BALNEARIA

Newsletter of the International Association for the Study of Ancient Baths

Volume 1 April 1993 Issue 1

Editor: Dr Janet DeLaine
Institute of Archaeology
36 Beaumont Street
Oxford OX1 2PG England

EDITORIAL

New ventures inevitably take longer to get off the ground than their promoters envisage, and this, the first newsletter of the International Association for the Study of Ancient Baths, is no exception. Work is also proceeding on the association itself. In the light of the many suggestions gratefully received from both regional representatives and prospective members of the association, we are now in the process of forming an interim organising committee, drawing up a constitution, and deciding on subscription fees to cover the cost of the newsletter and bibliography. The details will appear in the next newsletter, which is targeted for September to coincide with the Classical Archaeology Congress in Tarragona where we hope to publicise the Association. From there on the intention is to produce a newsletter in March and September every year.

One of the aims of the newsletter is to produce a baths bibliography, the first of which will appear next issue. Dr Hubertus Manderscheid of the Istituto Archeologico Germanico, Via Sardegna 79, 00187 Roma, Italy, has generously volunteered to act as central bibliographer, and information on new publications can be sent to him there or through regional representatives. Other contributions for the newsletter should either be sent directly to me or forwarded through the regional representatives. I am particularly keen to receive short pieces on new excavations, discoveries, or projects for the ***Site Notes and News*** section, and to encourage readers to make use of the ***Help!!!*** column.

I would like to take this opportunity to thank all those who have sent contributions for this first newsletter, and to say to all who have shown an interest in this new venture:

Welcome to ***BALNEARIA!***

CONTENTS

Roman Baths - a Health Warning!

Modern water-treatment plants are designed and operated to ensure that water supplied to consumers is filtered, chlorinated, and treated to ensure zero or minimal levels of bacteria and other micro-organisms, and all main water supply pipes are disinfected with chlorine before being brought into use. Such arrangements were not available to the Romans. Water contaminated by parasites, bacteria or harmful minerals would have been encountered to a greater or lesser degree from whatever source the Romans obtained it, so that people would have been at risk from any number of disease-creating organisms from their water supplies - typhoid and Leptospirosis being but two possible examples.

One micro-organism which would almost certainly have been present in Roman water supplies and bath-houses would have been the bacterium *legionella pneumophila* which causes Legionnaires' disease, first identified in 1976 after an outbreak of the disease at an American Legion convention in Philadelphia. This bacterium, of which there are 34 related species, commonly occurs in both natural and artificial aquatic environments. It also causes an influenza-like illness, but without the pneumonia complications of Legionnaires' disease, called Pontiac fever, while a related bacterium causes a similar illness called Lochgoilhead fever. Many species of the *legionella*-type bacteria do not, however, cause any health problems.

Legionnaires' disease is acquired by inhalation of water droplets in aerosol form. Our modern news media often sensationalises outbreaks associated with wind-blown spray from contaminated water-cooling towers of public buildings and offices, but more commonly aerosol effects are produced by streams of falling water from taps, showers, fountains, cascades, or indeed anywhere where falling water strikes a surface, or by bubbles bursting from a water surface. Untreated natural hot spring waters used for bathing or showering have been identified as a source of infection, as have modern domestic flexible hand-held showers among other things. Very high concentrations of the bacterium in water aerosol pose the greatest risk of infection. Initial symptoms of infection usually occur within a week but up to three weeks has been recorded. The initial symptoms are very high fever, severe headache and muscular pains, followed very quickly by difficulty in breathing and pneumonia. About half of the victims become confused and delirious, and many will have severe diarrhoea and vomiting. With modern medical treatment and the use of drugs the fatality rate rarely exceeds 15% of those affected, but in primitive societies mortality rates could have been 80% or more, although this figure can only be a subjective assessment.

With modern biocide treatments given to water supplies, Legionnaires' disease is not common with 100 to 300 cases reported each year in England. Since reporting is voluntary and primary pneumonia infections may be diagnosed by doctors as due to other causes without suspecting Legionnaires' disease, it is likely that the incidence is greater than it would appear. In primitive conditions with low or non-existent hygiene, the incidence of the disease would have been very much higher.

Susceptibility to the disease is variable. Healthy individuals may develop the disease on high exposure to the bacterium but in most cases a healthy immune system will respond to prevent the illness or very much modify it to the level of minor respiratory infection. The main groups of individuals at risk are:

Adults over 50 years of age: Given the general low life-expectancy in the Roman world this may have affected mainly the upper classes of society whose standard of living would enhance their life expectancy.

Males are three times more likely to acquire the disease than females.

