IUPAC Commission II.2
(Commission on the Nomenclature of Inorganic Chemistry, CNIC)

Chairman: Prof. **Herbert D. Kaesz**
Secretary: Dr. **Ture Damhus**

Minutes of final CNIC annual meeting, June 30 - July 3, 2001, at Queensland University of Technology, Brisbane, Australia

Final version, November 11, 2001/Ture Damhus

Commission members (titular, TM; associate, AM), national representatives (NR), and observers (O) present at the meeting:

Dr. **James B. Casey** (AM)
Prof. **Neil G. Connelly** (TM)
Dr. **Ture Damhus** (secretary, TM)
Prof. **Bernadette Donovan-Merkert** (O)
Prof. **Lars Ivar Elding** (O)
Dr. **Richard M. Hartshorn** (TM)
Dr. **Alan T. Hutton** (TM)
Prof. **Herbert D. Kaesz** (chair, TM)
Prof. **Willem H. Koppenol** (O)
Prof. **Risto S. Laitinen** (NR)
Prof. **Dan Meyerstein** (NR)
Prof. **Vincent L. Pecoraro** (O)

The main meeting took place during the days June 30 - July 2. There was, in addition, a business dinner on the evening of June 29, and on July 3, a smaller group met to finalize discussions about particular parts of Red Book I, currently under revision (cf. item 3 below).

The present minutes do not reflect the chronological progression of the meeting, but rather, under each subject, highlight key items discussed and conclusions and actions agreed upon.

1. *Formalities and announcements*

The chairman opened the meeting and welcomed everyone, in particular the two US observers, Prof. **Bernadette Donovan-Merkert,** Department of Chemistry, UNC Charlotte, and Prof. **Vincent L. Pecoraro,** Department of Chemistry, University of Michigan, both present as part of the US 2001 Young Observers' program. Prof. **Lars Ivar Elding,** Inorganic Chemistry, Lund University, Sweden, was present as an observer, replacing Swedish national representative Dr**. Ebbe Nordlander**, who could not participate, but sent his greetings.

Alan Hutton conveyed greetings from Prof. **Albrecht Salzer**, whose term on the commission had ended, but who expressed an interest in still participating, such as in proofreading.

The minutes of the preceding CNIC meeting in Dublin in August 2000 had been approved earlier and were available at the IUPAC Internet site by linking to

http://www.iupac.org/divisions/II/II.2/index.html

Since last the document by Wim Koppenol on ***muonium nomenclature*** had been published in ***Pure Appl. Chem.*** **73**(2), pp. 377-379, 2001, and is now accessible on the Internet at

http://www.iupac.org/reports/II/index.html

Also, reprints can be obtained from the secretary or the chairman as long as they are in stock.

2. *The Naming of New Elements*

This document prepared by Wim Koppenol had been reviewed by a number of international experts, and the comments received were considered and certain changes approved by the Commission.

[Secretary's comment at the time of writing these minutes: the thus revised document has in the meantime proceeded to IDCNS and public review and is accessible on the Internet at

http://www.iupac.org/reports/provisional/abstract01/koppenol_310302.html].

The chairman reported that he had sent a letter in January 2001 inviting the research group in Darmstadt who had been credited with the synthesis of element 110 to propose a name to be considered by CNIC. Receipt of the letter had been acknowledged, but as of the meeting in Brisbane, no proposal had been returned to CNIC. It was decided that the chairman write to the Darmstadt group again, pointing out that the new document proposes a 6 months' time frame for discoverers to reply to such an invitation.

3. *Red Books*

Neil Connelly reported that Red Book II was in production [secretary's comment: it has been published in the meantime], and that a contract for the publication of the revised Red Book I had been signed with the Royal Society of Chemistry. The original delivery of RBI to the ***RSC*** was to have been 2001-12-31. A three-month extension will be sought in order to provide time for IDCNS review. [Added in proof: this extension has now been agreed upon by the RSC and IUPAC.]

The revision of Red Book I will consist of eleven chapters, the first four of which had been thoroughly reviewed before this meeting. Revised versions of six of the remaining chapters were examined in detail, requiring an additional half-day session on July 3, attended by Vince Pecoraro, Herb Kaesz, Neil Connelly, Alan Hutton, Risto Laitinen, and Ture Damhus. The solid state chapter was accepted for review by cognizant members of the Inorganic Division.

