X3J16 Meeting No. 6
June 17-21, 1991

Grand Hotel
Bantorget 1
Lund, Sweden

1 Opening activities

The meeting was convened at 9:15 am on Monday, June 17, 1991 by Lenkov, chair of X3J16. Miller served as vice-chair, and Saks as secretary.

The Lund Institute of Technology hosted the meeting.

1.1 Opening comments

1.2 Introductions

Lenkov circulated the membership list and asked attendees to make any necessary corrections. He also circulated an attendance list. The attendance list was circulated each day, and is Appendix A of these minutes.

1.3 Membership, voting rights, and procedures for the meeting

Miller summarized the voting rules for X3 subgroups (sections 7.1 and 7.5 of X3/SD-2). For all subgroups, a quorum is one-third of the voting membership, with at least 4 members present. When less than a quorum are present at a meeting, a subgroup can still conduct business not requiring voting action and can draft proposals for action at the next meeting or for letter ballot. Miller added that X3J16 has about 55 voting members altogether, and so only about 19 members need be present at this meeting to allow votes on technical issues.

Miller also summarized the rules for actions requiring two-thirds of those voting (section 8.5 of X3/SD-2). "Two-thirds of those voting" is defined as approval by at least a majority of the membership and at least two-thirds of those voting, excluding abstentions. The two-thirds rule applies to issues such as approval of a draft for submission to ANSI, or a recommendation to convert a project from type D to type I. At this meeting, we needed a minimum of 28 yes votes (of the 55 total) to approve such actions.

A show of hands revealed 28 voting members present.

Miller said that voting members must attend two of every three meetings to maintain their voting rights. Miller said he thought that loss of voting rights was automatic, but recent discussions with Lenkov made him uncertain of the rules. Lenkov offered to check to rules during the morning break and report his findings to the committee.

1.4 Approval of the minutes for previous meeting

Saks submitted the minutes from the previous meeting (91-0045) for approval.

Motion by Schwarz/Miller:

"Move that we approve the minutes from the previous meeting."

Motion passed: lots yes, 0 no, 0 abstain.

1.5 Distribution of position papers, WG deliverables, and other documents not distributed before the meeting

Shopiro explained that the editor's report (91-0060) for the June working paper will not be ready until mid-July.

1.6 Agenda review and approval

Lenkov submitted the proposed agenda (91-0062) for approval, along with one addition -- a 15 minute US C++ TAG meeting scheduled 15 minutes after the X3J16 meeting on Monday. He explained that the US TAG consists of representatives of US domiciled corporations. These representatives need not be US citizens.

Lenkov added two other items:
    14.1 Format of the Document List
    18.0 Format of Meetings

Motion by Saks/Ball:

"Move that we accept the proposed agenda with these additions."

Motion passed: lots yes, 0 no, 0 abstain.

2 International Concerns WG

Carter explained that the US needs an IR (international representative) to the ISO C++ WG (X3/91-1066M). He invited members to send an application for IR to Dan Arnold at X3 by the end of July. Carter also said we will resume the discussion of conversion to a type I project on Friday. Until X3 appoints an IR, Lenkov will be acting IR.

Carter summarized the agenda for the US TAG meeting. There are two resolutions to consider:
-- that the US C++ TAG should approve the formation of a C++ WG (WG21) with Steve Carter as the convener.

-- that the US C++ TAG should accept all X3J16 positions as US C++
    positions.
He reiterated that US TAG members must represent US domiciled
corporations that are voting members of X3J16.

Carter reported that the C++ NWI (new work item) proposal was approved
by a vote of ten for and one against with two abstentions (ISO/IEC
JTC1/N1322). He summarized his expectations for the WG21 meeting this
week:
-- meet Tuesday and Wednesday morning
-- may meet jointly with X3J16 on Wednesday
-- resolve comments on ballots to approve the ISO new work item for C++

1.3   Membership, voting rights, and procedures for the meeting (revisited)

Lenkov returned to agenda item 1.3. He read the rules for termination
of subgroup membership (X3/SD-2 section 6.5). These rules state that a
member must be warned by letter upon failure of the principal and
alternate to:
a. attend two of three successive meetings, in which case membership
    terminates upon failure to attend the next meeting,
b. return ballots from two successive mailings, in which case
    membership terminates on failure to return the next ballot,
c. pay service fees.
X3 or the subgroup may vote to continue membership despite the member's
failure to comply with (a) or (b).