People already with respiratory infections such as pleurisy or tuberculosis rendering the lungs more vulnerable to further infection.

People with pre-existing illness such as cancer, diabetes, kidney disease or infection.

Alcoholics.

The *legionella pneumophila* bacteria can be found in almost any hot water system and will lie dormant in cold water systems. They will be present in the sludge forming at the bottom of hot and cold water storage tanks and in pipes in which lime and rust have created a deposit of scale. Stagnation of water

encourages growth, so that systems taken out of use for a time and subsequently reactivated may present a high risk contamination problem. Water temperature is also of significance. The bacteria lie dormant below 20° C, multiply between 20° C and 46° C (optimum temperature for growth in laboratories is 37° C), and can survive above this. At 50° C the bacteria are eliminated in a few hours, at 60° C they are killed in minutes, and at 70° C immediately.

The case for the *legionella* bacterium being present in Roman baths can only be conjectural, but given that it is a naturally occurring organism it would have been present, if only dormant, in cold water cisterns or feeder tanks for the boiler. In warmer Mediterranean climates, ideal water temperatures for growth would be attained in cold water cisterns and tanks in or adjacent to a bath house, while in colder climates water tanks in close proximity to the furnace could easily have reached 20° C or more, thus facilitating the multiplication of the bacterium. In order to kill any of the bacteria entering or already present in the water system of the baths, temperatures in both the hot water boiler and in any contaminated piping would have to exceed 50° C on a fairly consistent basis. It is highly unlikely that any associated cold-water storage facilities could or would have been given such preventative treatment. The most likely zones of infection within bath houses were the labrum and taps, plus ornamental fountains and cascades in more lavish establishments.

Because of the problems of Legionnaires' disease and of other water-bred bacteria, any modern reconstruction of Roman baths would need to pay due attention to health and safety legislation and public health requirements of the country in which it was built. Some years ago the Great Bath at Bath in England was affected by a different organism, the very rare amoeba *nagleria fowleri*, which only occurs in water from certain natural hot springs. Temperatures have to be uniformly high and certain nutrients present in the water for the amoeba to multiply. If water carrying the amoeba enters the nostrils of a bather, the amoeba can penetrate the tissue of the upper nasal passage and enter the brain, causing meningitis. Therapeutic bathing in the Baths has even now not been allowed to resume as it has not been possible entirely to eliminate the amoeba. On the other hand, drinking water containing the amoeba poses no great health threat, but as a precaution the City Health authorities at Bath discontinued the supply of spa water to the famous Pump Room, and eventually replaced it by sinking bore-holes 45 metres deep to reach uncontaminated water. The acid test of modern hygiene efficiency is to ensure that no contamination ever achieves levels which could imperil the health of the public. Bathers in the Roman period were not so fortunate.

Malcom J. Page

TERMINOLOGY

The baths: problems of terminology

One of the things which became clear at the International Conference on Roman Baths held at Bath in April 1992 was that we have severe problems with terminology. During the Conference an afternoon session on this theme was held, the main conclusion of which was that there was a serious need to create one! In my book on Roman baths I tried to formulate my own, and we used that as a starting point for discussion. I based my terminology on that used by ancient authors, although this is itself far from unambiguous; they seem to have had some of the same problems which confront us today. One of the questions raised was if the use of the ancient terminology with its inherent ambiguities does anything to solve our problems, or if it would, in fact, be better to create an entirely new one. A further related point was raised on the problem of the various modern languages and their very different approaches to the issue. In fact no two languages use the same terminology, whether based on the ancient sources or on the equivalent words in each modern language. If a new, modern terminology is to be created, it will be necessary to make one for each of the main modern languages, which as far as I can see may make the confusion even greater. Another problem brought up at the discussion was the danger of mixing terminology and typology, something which may seem almost unavoidable at least where the ancient terms are concerned. It is of great importance that the tool created takes this

problem into account as well.

As stressed in the Preliminary Circular, one of the reasons why the Association for the Study of Ancient Baths was formed was to try to create a terminology which could be used by all scholars writing about baths in the ancient world. This short notice is by way of an introduction to a discussion which hopefully will result in such a useful tool. I see no need to elaborate on my own ideas and solutions, as I have already put in my bid in the Introduction and Appendix of *Thermae and Balnea*. I should also refer you to R. Rebuffat's article on "Vocabulaire thermal" in the Table Ronde on *Les Thermes Romains* (Rome 1992). I look forward to participating in the discussion!

Inge Nielsen

Terminology Workshop: the hypocaust

The Terminology Workshop held as part of the International Conference on Roman Baths held at Bath in 1992 included a short discussion on the terminology of the hypocaust system. The following report was prepared by Dr P.H. Blyth, who acted as recorder for the discussion.