[After the meeting, a duty list and timetable for the next phases of the RBI revision work was assembled by Neil Connelly. This list is included here as Appendix 1 in the version edited and circulated by the secretary in August 2001, even though certain actions mentioned there may already have been modified by later developments. The list also comprises a summary of the changes that are to be highlighted in the preface to the revised RBI, and suggestions for reviewers.]

4. *Other projects*

Other projects being considered by the current Commission include computer-adaptable encoding of complex structures (Andreas Dress), organometallic nomenclature including metallacycles and possibly stereochemistry (Alan Hutton), and preferred names for inorganic compounds (Ture Damhus).

5. *Joint meeting with the Committee on Chemical Identity and Nomenclature Systems* (CCINS)

Alan McNaught, chair of CCINS, together with **William Town**, **Gerry P. Moss**, **Warren H. Powell**, and **Jeff Leigh** visited CNIC to discuss the future of nomenclature within IUPAC.

CCINS was set up as a temporary body in March 2000 and was asked to take an overview of requirements for both conventional and computer-based nomenclature systems, in cooperation with the established Nomenclature Commissions, and to recommend future strategy for work in this area.

A major recommendation from CCINS was the establishment of a new interdisciplinary IUPAC Division of Systematic Nomenclature and Structure Representation. This body would be responsible for managing the maintenance and development of standard systems for designating chemical structures, including both conventional nomenclature and computer-based systems. The Division would be responsible for approving project proposals on the basis of external review according to established IUPAC criteria, and for funding and monitoring approved projects. Funding would come from an established divisional budget or from the IUPAC Project Committee in exceptional cases. The IUPAC Executive Committee (EC) had endorsed this proposal, which now required confirmation by IUPAC Council. The feeling was that this would be approved.
[Secretary's comment: it *was* approved at Council.]

The CCINS presented an operational plan for the new division that included the establishment of an Advisory Subcommittee of suitably experienced people to advise the Division Committee on the needs of the community, to initiate project proposals, and to suggest project leaders. The subcommittee, which will be formed only after consultation with the present Nomenclature Commissions and the other Division Committees, is viewed as essential, both to provide status for active members of existing commissions, so that they can be persuaded to continue their involvement with IUPAC work, and to create momentum for work in this area. Periodically the other Division Committees and National Adhering Organizations will be asked to suggest new members for the Advisory Subcommittee.

The Executive Committee had also noted that the new Division would deal with systematic nomenclature for chemical compounds, but not with all names of chemical substances. In particular, this Division will not be involved with the names of new elements. The Inorganic Chemistry Division should continue to handle the authentication of the discovery of new elements and to appoint task groups as needed to recommend names for the elements.

Alan McNaught also reported on progress with on-line naming services and the IUPAC Chemical Identifier project, both current activities of CCINS, as can be checked at the Internet site

http://www.iupac.org/organ/ad_hoc_cmt/ccins.html#activities

The above recommendations by CCINS were favorably received by the members of CNIC. CCINS asked that any suggestions from CNIC members for CCINS to consider at its upcoming meeting a few days later be handed over, and the comments subsequently passed on to CCINS by the CNIC secretary are included here as Appendix 2.

6. *Joint meeting with the Commission on Nomenclature of Organic Chemistry (CNOC)*

Another joint meeting was with CNOC to discuss areas of overlap between inorganic and organic nomenclature. CNOC is in the process of finalizing a new version of the Blue Book that will also specify ***preferred names*** for many compounds. The draft document, running to almost 1000 pages, had been shared in part with CNIC shortly before the meeting. It names a large number of inorganic compounds, many of which are used as parent compounds (*e.g.* hydrides and inorganic oxoacids) for naming various organic compounds.

There was clearly not enough time available to have detailed discussions of all this in Brisbane. It was therefore decided to put together an interdisciplinary group to prepare a request for suitable funding under the new project system to continue the discussions. The group was to consist of two members each from CNIC and CNOC plus a person to represent biochemistry viewpoints. It was hoped that they would be funded to meet sometime in September to provide guidance to the authors of the CNOC document and to Neil Connelly for adoption into the Red Book I revision.

Separate minutes of the joint meeting have been prepared subsequently by CNOC secretary **Bernardo Herold** and by Ture Damhus and approved by both commission chairmen. These minutes are included here as Appendix 3.

[Secretary' s comment: the inter-commissional project alluded to above has in the meantime been established and funded by IUPAC, and the project group has held a meeting in Cambridge, UK, *ultimo* September. The project description – and eventually progress reports – can be seen at the Internet site

http://www.iupac.org/projects/2001/2001-031-1-800.html].