Miller will send letters to all X3J16 members who have not complied with
(a), and attach a recommendation that they switch to observer status.
Miller will drop from our mailing list members who fail to respond.

2   International Concerns WG (continued)

Carter explained that he, Johnson and Plum would describe how other X3
and ISO language standards committees have cooperated.

Carter summarized the interactions between X3J4 and WG4 (COBOL). He
explained that X3J4:
-- is a type D project with a synchronization plan
-- develops and controls the document
-- accepts all changes made by WG4
-- provides issues lists for WG4 to solicit feedback
and that WG4:
-- accepts all changes made by X3J4
-- expresses high level views (above the grammar) and leaves the
    details to X3J4
-- uses lots of letter ballots to get a sense of the document's
    acceptability

Carter said that X3J4 meets every two to three months. Approximately
seven members attend each meeting.

WG4 meets every nine to 12 months. About six or seven countries attend
each meeting. The US delegation has about six members, but most
countries send less than three. Several delegates have expressed
concern about the size of the US delegation. The convener can limit the
size of delegations, but has not. Also, the convener doesn't chair the
meetings.

Joint meetings of X3J4 and WG4 follow this format:
-- X3J4 meets for three days to recommend ballot resolutions.
-- WG4 meets for three days to consider X3J4's recommendations. Most
   X3J4 members attend as US delegates.
-- X3J4 meets for one day for concluding actions
This format addresses WG4's concern that a seven day joint meeting would
subject international delegates to too much detail.

Shopiro asked how joint decisions are made. Carter said "very
informally". Lajoie asked how the committees resolve a genuine
disagreement. Carter said it's possible that X3J4 could write a
standard that it knows will not pass WG4, resulting in separate US
national and international standards; however, this is unlikely.

Johnson described the synchronization of X3J3 and WG5 (Fortran).
X3J3 meets four times a year; WG5 meets one or two times a year. The
committees hold no joint meetings. However, committee meetings are
scheduled in tandem when possible: a one week X3J3 meeting outside the
US, followed by a one week WG5 meeting at the same site. International
members participate on X3J3. X3J3 and WG5 communicate both formally and
by resolutions.

Johnson also said that the US delegation to WG5 has six to 12 members.
This is a large delegation, but the Fortran standard is a large
document. Much of the meeting is tutorials that explain changes to the
document. X3J3 has approximately 48 members; WG5 has about eight
countries, with one to three delegates each. The US nominated the
convener of WG5. WG5 appoints a chair at each meeting. The convener
chaired all meetings this past year. X3J3 is a type D project that
synchronizes with WG5 under the Hague resolution (from SC5/WG9). X3J3
votes to accept WG5 resolutions into the document.

Gautron presented two alternative recommendations for ISO C++ from the
AFNOR C++ TAG (91-0071):
1. That X3J16s become the ISO C++ WG, with informal voting by X3J16
   rules, and formal votes by ISO rules.
2. That ISO C++ delegate technical development to X3J16 operating as a
   type I project.
AFNOR prefers the first alternative.

Several members expressed concern about the disparity in the voting
rules for straw votes and definitive votes in the first proposal.
Specifically, the outcome of a straw vote based on X3J16 membership
might be vastly different from the outcome of a formal vote based on ISO
membership.

Carter thought this met the needs of both the ANSI and ISO processes. Shopiro noted that Gautron's first alternative proposal is like having a US delegation of 50 members at ISO C++ meetings. Johnson said that choice of meeting frequency and location is important to insure that the right people are in attendance when it's time to vote.

Plum suggested an amendment to Gautron's first proposal - that straw votes under X3J16 voting rules should be followed by formal votes under X3J16 voting rules prior to formal votes under ISO rules.

Carter saw the first proposal as an invitation from ISO for all nations to send as large a delegation as they would like to ISO C++ meetings.

Lenkov opened the committee of whole.

Plum described the interactions between X3J11 and WG14 (C). X3J11 produced the C document, while WG14 just tracked it. During their active periods, X3J11 met four times a year, and WG14 met twice a year. The committees held two joint meetings. X3J11 had 40 to 50 members. WG14 had five to seven members, with two to six people per delegation.

Plum said that some WG14 members raised two objections to X3J11's standard to SC22:
1. Denmark raised character set issues.
2. The UK questioned the process by which standards are written.

Plum explained that votes by an ISO WG aren't binding upon its parent member bodies. The WG votes are just advisory; the member bodies cast the determining ballots. However, it's unusual for the member body to go against the WG's advice.