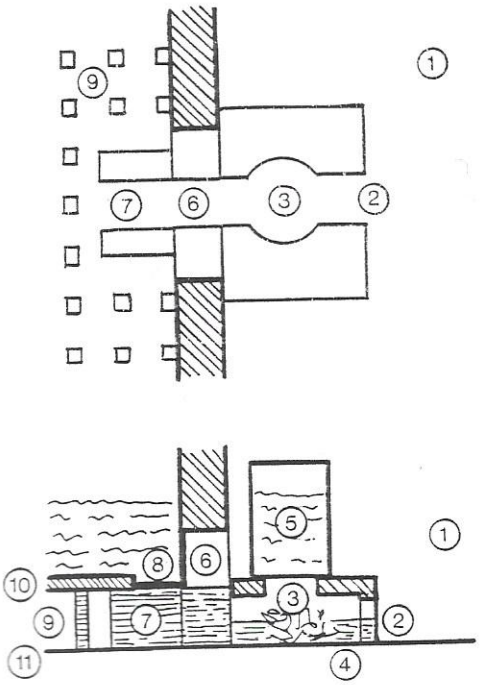
The discussion dealt with English terms only, and produced two conclusions:

1. Hyphenated terms should be avoided. They are increasingly rejected by editors for reasons connected with computer type setting.

2. To avoid ambiguities caused by vernacular usage (e.g. of words like "stoke-hole"), terminology should follow where possible that if modern iron-furnaces, etc.

Reduced to a narrative, the suggested terminology for a furnace feeding a *caldarium* pool runs as follows:

Fuel and air pass from the STOKING AREA (1) through the FURNACE MOUTH (2) into the FURNACE (3), whose floor is the HEARTH (4), and over which there is usually a BOILER (5) to heat the water. In the back of the furnace there is at least one FURNACE ARCH (6) through which hot gases from the fire pass into the FURNACE TUNNEL (7), over which is a secondary water heating tank called a *TESTUDO* (8). From the furnace tunnel the gases pass into the HYPOCAUST (9), which is the pillared area under the CALDARIUM FLOOR (10), having beneath it the SUBFLOOR (11).



The Editor would welcome any comments on the terminology used in this description, including indications of any commonly used alternatives for these items both in English and in other modern languages. Suggestions for improving the illustration would also be appreciated. The consolidated results will be published in a future issue of the Newsletter.

Dictionnaire méthodique de l'architecture grecque et romaine

Some of those having trouble with bath terminology will find some help in the latest volume of the *Dictionnaire* (Vol. II, 1992, ed. R. Ginouvès and R. Martin) devoted to elements of buildings, which includes a section on the components of hypocausts and of water supply systems. Volume III, now in the early stages of preparation, will be particularly important as it includes a substantial section devoted to Roman baths, covering the names of the rooms of baths and different bath types as well as expanding the material on hypocausts and water systems covered in

Volume II. There is also a section on Greek and Hellenistic baths and on the palaestra.

One of the problems of the *Dictionnaire* is that it does not deal directly with the ancient terms but with a set of ideas with which a term might be associated. It therefore rarely discusses the full range of meanings any particular ancient term might bear, or indeed the possible differences between ancient terms for the same concept. In addition it does not give all possible terms used to convey any particular concept even in the five modern languages it covers (French, German, Italian, English and Modern Greek), nor does it face the problems of translation between other languages or of out-dated terminology. The *Dictionnaire* will clearly form a useful tool for all those working on Roman baths, but is unlikely to provide the kind of comprehensive glossary and multi-language dictionary many of us would like to see.

Ed.

SITE NOTES AND NEWS

Ulpia Noviomagus 2, the archaeological newsletter from Nijmegen-West published by the municipality of Nijmegen, reports that excavations in April 1992 at the Honig factory site on the Waalbandijk uncovered remains of a large bath-building including a hypocaust. Part of a building probably to be identified as baths had already been excavated in this area as early as 1834 by Reuvens and Leemans.

Bathhouse at Khorvat 'Eleq

Excavations carried out over the last four years by the writer on behalf of the Hebrew University of Jerusalem and the Rothschild Foundation in Israel have uncovered a 1st century C.E. bathhouse at Ramat Hanadiv, on the southern slopes of Mt Carmel, 10 km. NE of Caesarea Maritima. The site (Hebrew Khorvat 'Eleq, Arabic Khirbet Umm el-'Aleq) is near a small spring known as 'Ein Zur ('Ein Umm el-'Aleq). The bath is part of a settlement, probably a small village with a fort. The fort, measuring 20 x 17 m, was erected in the Hellenistic period (2nd century B.C.E.) and was in use until the 1st century C.E.. The fall of the fortress and the surrounding village probably relates to the great Jewish revolt against the Romans (67-73 C.E.), indicating that it had a Jewish population.