7. *Visit by the Division President and Vice-president*

The commission also heard a report from the Inorganic Division President **Sean Corish** and Vice-President **Gerd Rosenblatt**. They noted that the Division has embraced the restructuring

of the Union and has striven to implement the changes necessary following the decisions of Council in Berlin (*i.e.* termination of commissions). The following paragraph is based on the Division report to Council at Brisbane and describes how they will proceed.

The Division Committee will manage its diverse activities and the projects in which these will be implemented through three coordinating groups. These will deal with 'atoms', 'molecules', and 'materials' and will comprise the Division leadership working with other experts as appropriate. They will provide the basis for the generation, assessment and, most importantly, the management of projects and will be responsible for the provision of viable and relevant programs in each of these areas.

It was recommended that if a subcommittee of the proposed new Division on Nomenclature would consist of active members of CNIC, that this group would also continue its liaison with the Division of Inorganic Chemistry for purposes of continuity and communication.

Appendix 1

Red Book I Revision, duty list

(NGC July13, post-Brisbane; TD August 13, 2001)

[**NGC** = Neil Connelly, **RL** = Risto Laitinen, **RH** = Richard Hartshorn, **AH** = Alan Hutton, **TD** = Ture Damhus]

A. Book Plan and Summary of Duties

Front Pages (NGC)
(Drafts will be circulated for comment). The Introduction will highlight the differences from the current Red Book (see further item C below). In particular, it will include a statement to say that we have changed from chapters on neutral molecules and on ions and salts to chapters on the three nomenclature systems – to avoid repetition. It will also note which nomenclature system is usually applied to which type of inorganic compound. **N.B.** This will need to be repeated in Chapter 1 and in the Introductions to Chapters 5-7 and the subject index will also need to reflect this change.

Tables (NGC)
Periodic Table on inside front cover. (Brisbane suggestions to be added).
Tables I-IV updated (Brisbane suggestions to be added).
Table V. Draft will be circulated. ***(N.B. All to comment on wording and to suggest additions and/or deletions).***
Table VI to be added to Table VII which will now include columns on "Element", "Stem", "'a' terms" (used in substitutional nomenclature), "Substituent group names – io", "'y' names" and "'ate' names". (Draft will be circulated for comment)
Table VIII to be redrafted (**TD**, at a relatively late stage).
Table IX. Draft will be circulated. ***(N.B. All to comment on wording and to suggest additions and/or deletions).***
See further below, Abbreviations.
Table I-3.2 will be deleted.

Chapters
(New numbering with old numbers – where necessary – in parentheses).
N.B. All authors to retain numbering used in Brisbane drafts – NGC will renumber everything for final draft with everyone double checking for mistakes!

1. Introduction (**NGC**).

2. Grammar (**NGC**).
(**AH** to check for compatibility with Blue Book Grammar). (**RL** and **RH** to send **NGC** annotated copies of Bristol draft to show where overlap with later chapters can be omitted).

3. Elements, atoms, groups of atoms (**NGC**).

4. Formulae (**NGC**).

5. Compositional Nomenclature (**RL**).

6. Substitutive Nomenclature (**RL**).

7. Additive Nomenclature (**RL**).
The abbreviated Boron sections - in Chapter 6 - to be checked to ensure that nothing major has been omitted.

8. Inorganic acids and derivatives (**TD**).

9. Coordination Compounds (**RH**).

10. Organometallic Compounds (**NGC**/**AH**).

11. Solid State.
(Being checked by Sean Corish and others from solid state community)

Ligand abbreviations (**NGC**/**TD**). Need to consider which structural formulae need atom numbering.

The abbreviations list, and associated diagrams, will appear as Tables at the back of the book. The covering text (how to construct and use abbreviations) will be in Chapter 4 (cross referenced in Chapter 10).

Subject Index (**NGC** - when revision finalised).

References to Blue Book - **TD** to check all such references when Revision complete.

B. Timetable for Completion

1. Updated drafts (post Brisbane) to **NGC** by end of September 2001 (but as early as possible). New version (by **NGC**) to be issued as soon as possible thereafter for everyone to double check for mistakes, consistency, etc. [Submissions by **TD** and possibly other chapters will depend on outcome of CNOC-CNIC meeting in Cambridge September 29-30.]

2. Final draft to go to review as soon as possible.

3. Manuscript to be submitted to RSC. Publication date of December 2001 to be delayed because of review process. Delay Agreed with John Jost. **NGC** has informed RSC of delay (13 July). Reviewers and IDCNS to be made aware of the necessity of speedy review!