Schwarz wondered how public reviews are handled by type I projects. Carter explained that type I specifies that the X3 technical committee ceases production of a domestic standards document, and directs its energies toward completing an international standards document. Secondly, national and international ballot cycles are synchronized through the shortening of the X3 public review period to correspond to the international review period. Comments are resolved on a country-by-country basis.

Carter explained that the resolution to create WG21 (the ISO C++ WG) was approved by the SC22 AG, but not by the SC22 plenary. WG21 is operating on a temporary basis at the direction of the SC22 secretariat.

Straw vote: Should we recommend to the US SC22 TAG that they vote in favor of establishing WG21 on a permanent basis with Carter as the convener? lots yes, 0 no, 6 abstain

Plum said that no matter what happens, X3J16 must continue to exist, even if to do nothing but track the ISO C++ standard. Miller said that Gautron's first proposal needs clarification, but we do want to do something to expedite ISO approval of X3J16 decisions.

Carter said Gautron's second proposal is a reference to the
International Concerns WG cooperation plan (91-0044) presented at the
last meeting. Carter suggested yet another way to run ISO WG meetings.
WG21 should invite all X3J16 members to the WG21 meetings, and maybe ask
Lenkov to act as chair. Attendees would "change hats" at various times
during each meeting; sometimes acting as X3J16 members representing
corporations, and other times acting as WG21 members as part of a
national delegation.

After some discussion indicating confusion about the issues, Carter
summarized Gautron's first proposal. The proposal calls for joint
meetings of what is now X3J16 and WG21. There are two possible
interpretations for voting policy:
1. Follow ISO voting rules - everything else is informal.
2. X3J16 and WG21 meet at the same time and in the same place,
   following the X3J16 meeting schedule. The attendees would "change
   hats" to tell which meeting they're in. X3J16 and WG21 might have
   different chairpersons.

Shopiro asked what happens to the draft if the ISO and ANSI votes
disagree. Must he put *#ifdefs* in the document? Lenkov said the
document must reflect the ISO decision.

Plum said that under the first proposal, the ISO WG directs the drafting
of the document. Under the second proposal, the ISO WG retains ultimate
control, but X3J16 has day-to-day control. So the draft will look like
what X3J16 wants until WG21 gets a crack at it. The difference between
the proposals is simply a matter of the time lag until WG21's prefer-
ences prevail.

Koenig suggested that no changes be made to the base document without
approval of both X3J16 and WG21. Shopiro said we must trust that inter-
national participation in the C++ standard will be sober. It's a matter
of trusting people he's never met, but he's willing to do it. Ball
disagreed with Koenig's proposal, saying it's tantamount to giving X3J16
a veto over WG21 decisions.

Plum favored Gautron's first proposal. He thinks people involved in C++
have more in common than people involved in other standards efforts.
Many problems in the development of the C standard were caused by the
fact that the ANSI and ISO committees did not meet at the same time and
place. We can achieve a higher information bandwidth by meeting
together.

Straw vote: Who supports Gautron's first proposal, with Plum's amendment
to have X3J16 formal votes as well as WG21 formal votes? 18 yes, 0 no,
11 abstain.

Straw vote: Who supports Gautron's second proposal, which is essentially
the same as the synchronization plan proposed at last meeting? 22 yes,
0 no, 6 abstain

Lenkov recommended that the US delegation to WG21 consist of Lenkov (as acting IR), Shopiro (also as proposed project editor), Plum (also as secretary for this meeting), Johnson, and Stroustrup. Carter will attend as WG convener. Lenkov asked if anyone objected to the size and composition of the delegation? No one objected.

Plum summarized the decisions made by WG14 regarding character set issues in ISO C (91-0075). He explained that WG14 approved a proposal to add digraphs to C as alternate lexical tokens, such as <% for { and %> for }. Each digraph becomes equivalent to its corresponding single character during retokenization (the fifth phase of translation).

Charney expressed concern about the using the <: digraph in C++ because of the :: operator. Plum said that Stroustrup long ago said that C++ programmers won't mind adding a space before :: now and then.

In response to a question from Gautron, Plum explained that digraphs aren't recognized inside character constants and string literals. That is, "<%%>" is still "<%%>", and not "{}". Digraphs do not eliminate the need for using trigraphs inside character constants and string literals.

Plum described both proposals for extended identifiers considered by WG14 (page 4 of 91-0075). The first proposal (made by Plum and dubbed the "Plum Danish" proposal) was rejected. The second proposal was generally accepted.

