

**15th Meeting of ICOMOS International Scientific Committee for Stone (ISCS)
Hosted by Dr Christoph Franzen and Dr Stefan Simon
at the IDK, Dresden, Germany
15-16th January 2010**

The 15th Meeting of the ISCS was held in the State Conservation Office, Dresden at the invitation of Dr Christoph Franzen (Institut für Diagnostik und Konservierung und Denkmalen in Sachsen und Sachsen-Anhalt e.V.) and the President of ISCS Dr Stefan Simon (Rathgen-Forschungslabor - Staatliche Museen zu Berlin).

ISCS Members were warmly welcomed by Prof. Dr. Pohlack (State Conservator, State Conservation Office, Dresden).

Present:

Name	Acronym	Organisation	State
Andrew McMillan	AMM	British Geological Survey	UK
Bärbel Arnold		BLDAM-Brandenburg	GE
Christoph Franzen	CFN	IDKDSSA, Dresden	GE
Gerald Ziegenbalg		IBZ-Freiberg	GE
Heinz Siedel			GE
Jean-Marc Vallet	JMV	CICRP, Marseille	FR
Marisa Pamplona		Rathgen-Forschungslabor - Staatliche Museen zu Berlin	GE
Myrsini Varti-Matarangas	MVM	I.G.M.E, Athens	GR
Stefan Simon	SSN	Rathgen-Forschungslabor - Staatliche Museen zu Berlin	GE
Blaeuer			CH
Véronique Vergès-Belmin	VVB	LRMH, Champs-sur-Marne	FR
Wanja Wedekind		GMX	GE

Apologies :

Tamara Anson-Cartwright (CA), Kathrin Schütte, Sybille Herkner, Richard Ollig, York Rieffel

The meeting was in fact scheduled for 2009 (ISCS is expected to meet annually) but had to be postponed until January 2010. The 2 day meeting was convened to discuss the business of the ISCS, and to provide an opportunity for the presentation of several ongoing scientific studies. Tours were led by conservation experts to the inner City of Dresden and to the restoration workshops of the state conservation office.

Agenda (Day 1)

1. Agreement on schedule, additions

The main addition to the agenda was for the Committee to consider a response to Gustavo Araoz's email concerning the response to the natural disaster which had recently occurred in Haiti. The Committee drafted a letter offering the support of

members and explaining the areas of expertise which could be called on following on from the humanitarian rescue and rehabilitation phase. It was also necessary to enquire how the budget for recovery phase was to be defined. The letter was emailed to Gustavo and ICOMOS organisations by SSN.

2. Round table: presentation of new participants, guests

Members and prospective members (Marisa Pamplona, *****) introduced themselves.

3. Secretary to be chosen

AMM was elected to take Notes of the Meeting.

4. Quebec meeting report: approval

SSN described the work of the ISCS members in Quebec including the drafting of the revised Statutes and the Trinennial Workplan. ISCS was delighted that it proved possible for the new Glossary of Stone Deterioration Patterns to be launched in Quebec and thanks all contributors including the financial sponsors. The New Board of ISCS (Stefan Simon, President; Tamara Anson-Cartwright, Vice-President; Jean-Marc Vallet, Secretary; Andrew McMillan, Treasurer) for the period 2008-11 was elected in late 2008.

5. New candidates for ISCS, presentation, discussion

The Meeting elected the following candidates as Expert Members of the ISCS:
Ann BOURGES (Stone conservation scientist) proposed by LRMH, France
Gilles MARTINET (General Manager of LERM) proposed by F/ ICOMOS
Sandeep SIKKA (LEED Accredited Professional and a Conservation architect based in New York) proposed by US/ ICOMOS (Donald G. Jones)

Subject to receiving written correspondence (including receipt of CVs) from the candidates confirming that they wish to become Expert Members the following may be approved at the next meeting:

Seema Badhauria (Associate professor, Department of Botany, R. B. S. College, Agra – 282002, India) proposed by ICARSAH- ICOMOS

Didier GROUX proposed by F/ ICOMOS

Olivier LABESSE proposed by F/ ICOMOS

It was important to follow the criteria set out the Statutes for the election of Expert and Associate Members.

It was agreed that normally elections will take place at meetings of the ISCS unless a quick decision is needed.