The bathhouse seems to have been built only during the second phase of the settlement in the 1st century C.E.. From its small size (17 x 7.5 m), it would appear to have been a private bath serving the residents of the fort. There are four consecutive rooms in a linear sequence. A built staircase led from the outside into the westernmost room, a frigidarium containing a small piscina. In the centre of the frigidarium were discovered four limestone columns which appear to have carried a tetrastyle atrium-type roof. To the east of the frigidarium is a transitional room paved in white mosaic which is followed by the caldarium with a well-built bathtub and a niche built into its southern wall. Monolithic hypocaust pilae support a white mosaic floor. The easternmost room was the praefurnium, from which the hypocaust of the caldarium was heated. A large pool (11 m square with 2.5 m high walls) was discovered near the bathhouse, fed via a conduit from the spring of 'Ein Zur. The bath, pool, and conduit were destroyed along with the village around 70 C.E..

Dr Yizhar Hirschfeld
Institute of Archaeology
The Hebrew University of Jerusalem

The Reconstruction of the Baths of Heerlen in ARCHEON, Alphen aan den Rijn

In April 1994 the archaeological theme part ARCHEON will open its gates to the public, reproducing the ancient past of the Netherlands from the end of the last Ice Age to the 14th century AD. Among the full-sized reconstructions to be built on a 24-acre site at Alphen aan den Rijn (30 km south of Amsterdam) is a small Roman town complete with bathhouse. The park will mainly display reconstructions and replicas based on excavations or finds familiar to the Dutch public and for which the originals are preserved either *in situ* or in museums. The foundations of the baths at Heerlen/ Coriovallum, discovered in 1940 and later excavated, were enclosed in 1977 and opened to the public as a museum. These baths thus

satisfied the criteria set out above, but also had practical advantages including their size (48 x 43 m), their simple layout, and the opportunity for checking the measurements given in the publication on site.

Once the ground plan was confirmed, a reinterpretation of the proportions of the original Roman building could be made in the light of historical and archaeological evidence for Roman building practice in the first century AD. This produced some surprising results. The reconstruction brings together both the original architectural design as we interpret it and construction processes on the Roman building site. The reconstruction is of course based on the ideal design since any later alterations to the original elevations can no longer be traced.

Construction of the bathhouse in ARCHEON was begun not long ago and should be completed by the end of 1993.

Dr Hugo J. Helmer, ARCHEON
Alphen aan den Rijn, The Netherlands

Baths in Bulgaria

Dr Krasimira Vacheva, the Association's representative for Bulgaria, reports the following recent excavations, at present temporarily suspended.

MOESIA

1. **Novae** (near Svishtov on the Danube)
   - Legionary baths of 1-2nd century AD.
   - Private bath
2. **Oescus** (in the village of Gigen near the Danube)
   - Public baths, probably late Roman
3. **Durostorum** (at Silistra on the Danube)
   - Public baths, early 2nd to 5th centuries AD
   - ?Public baths
4. **Nicopolis ad Istrum** (22 km from Veliko Tarnovo on the R. Rossitsa)
   - Thermae, ?2nd century AD.

THRACIA

1. **Deultum** (near Burgas)
2. **Unidentified Late Roman fort** (near the village of Belovo)
   - military baths

An Unsuspected Fortress Bath

Excavations at Carpow, Perthshire, Scotland, in 1961-62 (R.E. Birley, *ProcSoc AntScot* 96, 1965: 184-207) uncovered two stone buildings fronting the *via principalis* of an early third century legionary fortress, identified as the *principia* (headquarter's building) and the *praetorium* (commanding officer's house). While the former identification is secure, the latter is certainly mistaken. It seems to have arisen because the *praetorium* was expected to be the most important building after the *principia* fronting the *via principalis*, and as such would be a "substantial", i.e. stone-built, structure. The possibility of the building being a bath-house was ruled out by the excavators, but in fact it can be convincingly interpreted as precisely this.

The excavator was at least correct in assuming that the large hall 18 and its eastern extension 19 were roofed. These represent a great symmetrically planned central *frigidarium* and *basilica* or entrance hall, reminiscent of the imperial thermae at Rome. The axial disposition of the thermae is also reflected in the twin *apodyteria* (Rms 1 and 16) and a sequence of heated rooms symmetrically disposed round both ends of the *frigidarium* (Rms 2, 3, 5-7 and Rms 11-15). However, instead of a central *caldarium* opening through to a *tepidarium* and back to the *frigidarium*, the way was blocked by a large pool (no. 8), the drain from which was traced under the floor of 18/19. There can be no doubt that in the original plan of the building this was intended to be the cold plunge of the *frigidarium*.