Stroustrup wondered if it would be possible for a programmer using a compiler in the English locale to write programs for a Danish locale. Plum said this has to be worked out.

O'Riordan agreed with Stroustrup's concern. He said that Microsoft's Japanese customers complained that Microsoft C's early implementation of locales didn't let them develop for English locales while writing in the Japanese locale. Microsoft ultimately changed its implementation.

Plum discussed the question of what "basic execution character set" means. ISO C doesn't define it precisely. Does it means (a) all small integer values that fit in one byte, or (b) only certain "defined" values.

Straw vote: Who thinks (a) is right? 11. Who thinks (b) is right? 0. Who doesn't know? 10.

Plum briefly summarized the other three character set issues:
-- L'a' == 'a'
-- the new header <wchar.h>
-- the widechar library

Lenkov closed the committee of the whole.

The committee recessed at 5:35 pm Monday and reconvened at 1:50 pm Tuesday, after WG sessions.

Lenkov announced that he had invited members of WG21 to participate in
the X3J16 meeting for the rest of the week. There were no objections.

Lenkov opened committee of the whole.

3   WG Reports

3.1   Formal Syntax WG

Charney presented the scope of work for this meeting (91-0079):
--   identify typographical errors and omissions in the current version
     of syntax
--   propose further changes to aid consistency of the syntax
--   submit 91-0033, 91-0035, 91-0037 and 91-0048 (replacing 91-0034) for
     vote

3.2   Core Language WG

Koenig described the work of the Core Language WG. Almost all mailing
list discussion had been:
--   requests for new features (in disguise)
--   discussion of naming issues, including nested classes and scope of
     friends

Koenig said the naming issues have been very difficult. He also
explained that Schwarz previously recommended a policy that the language
should reject any construct where the right name resolution is not
obvious; however, it's difficult to agree on what is not obvious.

Koenig said the group will also work on the lifetime of temporaries, if
they can get to it.

Miller has the current list of Core Language issues and their
resolutions. He suggested that only the very interested will want a
copy.

3.3   Extensions WG

This item was rescheduled for later.

4   WG Sessions

5   Report on the ISO C++ WG morning meeting

This item was rescheduled for later.

6   WG Reports (continue)

6.1   Libraries WG

Schwarz reported that the Libraries WG had not made much progress since
the last meeting. The WG is working on a proposal for iostreams based
on the AT&T specification, with some parts removed. They received
little feedback as to whether they have discarded too much or not

enough. Schwarz offered to hold a technical session on iostreams. He hoped the WG would have a section on iostreams for inclusion in the draft by next meeting.

Lenkov scheduled a technical session on iostreams for Wednesday afternoon.

Schwarz said the WG also worked on strings. They encountered some problems with widechars and internationalization. They will solicit more advice from the committee.

Schwarz reported that the WG received about five responses to its request for sample documentation on container classes. Allison will distill information from these submissions to present at the next meeting.

For the next meeting, the WG plans to write a preamble defining conformance for the libraries section of the draft. Schwarz expected the preamble to cover issues such as
-- can an implementation add members to a required library class?
-- can it create a library class by instantiation of a template?

Future work includes:
-- the C library and *wchar.h*
-- standard exceptions, e.g., should the *new* handler throw an exception instead of returning zero by default.
-- language support functions, like *operator new*

3.3 Extensions WG (previously skipped)

Stroustrup reported that the WG has not done much since the last meeting. He listed new requests for extensions:

-- extended character sets and new keywords (91-0070)
-- metaclasses and multiple inheritance (91-0065)
-- compile time constants in classes (91-0067)
-- non-inline function definitions in classes and automatic operator generation (91-0064)
-- name space control (91-0041)
-- nested functions
-- pointers to bound functions

Stroustrup said he didn't really understand 91-0065 and would seek clarification. He listed other issues raised previously:

-- return type of virtuals: O'Riordan wrote a new paper (91-0051)
-- operator . (dot): Stroustrup and Koenig haven't written the promised paper yet
-- constrained genericity: no new papers have been written
-- run-time type identification: Lenkov wrote a new paper (91-0063)

Stroustrup suggested that run-time type identification be discussed in a technical session. Lenkov scheduled it for Wednesday afternoon.

6.2 Environments WG

Wilkinson reported the progress of the Environments WG. He invited comment on Chapin's new paper on the One Definition Rule (91-0073 replacing 91-0024). Chapin also wrote a new paper summarizing e-mail discussions on translation limits (91-0072). The WG has not reached consensus on this issue.