Actions:

1. The ISCS should proactively seek nominations of candidates from national ICOMOS committees.
2. The ISCS website should contain a statement explaining the role and activities of the ISCS committee, the role of Expert Members, the eligibility rules and the ways in which prospective members can apply.

6. Current state of activities 1-16 of the Triennial Work Plan (TWP)

Each of the 16 activities of the Triennial Work Plan (TWP) was discussed, some in more detail than others. It was agreed that for some activities only minimal progress could be made within the space of three years. All 16 TWP activities are listed below.

GOVERNANCE:

TWP 1: Provide annual report to Scientific Council.

TWP 2: Identify the need and create sub committees to support ISCS activities.

MEMBERSHIP:

TWP 3: Invite all national ICOMOS committee to propose members to the committee according to 2008 ISCS statues membership categories and the committee's technical mandate has been expanded to inorganic porous building materials (IPBM). It is important to proactively renew the invitation to join the ISCS. Only certain national committees had responded to the first call. ISCS could ask the ICOMOS Board which meets in Paris and also the heads of scientific committees (who meet each year) to place this matter on the agenda.

ACTIVITIES:

TWP Activity 4: Update and maintain membership list and email distribution list. ISCS needs to update and maintain its membership list ensuring who are Expert Members and Associate Members; and who, amongst the Expert Members, is eligible to vote (**one** representative per country).

TWP Activity 5: Launch and promote the Illustrated Glossary on Stone Deterioration patterns/Glossaire illustré sur les formes d'altération de la pierre at the ICOMOS 16th General Assembly in Quebec City, Canada. This was achieved thanks to the hard work of VVB and TA-C.

TWP Activity 6: ISCS members to promote the Illustrated glossary to their national ICOMOS committees and to technical training and conservation institutions in each member's country. ISCS members continue to promote the Glossary. A Powerpoint presentation is available.

TWP 7: Multilingual glossary: state of the current translations, proposals about the dissemination of the new bilingual glossaries

VVB confirmed that there had been 78, 000 downloads of the French-English translation since its publication in October 2008, averaging 3,000 downloads per month. Members were interested to know how this compared with other downloads available from ICOMOS and it was recommended that contact was made with the web manager.

The German translation had progressed with Rolf Snethlage having translated the captions. The translation had been sent to SSN and needed reviewing. It was intended that only a pdf file (for downloading from the ICOMOS website) would be produced. The Spanish translation was complete and had been sent to Elena Charola for review. Work had started on the Greek translation. A Portuguese translation may have been started (to check). The intention is that the layout of each should be the same as the French-English Version. However it was estimated that for each new version c. 3000 EURO might be needed for changing the text to fit the original layout before a pdf file is produced. Further funding might be needed if a printed version is required (e.g. for the Greek translation). It was suggested that part of the funds for each version should be sought from the relevant ICOMOS national committee(s). To assist with this

process a generic 'fund-raising' letter was drafted in English by AMM, discussed and forwarded to SSN after the meeting. It was recommended that all authors of the French-English Version be contacted to offer their thoughts on the present layout. If the photographs are to remain the same in each version then appropriate credits must be the same as in the original.

VVB asked who will pay for future publications and indicated that existing funds (resulting from sales of the French-English publication) could contribute towards paying for part of the production.

See also discussion under Agenda item 11 (below). [*NB. there has subsequently been email correspondence between VVB and the Board – I suggest we summarize our agreed position in these notes*]

TWP 8: Develop the ISCS website to improve communication of the activities of ISCS such as provide PDF version of Glossary, newsletters and to have a clearing house of key stone conservation conferences and link to technical publications.

TWP 9: Plan and schedule annual meeting (2009, 2010) possibly to coincide with key international stone conferences to help increase participation of ISCS members and reduce travel expenses to members for attending meetings. Not progressed

TWP 10: Develop a joint initiative of ICOMOS international scientific committees in the field of conservation, dissemination and training e.g. CIPA, ISCARSAH and Historic Gardens. (proposed topics: outer sculptures and documentation/ conservation of stone monuments): see item 9 of this report

TWP 11: Build ICOMOS - ICCROM relations in stone conservation training by offering an ISCS representative to any ICCROM course planning Committee such as Venice Stone and expert members to key ICCROM training initiatives associated with stone conservation. No action has been taken. It is difficult to see how Stone experts from the ISCS can be integrated into the already well-established ICROM training regime. A more positive move might be to highlight the pool of expertise in stone to Gustavo Araoz and also consider the possibility of developing short courses in stone conservation in other parts of the world (e.g. Africa). It was important to identify where gaps in training existed by discussing with government contacts etc. and with national ICOMOS committees.

