrosion leaving only brownish rust or greenish traces may be found. What kind of metal was it made of? What was its weight and dimensions?

Materials Analysis

At the excavation site there are collections of grayish, brownish and black aggregates. Are they derived from plant material, of animal or human origin, traces of corpses, bone material, limestone, gypsum, rotted leather or specifiable dross?

A chemical analysis ought to be able to tell us.

Ceramic and Decorative Objects

Shared Identity of ceramic ensembles, sherds, pearls or bronze

Chemical analysis of sherds of ceramic pieces and fragments of other decorative objects allows a quite differentiated perspective. The different content of trace elements provides a kind of finger print identifier, which indicates for example whether sherds of ceramic items or fragments of bronze weapons derived from the same workshops.

Metal- Content in Sherds/ Gr. Meckelsen, Low. Sax., 1.st Cent. B.C.

Sherd	K %	% Na	% Mg	Fe %	Mn %	Ni ppm	Zn ppm
1a	1,88	0,80	0,05	3,32	0,015	47	181
1b	1,70	0,65	0,03	3,58	0,018	40	172
1c	1,82	0,75	0,03	3,25	0,014	50	168
2a	2,27	0,60	0,05	3,42	0,029	44	131
2b	1,96	0,68	0,03	3,24	0,030	36	135
2c	2,03	0,77	0,07	3,24	0,031	52	124
3	1,58	0,54	0,04	3,69	0,060	30	143
4	1,54	0,46	0,03	3,29	0,021	14	106
5	1,61	0,46	0,03	4,20	0,009	34	94
6	1,92	0,61	0,03	2,93	0,028	31	112
7	1,94	0,57	0,04	3,06	0,084	37	116
8	1,99	0,69	0,03	2,96	0,029	22	100
9	1,98	0,61	0,06	3,30	0,022	30	200
10	1,34	0,67	0,05	3,40	0,041	38	157
11	1,94	0,57	0,04	3,18	0,335	41	158

Archaeometry

These days chemical analysis has become increasingly important in archeology. It is useful in indicating many things.

- In the excavation of dwellings there may be suggestions of the location of the living/cooking area and of where the cattle were housed.
- Greenish sand, could it be evidence of lost bronze fragments?
- Was the structure made of limestone or gypsum?
- Chemical plaster analysis can distinguish between construction periods.
- Rusty items, don't discard them, it is possible to estimate the weight of the original metal item by the amount of remaining corrosion.

If you have further questions, our lab may be able to provide answers.

HEINLEIN
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Dr. Jörn Heinlein
Volkenser Weg 2
D-27404 Elsdorf

Tel.: +49-4282-59 32- 48
Fax: +49-4282-59 32- 47
jheinlein@t-online.de
www.joern-heinlein.de