Wilkinson will present 91-0053 on static initialization order later in the meeting. He said no other work had been done since the last meeting. The remaining open issues are:
-- type-safe linkage
-- suggested warnings
-- C and C++ compatibility

6.3 ANSI C Compatibility

Plum reported that the C Compatibility WG has made some progress in preparing the list of incompatibilities between C++ and C requested by SC22. Plum also reported that only a few of the terms listed in 90-0088 have been incorporated into the current draft. He suggested that he and Shopiro (and anyone else who wants to participate) should meet before the next meeting to incorporate the terms. Plum will announce the time and place of the meeting.

5 Report on the ISO C++ WG morning meeting (skipped previously)

Plum reported the results of the WG21 morning session. He explained WG21's responses to the comments on the ballot to approve an ISO new work item on C++. The ballot comments appear in JTC1/N1322 = X3/91-1153. The responses appear in WG21/N0010 = X3J16/91-0087.

Insinga asked that all X3J16 and WG21 documents have both X3J16 and WG21 document numbers with identical last four digits.

Carter proposed rules to allow both X3J16 members and WG21 delegations to participate in formal X3J16 votes on technical issues. He also urged the liberal use of straw polls to avoid disenfranchising those WG21 delegations that might lose voting rights on X3J16 for failure to attend two out of every three meetings.

Simonsen noted that national delegations represent peers of ANSI, and can't be members of an X3 technical committee. Stroustrup suggested that each X3J16 member and each national delegation be given one vote on each technical issue.

Koenig observed that if we don't follow ISO rules on ISO votes, ISO won't accept the standard. If we don't follow X3 rules on X3J16 votes, X3 won't accept the standard. Thus we must observe the union of ISO and X3 rules.

Carter said that WG21 can adopt internal procedures for conducting straw polls which appear similar to X3 rules, such as the X3 requirement that members attend two of three meetings to vote on technical issues.

Carter said that a document created under X3 rules, where JTC1
directives ought to be applied, would likely undermine the credibility
of the document within SC22.

Jackson said he didn't understand why we are spelling out all these
rules for voting in informal votes. He thought X3 has no rules
governing straw votes. Lenkov said straw votes are designed to give a
good indication of how formal votes will turn out. Thus, they follow
the same rules as formal votes.

Carter reiterated that it's very important not to disenfranchise
international participants. He stressed the importance of using straw
polls to reach consensus.

Lenkov summarized the three main issues that came up in discussion:
1. how to conduct straw votes in a joint X3J16/WG21 meeting.
2. how to handle formal X3J16 votes.
3. how to number documents.

Carter said again that it's very important not to disenfranchise
international participants. He said we must assume that international
representatives will conduct themselves responsibly during technical
discussions. There is the possibility that they could disrupt the
standards process, but it's not likely. We must trust that this won't
happen.

Miller was confused by Carter's statements. Miller thought Carter said
we should petition X3 to allow national delegations to participate in
formal X3J16 votes. On the other hand, Miller also thought Carter said
it doesn't matter if national delegations can participate, because we'll
make liberal use of straw votes and use ISO rules for the final
decision. Carter responded that the latter is true, but the former
would be nice.

Lenkov attempted to take the following straw vote: Who thinks straw
votes should be taken on the basis of one vote for each X3J16 member and
one vote for each national delegation? Simonsen explained that ISO
rules for straw votes grant one vote per technical expert, and there can
be any number of technical experts per country.

Straw vote: Who thinks straw votes for X3J16 members will continue to
follow X3J16 rules (one vote per organization), and national delegations
will follow ISO rules (one vote per technical expert)? lots yes, 0 no,
1 abstain

Carter read a proposal that X3J16 recommend that X3 grant free member-
ships in X3J16 to WG21 national delegations. Johnson said that the
proposal doesn't give Simonsen what he wants -- Simonsen doesn't want to
be a member of X3J16, he just wants to vote.

Jackson said that, as a Canadian representative, he didn't care about
X3J16 formal votes. He only cared about X3J16 straw votes and ISO
formal votes. Stroustrup responded to Jackson that if members vote in
straw votes but not formal votes, we'll be confused by the results.

Carter made a simpler proposal: X3J16 recommends that X3 extend X3J16 voting privileges to members of WG21. After a brief discussion, Carter withdrew his proposal.