TWP 12: Explore the opportunity to build a collegiate collaborative (hybrid) with ICOM –cc stone committee. No action.

TWP 13: Further explore an opportunity to advance the understanding of traditional building technology and conservation methods through the development of a centralized digital portal (CDP) such as the Carleton University Immersive Media Studio, Ottawa, Canada. It was suggested TA-C should make contact with those working at Carleton University to get an update on activity and to see how ISCS members could become involved.

TWP 14: Explore opportunities to promote the understanding of traditional use and conservation of stones to the public and youth. It was recognized that there are many local (national) educational initiatives (e.g. projects raising awareness of stone heritage in Greece) but for ISCS to take this forward there needed to be some general topics of international relevance which could be developed. *Steine in der Stadt/Stone in the city* is an example of a new publication produced by volunteers describing the stone of 18 German cities. Other publications tabled at the meeting included
***** (CFN)

TWP 15: Provide advisory services and support to the key initiatives of the ICOMOS World Heritage working group initiatives including expert members to multidisciplinary teams for ICOMOS missions or review of the state of conservation of World Heritage sites. Dissemination of information on stone could form a theme for the next ISCS conference. Questions of whether knowledge of stone travels with the material (i.e. is there sufficient knowledge of how imported stone will perform in different countries and latitudes; how does stone perform in varying climates?). It was considered a valuable task for ISCS to identify how schools in countries across the world promoted education in topics such as stone, geology and heritage and economic relevance. Feedback might be sought from national ICOMOS committees

TWP 16. Support and contribute to the scientific program for the 17th ICOMOS General Assembly in Iran (2011). Currently it is not known where the next GA will be held.

7. Day 1 Tours

A 'Tour of the city: looking for the stones and restoration' led by Dr Franzen took place at a lunchtime interval on Day 1

Visit restoration workshops of the state conservation office (in house), conducted by Dr Franzen.

ISCS meeting participants warmly thank CFN for arranging these tours.

Dinner

Agenda (Day 2)

8. Presentations on scientific projects

8.1. EC program "MEDISTONE" (JMV)

This project demonstrates a practical application of the recently published ISCS Glossary (2008). JMV described a Guide for stone conservation of the archaeological site of Volubis (Morocco). Part of the European project 'MEDISTONE', the WP2 activity objectives included the recording of field observations; diagnosis of the state of conservation of monuments with reference to the ISCS glossary; and salt analysis. The Guide contains observations on the causes of alteration; recommended conservation practice; and an annex with a glossary of deterioration patterns observed. Causes of stone alteration include water, soluble salts, intrinsic properties of the stone materials, biological activity and anthropogenic activity.

Water is responsible for enabling: chemical action (dissolution); physical action (transport, freezing action); and the development of active alive organisms. Together these mechanisms constitute the main alteration patterns observed at the archaeological site of Volubilis.

Encrustation is seen (e.g. Triumphal arch) in areas where buildings were rebuilt using hydraulic mortar. Q.(Bauer): Always referred to hydraulic mortar? But $\text{Ca}(\text{OH})_2$ can be dissolved from lime mortar.

Discolouration – orange patina was observed to be developed on grey limestone with low porosity.

Soluble salts were observed mainly on rebuilt monuments: they are transported in solution within the pores of the stone and originate from surrounding soils, aerosols from sea, and materials used in earlier restorations. When the solution is saturated, crystallization occurs (as efflorescence on the surface, or subflorescence within the stone). Examples include efflorescence on the surfaces of beige- yellowish calcarenite limestone used in the Triumphal Arch. Chemical and XRD analysis is summarised in this table:

Salt	Beige- yellowish calcarenite limestone	Grey limestone
halite (NaCl)	moderate	limited
gypsum ($\text{CaSO}_4, 2\text{H}_2\text{O}$)	extensive	limited
Nitrates family (KNO_3 etc.)	Limited	Trace

Powdering and contour scaling occurs in beige-green marly limestone producing rounded boulder shaped masonry (e.g. Gordian's Palace, gatepost).