C. Changes to be highlighted in Preface to Red Book I Revision

1. Mainly revised to clarify old book, to correct, make consistent, and avoid overlap.

2. Additions (usually already reviewed elsewhere)
- New organometallic chapter
- Radicals sections changed
- Rings and chains
- Inorganic acids chapter revised (not reviewed)
- New elements and how to name them (revised section)

3. Deletions
- Boron chapter removed, basic material moved to Chapter 6 (updated boron nomenclature to be a project!)
- Section I-10.8.4 omitted (single strand polymers – now in RBII)
- Table I-3.2 (not necessary – text adequate)
- Appendix and associated tables – we now have an agreed Periodic Table!

4. Changes
- Order of enclosing marks (to be simpler and, where appropriate, consistent with organic usage).

Order of ligands (no distinction based on charge).
Order of metals in polynuclear compounds (now corresponds to order in formulae)
Clarification of η and κ usage
Locants corrected for organic ligands
Sections on ligand abbreviations

D. Suggested Reviewers for Red Book I Revision

Jeff Leigh
Alan McNaught
Editors of *Dalton*, *Inorg. Chem.*, *Angew. Chem.*, *Journal of European Chemistry*, *Helv. Chim. Acta*, others(?)
Selected CNOC members (Warren Powell, Henri Favre?)
Jan Reedijk
M. de Bolster

Appendix 2

Comments for CCINS from members of CNIC

- Consider mechanisms for getting people involved in different nomenclature projects together on a regular basis, such as at the IUPAC general assemblies – maybe in 'open space sessions' or other frameworks where cross-consultation betweeen different areas is encouraged.

- There is a need for regular reviewing cycles for nomenclature, or initiation from the division (*e.g.* for revision of Red Books, Blue Book, *etc.*)

- Brainstorming among/informal contact with "grassroots" needed to identify shortcomings or problems with nomenclature which must then be presented to people who are willing, able and knowledgeable enough to initiate a project.

- It is a problem that IUPAC publications sometimes do not follow IUPAC nomenclature. There ought to be a mechanism whereby CCINS or a successor body will oversee the publications.

[*Handed over to CCINS prior to its meeting in Brisbane on July 4, 2001*.]

Appendix 3

Inorganic Chemistry Division
CNIC – Commission on Nomenclature of Inorganic Chemistry (II.2)

Organic and Biomolecular Chemistry Division
CNOC – Commission on Nomenclature of Organic Chemistry (III.1)

Joint Meeting of CNIC and CNOC
July 1st, 2001

Attendance CNIC:
Titular Members: N. Connelly, T. Damhus, R. M. Hartshorn, A. T. Hutton, H. D. Kaesz.
Associate Members: J. Casey.
National Representatives: R. Laitinen, D. Meyerstein.
Observers: L. I. Elding, B. Donovan-Merkert, W. H. Koppenol, V. L. Pecoraro.

Attendance CNOC:
Titular Members: B. J. Bossenbroek, H. A. Favre, B. J. Herold, J. L. Wisniewski, A. Yerin.
Associate Members: L. Goebels, K.-H. Hellwich, V. Kisakürek, J. Nyitrai, H. Smith.
National Representatives: G. Moss.
Emeritus Members: S. Ikegami, W. H. Powell, O. Weissbach.

Minutes
The meeting was called to order by the Chairman of Commission II.2 (CNIC), H. D. Kaesz, and the Chairman of Commission III.1 (CNOC), H. A. Favre, at the Queensland University of Technology in Brisbane, Australia at 09:00 a. m. on Sunday, July 1st, 2001.

The main subject of the meeting was the CNOC P-Names (preferred names) document and its areas of overlap with currently ongoing work in CNIC regarding the revision of Red Book I.

H. A. Favre explained that the P-Names document was now almost finished in a form ready for review outside CNOC. The document runs to approx. 950 pages (without an index).

T. Damhus, Secretary of CNIC, explained that CNIC had been asked to also consider the generation of P-names for inorganic compounds. G. Moss added that the round table discussion in Washington in March 2000 had revealed a strong desire among nomenclature users for IUPAC to produce just one name for each compound, which had led to the request to CNIC.

P-names are in general only intended for uses where it is compulsory to have a single name for each compound, *e. g.* for legal purposes as in connection with patents, environmental regulation and others. Other names which are considered acceptable may still be used in other contexts.