Lenkov reopened the discussion of document numbers. He said every document now gets two numbers: a WG21 number and an X3J16 number. Lenkov restated Insinga's request that both numbers end in the same four digits.

Miller explained that ISO WG documents are numbered sequentially without regard to date, while X3J16 document numbers reset to 0000 each year.

Insinga simplified his request. He wanted all X3J16 and WG21 documents to be numbered in the same order (not necessarily the same numbers). He also wanted to be able to go to one person to get both numbers.

Plum said that Carter, as convener, can delegate the job of numbering documents to Miller. Plum suggested that Miller could find a way to satisfy both groups. Miller agreed.

Straw vote: Who wants Miller to do this? lots yes, 0 no, 1 abstain

Lenkov asked for suggestions on how to distribute one set of documents to everybody with no duplicates. Plum suggested that we ask someone in Europe to volunteer to handle all European mailing, and ask someone in the Far East to handle all Far Eastern mailings. A volunteer in the US can handle the US mailings. Miller will air express one copy of the documents to Europe and one to the Far East, and they will make copies for their areas. Miller agreed to coordinate these mailings.

Carter explained that ISO requires meeting information to be available at least three months before a meeting. So TI (the host for the next meeting) should provide the information in the mailing after this meeting.

Lenkov closed the committee of the whole.

Motion by Plum/Carter:

"Move that straw votes will include X3J16 voting members (one vote per organization) and WG21 voting members (one vote per technical expert)."

Motion passed: 27 yes, 0 no, 1 abstain

Lenkov opened the committee of the whole.

Straw vote: Who wants X3J16 to convert to a type I project? lots yes, 0 no, 2 abstain

Lenkov said the motion to recommend converting X3J16 to a type I project (the motion by Shopiro/Druker under item 16.1 of 90-0115) would not be untabled because we didn't have enough members to ensure passing the motion. We will have a letter ballot after this meeting.

The committee recessed at 5:30 pm Tuesday.

7   WG sessions

8   Working Paper for Draft Proposed Standard

     This item was rescheduled for later.

9   General session

The committee reconvened at 1:45 pm Wednesday as a joint session of WG21 and
X3J16. The minutes for the joint session is in a separate document (N0014 =
91-0093). The committee recessed at 3:50 pm Wednesday.

10   Working group sessions and special technical sessions (if needed)

The committee reconvened at 9:00 am Thursday.

11   General Session

     Lenkov opened the committee of the whole.

     --- Language Extensions ---

     Stroustrup expressed concern about the large number of extensions
     proposals the group had already seen. He summarized the issues
     discussed the previous day:
     --   8-bit characters in C++ identifiers: postponed for more work
     --   proposal from the USSR (91-0065): Stroustrup and O'Riordan will
          write a letter seeking clarification from the author(s)
     --   return type of virtuals: Goldstein and Lenkov will writing something
          about the usefulness this feature
     --   non-inline function definitions in classes and automatic operator
          generation (91-0064)

     Stroustrup explained that 91-0064 was considered by the Extensions group
     and rejected. It supported only stylistic differences rather than
     fundamental facilities. C++ is big enough already. The group won't
     accept an extension just because it makes language a little more
     convenient.

     Stroustrup told the story of the Vasa, a Swedish warship built several
     hundred years ago. When it was almost finished, the engineers intro-
     duced several design changes adding more beauty and guns. On its first
     voyage, the Vasa only made it halfway across the harbor before cap-
     sizing, killing 50 people. He did not want C++ to meet a similar fate.

     Lenkov asked if the letter writer will get a written reply. The
     committee discussed method for efficiently handling responses to
     requests. Many agreed every letter writer should get a written reply.

Goldstein and Stroustrup will write a set of guidelines on how to submit
a proposal. It will be ready for the next meeting.

Charney will work with Stroustrup to draft a letter to the author of
91-0064 with the intent that this be the first draft of a form letter.

Lenkov asked for a volunteer to start organizing a database of standard
responses.

Stroustrup continued with the summary of extensions issues:
-- compile time constants in classes (91-0067): O'Riordan and Gibbons
   will work on a paper
-- operator . (dot): on hold awaiting paper by Stroustrup and Koenig
-- constrained genericity: on hold awaiting paper by Tiemann and Lea
-- name space control (91-0041): postponed to another time

Stroustrup proposed a new set of lexical tokens for C++ based on
Simonsen's proposal to WG14. The proposal had three parts:
1. Add these names and digraphs to C++ as alternate spellings for their
    corresponding tokens.