Contour scaling occurs in grey massive limestone (e.g. Western wall of the Basilica, West exposed face).

Intrinsic properties of the stone materials are mineralogy (including the presence of swelling clays) and porosity. A range of deterioration patterns may be attributed to the presence of swelling clays (smectites according to Dessandier et al., 2008) in the beige- yellowish calcarenite limestone.

Cracks (fissures) are thought to occur through cycles of dilation/retraction and textural properties of the limestone – thermoclastic effects.

Biological activity includes plants, algae, lichens, bacteria and animals.

With algae and lichens patinas on grey massive limestone (e.g. Basilica, West exposed face) may be attributed to the development of oxalates (weddelite $\text{CaC}_2\text{O}_4, 2\text{H}_2\text{O}$, Whewellite $\text{CaC}_2\text{O}_4, \text{H}_2\text{O}$), iron oxide, and phosphate.

Plants and animals

Anthropogenic 'activities' include: technical mastery (building skills), lack of maintenance (effects of burying monuments, and alteration due to human/animal behaviour (e.g. abrasion, chipping, fires).

Monitoring of contour scaling suggests that this deterioration increased during the period 2006-08 resulting in more detachment of stone, erosion and discolouration. Often several alteration patterns are observed in association. Therefore superposition of alteration patterns need to be understood.

The MEDISTONE website contains an extended Glossary of definitions of deterioration patterns. It facilitates the monitoring of stone structures and mapping of the scale of intensity of stone decay. The aim is to develop a predictive model and to quantify and prioritize the required maintenance.

8.2 EU-STONECORE Project (GZG)

Ziegenbalg, IBZ-Freiberg

STONECORE is an EU Framework 7 project (www.stonecore-europe.eu) researching stone conservation materials compatible to those used in construction. It is also examining the removal of fungal colonies without use of biocides. There are many partners (including ISML researching UK mildew removal) - see website Part of the project involves non-destructive GPR (TUDelft) research using enhanced ultrasonic methods.

The work involves ongoing research into Nanoparticles and their use in stone and mortar consolidation. Key characteristics include the ability of nanoparticles to deeply penetrate stone. Nanoparticles are highly reactivity and have defined compositions. Nano materials currently under development include CaOH_2 , BaCO_3 CaOH/MgOH_2 , and MgCO_3 in ethanol, and n-propanol solutions.

Examples of ongoing research in stone/mortar consolidation using CaOH_2 – nano CaLoSil : nano-lime (max. particle size $250\mu\text{m}$) showed how this consolidating material could be sprayed, injected, or pipetted. Measurements of mechanical properties, cohesive performance, penetration depth, changes in structure and colour, water uptake and porosity, and vapour permeability characteristics have been made. Monitoring of the time it takes to carbonate (calcite) is a key part of the research.

Pore structure analysis of an example of porous Maastricht limestone showed newly formed CaOH_2 deposited within stone, but the pore structure remains the same. In the case of Polish Zerkowice sandstone, porosity and water absorption is reduced after treatment, but the pore structure remains open. Applications are being made on buildings in Mainz, and other buildings identified for the study in Germany, Poland, Austria, and Greece. A meeting to discuss recent progress in consolidation of calcareous materials is planned in Litomysl, Czeck Republic, 22-23 April 2010 (abstracts by 28/2/10). Topics include: materials for consolidation development of testing of nano-materials for consolidation of calcareous materials, mortar, stone and wall paintings; case studies; new methods of non-destructive damage assessment.

8.3. Cultural Heritage Endangered Flooding (CFN)

A final report for this project (CHEF) is in preparation. The effects of the flood in Saxony during August 2002 were described. At Pillnitz, on the Elbe River upstream of Dresden heavy rain resulted in small tributary brook (the Meixbach) being dammed by wood debris on 13th Aug. It was decided to evacuate all important items from the

cellar rooms on 14th Aug; numerous logistical problems arose including local power cuts on the 15th. Ultimately valuable heritage furniture was removed on 16th Aug. The lack of contingency plans and lack of knowledge on how to handle valuable artefacts and furniture were obvious in retrospect. The report will highlight recommendations for the rescue of heritage artefacts and flood prevention measures.