CNIC, however, regarded it as too ambitious to have P-names in the revised Red Book I, except maybe for restricted classes of compounds. N. Connelly of CNIC, main editor of the revised Red Book I, explained that there is a contract with the Royal Society of Chemistry (the designated publisher) to complete the revision by the end of 2001.

Nevertheless, CNIC had been concerned that a large number of purely inorganic compounds, parents as well as derivatives, are explicitly named in the CNOC document, a number of these according to principles that run against the line of the revised Red Book I and the inorganic P-names in cases where CNIC had already had a vision of the latter. H. A. Favre pointed out that it was often necessary to compare different parts of the CNOC document in order to fully appreciate the background for particular principles or names set forth. T. Damhus told that CNIC had received before the meeting only selected chapters of the CNOC document, and so late that the CNIC members had not yet had a chance to read these carefully.

It was eventually understood that the areas of overlap had to be discussed further by both Commissions. The goal of complete agreement with respect to all contentious issues may not be reached, however, before the documents go to public review. In that case it was considered of utmost importance that the new edition of Red Book I and the P-Names document of CNOC should both contain ample cross-references to the other document, and state explicitly the existing differences between options. For the P-Names document of CNOC this would mean that, if there are acceptable alternatives to a given name, the one according to the revised Red Book I should also be mentioned.

As regards the review of the P-Names document and the revised Red Book I, access to both documents should be granted to both commissions before submission to the Interdivisional Committee on Nomenclature and Symbols (IDCNS) which will still be followed by public review. Submission to IDCNS is expected to be by end of 2001.

A discussion followed of a number of specific inorganic compounds named in the CNOC document, including parent hydrides, and retained names for compounds like hydroxylamine and inorganic oxo-acids. Problems with numbering of atoms in polydentate ligands were also touched upon.

Before going into a more detailed discussion of these problems two specific points were discussed and agreed:

1. It was understood that acronyms and abbreviations used in the revised edition of Red Book I for organic ligands would not need to be changed, even if the acronym or abbreviation were not any more consistent with the P-name (example: maintain ligand abbreviation "thf" even if P-name will be oxolane).
2. It was voted unanimously that there will be only one P-name for each compound.

A suggestion was made by D. Meyerstein (CNIC) to remove all P-names from both the Red Book and the CNOC document and to produce a separate volume on P-names. In a discussion of the purpose of designating P-names several participants pointed out that even though it would often not be the intention that practitioners or educators should use P-names in their daily communication, the mere presence of P-names in IUPAC recommendations would make people consider them as the ones they should use.

After a break a more detailed discussion followed on specific examples:

The first one was about the inorganic parent hydride InH_3:
H. A. Favre presented arguments in favour of the name indigane, instead of indiane or indane, or other possible alternatives:

1. If indiane was used confusion might be caused by "di" being also a multiplicative affix. As a consequence HIn=InH would have to be called diindiene, without being a diene.
2. Indane cannot be used because it is already a widely used name for a certain bicyclic hydrocarbon. Also the 5-membered heterocycle with two double bonds and one indium atom would have to be called indole instead of indigole, indole being already used for another nitrogen heterocycle.
3. Indicane is also a name already used for an existing compound.
4. Indiumane would also not be convenient.

W. H. Koppenol argued against indigane because it would suggest a non-existing relationship to indigo[*].

For the preference by CNOC for hydrazine instead of diazane, H. A. Favre presented the following reasons: Wide use of names for many hydrazides RCO-$NHNH_2$, hydrazones RR'C=NNH_2 and for the hydrazino group -$NHNH_2$ and hydrazono group =NNH_2 which should be retained (*e. g.* in $(HO)_3P{=}NNH_2$ hydrazonophosphoric acid). A name like methyldiazane would, however still be accepted, although the preferred name would be methylhydrazine. Moreover hydrazine is a hazardous compound and for these, as *e. g.* also for acetylene, the traditional names should be retained for safety reasons.

T. Damhus asked about the names which CNOC prefers for the following anions, question which was answered by W. H. Powell:

$H_2N\text{-}NH^-$	hydrazinide
$H_2N\text{-}N^{2-}$	hydrazinediide

[*] Note added after the meeting at the request of G. Moss: Reich and Richter called it indium in 1863 after the indigo-coloured flame test – recognised as different from the colour from caesium.