Existing	Alternate
{	<%
}	%>
[	<:
]	:>
#	%%
&	bitand
&&	and
|	bitor
||	or
^	xor
~	compl
&=	and_eq
|=	or_eq
^=	xor_eq
!	not
!=	not_eq

2. Ask WG14 to consider replacing *not_eq* with <>, and to reserve the
    names as C library names.
3. Add an a empty header *iso646.h* to the C++ library.

The committee discussed whether the new words should be keywords or
macros. Koenig said he thought his argument (made the previous day) was
a clincher. Miller said it was indeed a problem, but he questioned
whether it was that severe.

Plum agreed with Miller. He was concerned about taking names from the
users' name space. He proposed a new header tentatively called *newkw.h*,
a vendor supplied header that renames the keywords into names taken from
the vendors' name space.

O'Riordan saw no problem with new keywords. He said vendors will supply compiler switches to create non-conforming implementations (that turn off the new keywords) to satisfy their customers' need to preserve old code.

Miller said the only reasons he favors using macros is because that is the solution proposed by WG14.

Stroustrup said that a typical C++ program places an order of magnitude more information in headers than does a typical C program. All it takes is for one header to break the rules to cause problems. There's a lot of work going into the development of C++ development environments. Preprocessor use in C programs has been a major contributor to failure of environment projects for C. Consequently, we don't want to introduce new dependencies on the preprocessor.

Miller asked if the wording of the proposal should be in terms of phases of translation. Plum said the current working paper doesn't define the phases yet, so we can't do it.

Lenkov closed the committee of the whole.

Motion by Allison/Bruck:

"Move that we adopt part 1 of Stroustrup's proposal, as above."

Motion passed: 24 yes, 2 no.

Motion by Miller/Gibbons:

"Move that we adopt part 2 of Stroustrup's proposal, as above."

Plum noted we are not asking WG14 to treat older C++ reserved words, such as *public* and *class*, as reserved words.

Motion by Schwarz/Wilkinson:

"Move that we divide part 2 (at the ", and") into two motions."

Motion passed: 16 yes, 5 no.

First part of motion by Miller/Gibbons passed: 22 yes, 2 no.

Second part of motion by Miller/Gibbons passed: 14 yes, 10 no.

Motion by Bruck/Insinga:

"Move that we adopt part 3 of Stroustrup's proposal, as above."

O'Riordan said that if WG14 adds these new words as keywords, this motion becomes unnecessary. Koenig explained that WG14 won't make them keywords. They are bound not to restrict the current set of strictly conforming programs.

Schwarz said he was reluctant to describe an empty *iso646.h* in the library section. Plum suggested describing it in the standard where it describes the additional keywords.

O'Riordan noted that an empty *iso646.h* doesn't guarantee that C program using *iso646.h* will compile as C++. He gave this example:

```
extern void and();
f() { and(); }
#include <iso646.h>
```

Stroustrup explained that an empty *iso646.h* is only intended to guarantee that a C program won't break for the mere fact of using *iso646.h*.

Miller proposed a friendly amendment: replace "an empty" with "a".

The amendment was accepted by Bruck/Insinga.

Motion passed: 16 yes, 5 no.

Lenkov opened the committee of the whole.

Stroustrup asked for a volunteer investigate AFNOR's proposal for 8-bit characters in identifiers. Plum offered to work with Gautron on it. Stroustrup reminded the committee that the Japanese have said they don't care what the proposal is as long as it handles their character set.

The committee discussed whether to write a formal letter to WG14 requesting that they consider replacing *not_eq* with <> and reserve the names as C library names (as per the earlier motions). Members agreed it was sufficient that Simonsen was present when the request was made informally on Wednesday.

Miller assumed the chair.

Lenkov presented 91-0063.

The committee discussed whether *ref_cast* should throw a standard exception if it fails (Example 4 from 91-0063). Lenkov saw this as the main disadvantage of this part of the proposal. He described an alternative technique using *ptr_cast* that requires that users check for null explicitly. Shopiro sketched a version of this alternative:

```
try {
    ...
    SortedList *p;
    if (p = ptr_cast(LenSortedList, l_p))
        func(*p);
    else
        throw bad_ptr_cast;
    ...
}
```

Several members argued that the alternative is no good because users won't check. Further discussion was deferred to the technical session later that day.

Lenkov returned to the chair.

--- Project Editor ---

Shopiro summarized the changes to the June Working Paper for the draft standard. He also promised to format the draft to fit better on A4 size paper.