8.4. Developments and challenges of winter shelter systems (CFN)

CFN described current practice regarding temporary winter protective shelters for free-standing sculptures in parks, including the building, dismantling, and storage of these structures. In several northern European countries the sheltering of stone sculptures is a long standing tradition. In the last couple of years the typical wood shelters have been partially replaced by impermeable, textile-, metal- (aluminium), acrylic- and material combination systems. Wooden constructions permit air to circulate and slow the process of deterioration. Issues to consider include cyclical changes such as precipitation (rainfall variation; rainfall greatest in winter), temperature variation, radiation, and possible pollutants. CFN is collecting information on types of protection. Shelters need to meet structural engineering requirements, be repairable, and easy to erect and dismantle. Traditionally shelters have protected marble monuments but now sandstone also being protected.

8.5. Ultrasonic pulse velocity applied to outdoor marble sculptures (MPA-SSN)

SSN described a project examining ultrasonic pulse velocity applied to outdoor marble sculptures. The monuments comprise 26 marble sculptures (Kings and nobles 12th -19th C.) erected in 1900 in Tiergarten, Berlin Cital Spandau. They were buried post- 2nd World War until 1980s. Fresh marble is characterised by high velocities Higher surface to volume ratios result in more decay. The worst marble used 1880-WW1. Pamplona, Simon et al.

8.6. Ultrasonic velocities measurements in Arles's St Trophime cloister (PBT-SSN)

More on ultrasonic techniques. This project is a rare example where measurements on marble columns in monastery in S France taken nearly 20 years apart can be compared. There is a good comparison of measurements made in 1992 (using USG 20 equipment, 250 khz frequency) and those made in 2009 (55khz frequency). The values in 1992 are slightly lower than in 2009 but are reproducible. The SW wing shows greater difference in velocity readings, due to weathering. Younger marbles 100-200 years younger.

8.7. Origin of cuts? (SS)

SSN recommended that the ISCS members start collecting information and illustrations on anthropogenic markings on stone (e.g. on 'knife' markings, scratches, gouges). It was agreed that standardised information would be required and that the type of observational information collected needed to be defined (Action SS: to define criteria). It was agreed to separate facts from inference about how markings were made.

8.8. Salt crystallization (JMV)

JMV reported the findings of a PhD study by Julie Désarnaud (involving the laboratories of the CICRP and CINaM, Marseilles) on the 'Growth and dissolution

mechanism of loaded KCL crystals: Involvement in the knowledge on stone degradation by salt'. There is controversy about the induced rock alteration mechanism in presence of salts. Currently, this alteration is considered to be the result of a developed salt crystallization pressure (this pressure is supposed to exceed the stones mechanical resistance). Historically, the crystallization pressure concept arises from experimental studies carried out between the end of 19th century and the middle of 20th . But there are discrepancies between these conclusions and current theories about crystal growth. The goal of this study was to reproduce Correns and Taber's experiments under controlled experimental conditions.

Laboratory results show that monocrystal of a given size never develops crystallization pressure under the following conditions: the monocrystal always is in a supersaturated solution; the pore size can be considered as representative of big pores (>50µm; gravitating water circulation); and there is no drying/ wetting cycle. A conclusion of this study is that it seems unlikely that a crystal like KCl could damage stone by means of crystallization pressure.

8.9. DESALINATION EU-Project (VVB)

VVB described the EU Desalination project (FFP6). Clay mineral and cellulose poultices are the most common types. Characterising poultices and substrate are vitally important. A final report is in preparation and the project complete. The launch of the findings will be in Cologne where 10-11 scientific papers will be presented at a conference. A conference/teaching session is scheduled for New Orleans in May 2010.

Guide Tour of the Dresden Zwinger

An excellent early afternoon Guided tour through the Dresden Zwinger was conducted by Dr. Kiesewetter, Prof. Siedel, and Dr. Franzen. The Dresden Zwinger (1711 – 1728), built of locally available Cretaceous sandstone from the Elbe Basin (Cotta and Posta sandstones), experienced several restoration phases, including post-2nd World War restoration, with quite different strategies. Since the beginning of the 1990s a new concept of surface treatment is tested. Pros- and cons were discussed on site.