H. D. Kaesz suggested the name for the six-membered ring $(SiH_2)_6$ to be discussed. H. A. Favre answered that for rings with up to 10 members the Hantzsch-Widman method would be preferred, according to which the name would be hexasilinane, but that the name cyclohexasilane (used by CAS) would still be considered an acceptable name.

B. J. Herold asked the members of CNIC how they would name noble gas compounds. T. Damhus informed that FArH is known and that one could call it additively fluoridohydridoargon. B. J. Herold proposed that if group 13 to 18 parent hydrides were to be named in a consistent way substitutively, the name would be fluoro-λ^2-argane or fluoro-λ^2-argonane.

Other subjects discussed were the names for H_3SiOH, silanol preferred by CNOC, and $Al(OH)_3$, alumanetriol preferred by CNOC. H. A. Favre explained that by prior mutual agreement, CNOC would use substitutive nomenclature based on parent hydrides of main group elements, except for group 1 and 2. T. Damhus, having participated in and having consulted the minutes of the 1996 CNIC meeting in which H. A. Favre and W. H. Powell also participated, pointed out that the decision at that time was that organometallic compounds of these main group elements would be named substitutively, not all compounds of these elements.

T. Damhus asked then for the reasons for using the name hydroxylamine instead of azanol for H_2NOH. H. A. Favre replied that, once it had been decided to use the name hydrazine instead of diazane, one would not use the name azane at all, in order to be consistent for nitrogen compounds. For amines the names methanamine, etc. would be used. B. J. Herold pointed out that, since the most abundant elements in bio-organic compounds were C, H, O, N, S and P, there were reasons to treat them in organic nomenclature in a different way from other elements, because of the large and ever growing number of such compounds, which have already been named in a well established systematic way.

T. Damhus asked then which names would be preferred for the following structures. H. A. Favre replied:

H_2NO^-	aminooxidanide
$HONH^-$	hydroxyazanide
NH_2^-	azanide (amide would be kept as a retained, although not preferred name for general use)
CH_3NH^-	methanaminide
CH_3PH^-	methylphosphanide.

In cases where these names appear as ligands in additive nomenclature the ending “e” would be substituted by “o” as in methanaminido.

H. A. Favre coming back to the problem whether to use names for aluminium compounds derived substitutively from alumane, like alumanetriol, instead of a more customary name as aluminium trihydroxide, one would have to draw lines through the periodic table, defining which elements would be considered for nomenclature purposes as metals or non-metals.

The last set of examples discussed was that of inorganic oxoacids CNOC wants to use as functional parents like sulfuric acid, sulfurous acid, as well as phosphoric, phosphorous, phosphonic, phosphonous, phosphinic and phosphinous acids. H. A. Favre, supported by G. Moss, stressed that, given the importance of esters in biochemistry, and the unwillingness of biochemists to change names like adenosine triphosphate and diphosphate, *etc.,* it would be difficult to depart from the existing practice, which involves a very high number of different bio-organic compounds already named systematically and registered with such names in many data-bases.

For polydentate anionic ligands unsolved problems of how to give locants to oxygen atoms were identified as shown by the following examples: In tartaric acid the problem is easy to solve by referring the locants to those of the adjacent atom of the carbon chain, and thus number them as O-1, O-2, O-3, and O-4 (or 1-O, 2-O, 3-O, and 4-O). In the case of triphosphoric acid one will have to decide between two possibilities: either to number the phosphorus atoms from 1 to 3, and therefore give to the oxygen atoms which are not part of the chain the locants O-1, O-2, and O-3 (or 1-O, 2-O, and 3-O), or to number the atoms of the chain from 1 to 5 (including both phosphorus and oxygen atoms) starting with the phosphorus atom at one end and finishing with the one at the other end, and thus have O-1, O-3, and O-5 (or 1-O, 3-O, and 5-O). G. Moss quoted as an example the steroid parent furostan where there is no

locant for the oxygen atom between C-21 and C-23. The examples of hydroxymethanetricarboxylic (A. Yerin) and 2-hydroxypropane-1,2,3-tricarboxylic (citric) acid (K.-H. Hellwich) were also quoted.

Both commissions concluded the session by agreeing on the urgent need to continue the discussion of areas of overlap in a more restricted group with representatives from the areas of inorganic and organic chemistry, as well as biochemistry. It was suggested by H.D. Kaesz and H.A. Favre that T. Damhus and R.M. Hartshorn from CNIC, H.A. Favre and W.H. Powell from CNOC, and G. Moss to represent biochemistry, be appointed to the Task Group.