Behind the pool was Rm 10 with its adjunct Rm 9, while in a similar position on the opposite side lines of post-holes were recorded outlining a similarly shaped feature. This construction can now be explained thanks to more recent excavation in the *principia* which revealed wall foundations laid on planking and supported on wooden piles (*Britannia* 7, 1976: 299). Restoring such walling on the piles in Rm 10 results in a feature (Rm 17) which matches Rm 9. Both flanked the major furnaces and flues which fed the ranges of heated rooms to the north and south. Rm 10 was thus intended to serve as

two separate bath suites.

There is no doubt from their proportions and position next to the furnaces that 7 and 11 were intended to be the hot pools of the *caldaria* 5 and 12, while 6 and 13 were probably additional hot pools since there appears to have been a flue through one of the walls of 13. A flue in the west wall of Rm 9 allowed heat from the main flue to circulate below a water-tank supported on its walls. The width of the main flue leading to the hypocaust in 7 could have allowed a hot-water boiler and *testudo* to be mounted over the furnace to maintain the heat of the water in the hot pool. Rooms 2, 3, 14, and 15 will have been *tepidaria*, Rm 2 having an auxiliary stoke-hole.

The walls in Rm 17 were either never built or, less likely, were removed at a later date. In either case this should be associated with the blocking of the flues between 10 and 11 and between 11 and 12, which suggests that the north bath suite was disused or converted to serve a different purpose. This may have been due to problems with the stability of the ground, as indicated by the provision of the wooden piles and the three large buttresses on the north side of Rms 14 and 15. However, the cold pool in 8 may also have been replaced by a much smaller pool (area 4) in the south-west corner of the *frigidarium*. In this case, it is possible that the norther bath-suite was not operated simply because it was not needed.

The arrangement of two complete and identical sets of bath rooms around a common *frigidarium* is a unique one as far as the writer is aware. However, the use of tiles stamped by the Legio VI Victrix in the *principia* combined with a building inscription carrying the emblem of Legio II Augusta (R.P. Wright, *ProcSocAntScot* 97, 1966: 202-5) allows the suggestion to be made that the fortress was built to hold a garrison composed of troops from both legions and that this led to the doubling of the bathing facilities. The use of only one of the suites should then mean that the garrison was reduced by half and the vexillation of one or other legion withdrawn in advance of the final evacuation of the fortress.

E.W. Black

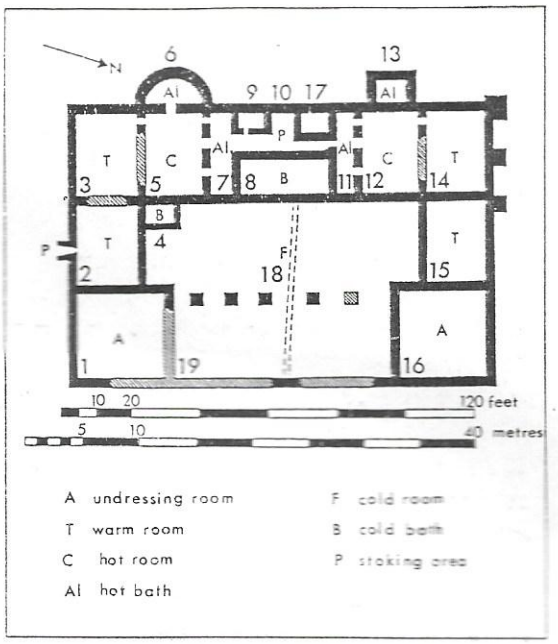


Fig. 1 The "Legate's Residence" interpreted as a bath building (after Birley 1965, Fig. 2a)

HELP!!!

A hypocaust in the baths at Leptiminus in Tunisia (see interim publication in N. Ben Lazreg and D. Mattingly, *Leptiminus I*, *JRA* Suppl. 6, 1992, 76-88) has produced the unusual lozenge-shaped bricks illustrated below. The bricks come from the fill of the largely robbed hypocaust along with the usual bessales, pedales and bipedales. The centre square of the lower surface had clearly been exposed to the hot gasses of the hypocaust, but the only reconstruction which could incorporate all these elements assumes a triple layer of bricks. Can anyone provide me with parallels for this construction, or suggest an alternative?

Ed.