9. Discussion of the co- organisation of the meeting in Jordan

This co-organised meeting in Petra/Jordan, with ICOMOS-CIPA (Archives), is scheduled for December 2010 but the precise dates are not known. ISCS cannot contribute finances but can assist in kind. The aim is to reinforce the links between these two scientific committees. Documentation, agenda and dates remain to be announced. An Announcement about the meeting is expected in February.

The ISCS agreed that an alternative meeting place should be reserved for December 2010 /January 2011 for the next ISCS annual meeting, if the Petra meeting did not go ahead. Madrid, Spain was considered as a contingency. (Action: SS to contact CIPA)

10. Organization of the PGC conference: themes, contacts, scientific and organizing committees, management of the first announcement

VVB outlined the proposed PGC conference, 'Conservation of stone in parks, gardens and cemeteries', June 2011 (to include an ISCS meeting) in Paris. It will be

coordinated by the ICOMOS-ISCS and the French Section of The International Institute of Conservation (SFIIC) in association with the SFICC's 14th Series of study days. (3 days) Dates will be fixed in month's time; it will comprise a 3 day meeting – lectures and posters. One lecture hall of the School of Restoration in Paris has been reserved. The conference will be announced in March 2010; with call for abstracts in June; 2nd announcement call of abstracts Dec. 2010, submission Jan 2011; deadline for submission of papers March 2011.

Modest financial contribution is expected, c. 1500 EURO, from ISCS towards the costs of organisation. No budget is available yet. It is envisaged that ISCS members could review papers which will be in French with English Translation.

(Action: ISCS should ask members to volunteer to be part of the Scientific Committee and to review papers and assign them to the themes. ISCS to prepare call for volunteers which can be published in the next Newsletter).

11. Financial aspects including the management of the funds

ISCS funds currently constitute the proceeds from the sale of the Glossary. Details of these funds which are held on ISCS behalf by ICOMOS in Paris, were published in the last Newsletter.

A proportion of the funds will be allocated towards the organisation of the PGC conference (see 10. above). Funds are also required to develop further versions of the Glossary.

SSN has requested that VVB establishes if the PDF and the layout are ISCS property. Could raw files be transferred to other publishers? VVB will discuss with the designer contact a quotation for the layout and a quotation from the printer for book version.
[NB there has been further email correspondence on this]

Financial statements: it was agreed that ISCS Accounts should be presented in future Newsletters and at each Committee Meeting.

ISCS may hold a stock of books published for the PGC conference; the cost of distribution as well as cost of publication need to be established.

MVM raised the question of developing leaflets on stone – it was agreed to discuss this at the next meeting.

12. Supplementary information about other topics

12.1. Recent developments in stone conservation UK (AMM)

AMM outlined the outcome of the BGS Seminar 'Building Stone Symposium 'Building a Future for Stone' held in London (The Geological Society, Burlington House) on stone heritage. The meeting was coordinated by Dr Ewan Hyslop and colleagues and attracted a varied audience of >80 delegates. A number of issues had been raised by delegates with the emphasis of the meeting being on provision of information on UK indigenous stone-sourcing and characterization. The development of stone databases were discussed at the meeting. These include the Northern Ireland Stone database (www.stonedatabase.com) and the developing UK database by BGS in collaboration with the Scottish Stone Liaison Group (www.sslg.co.uk). Following on from the 'Glasgow Safeguarding Stone Heritage' Project, Building Stone audits had become an important part of identifying local needs for conservation and repair. The English Stone Forum has developed a useful web portal (see www.englishstone.org.uk).

Items on original Agenda which were not discussed:

New information about the other ISC and links with them

- 1. links with the ISC “wall paintings”** (postponed)
- 2. conclusions from the ISC meeting in Malta** (no information) – ISCS was not represented at the Malta meeting

Acknowledgements

In addition to our main hosts the ISCS participants would like to offer many thanks Dorit Gühne (coffee and many many more) and to our excellent guides Drs A. Kiesewetter and H. Siedel.

Andrew McMillan

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