Miller suggested adding to 1.3p2.5 (Section 1.3 Paragraph 2 Sentence 5) that "type also determines the operations on a object." Shopiro asked Miller to submit the suggestion via e-mail.

Schwarz cited a problem with the use of the word "type" in 1.3p2.5. There are two uses of the word "type": 1) the type of object which depends on how the object is created, and 2) the type of an expression that references an object. The second use is a type that a program ascribes to an object. Schwarz said these two uses are not distinct. Shopiro asked Schwarz to send e-mail about this.

O'Riordan asked why the current document says that the fundamental unit of storage is a byte, and not a *char* (as in C)? Shopiro said he thought byte was a more fundamental unit, and he promised to add explanation in editor's report (91-0060). Plum said he likes byte because it avoids confusing *char* with its meaning as a type.

Gibbons pointed out that the example in 7.1.3p5 example has only one typedef name, although many are allowed. Shopiro asked Gibbons to send a reminder via e-mail for Shopiro to revisit the example.

Miller pointed out a minor bug in 7.1.6p1. The parenthesized part of the next to last sentence should read "(which is not a subobject of an object of a non-ROMable type)".

Shopiro explained that the discussion of dominance is now gone. The Core Language group agreed that the changes to Chapter 10 made last time were editorial.

Miller noted that 9.4p1 uses "incomplete type", but it's not defined anywhere. Shopiro said he and Plum will be adding the definition soon.

Shopiro summarized the open issues. At Koenig's request, Shopiro referred the last sentence of 5.9p2 on pointer comparison to the Core Language WG for study. No one objected.

Shopiro explained that the text of the Working Paper uses the terms "formal argument" and "actual argument", but the syntax uses various inconsistent abbreviations. He suggested switching to the terms "parameter" and "argument", as used in the C standard. The committee generally agreed, and left it to Shopiro to decide.

Ball noted the term "side effect" appears in several places without definition. Plum said it's in the list of terms (from C) to be incorporated into the Working Paper. Ball also asked that side comments, such as "but this fact is not very useful" in 5.9p1.1, should be removed. Ball also said phrases like "may be undefined" as in 5.4p17.5 should just be "is undefined". Shopiro said he'd try to be more precise.

O'Riordan pointed out that the committee previously removed the constraint that the statement in a selection or iteration statement can't be a declaration. However, there's no notice that the constraint has been removed. Shopiro asked O'Riordan to send e-mail reminding Shopiro to add an example.

Lenkov closed the committee of the whole.

Motion by Miller/Druker:

"Move we approve the current Working Paper (91-0059)."

Motion passed: lots yes, 0 no.

Lenkov opened the committee of the whole.

--- Core Language ---

Koenig explained that the WG spent all its time this week on name lookup.

Miller explained the name lookup issues. The WG had been working on an algorithmic description. It proved useful for framing ideas, but now they have progressed to a prose description. Miller explained that the WG has reached agreement on the basic principles of name lookup as illustrated by this example:

```
struct X {
    static int i;    // 3
    struct Y {
        int i;       // 2
        void f();
    };
};
int i;               // 4
void X::Y::f() {
    int i;           // 1
    i = 5;
}
```

The question is, to which declaration of *i* does the *i* in

```
i = 5;
```

refer? Miller said that, in the example as shown, it refers to the declaration identified by the comment // 1. If you remove that declaration, then it refers to the declaration with the comment // 2, and so on.

Miller said that despite this basic agreement, there are many open issues:

1. scope of name in a friend declaration. If you have a friend declaration, into which scope is the name inserted?

2. resolution of names in inline friend function definitions. This was unspecified before the ARM was published. Existing implementations resolved names as if the function appeared lexically outside the class. The ARM says such a function is in the lexical scope of the class in which it appears. The WG is considering banning them.

Ball offered to a write paper proposing to make inline friend function definitions obsolescent.

3. resolution of names in friend declarations. Miller gave this example:

    ```
    typedef int T;
    class X {
        typedef float T;
        friend T f(T);
    };
    ```

    Are both *T*'s in the declaration of *f* the same, and which *T* are they? The ARM says they're both the inner *T*.

4. inline definition of friend member declaration. See the later discussion.

5. out-of-scope definition of nested classes. Miller gave this example:

    ```
    class X {
        class Y;
        ....
    };
    class X::Y { ... };
    ```

    If these are allowed, how do we restrict them so they don't happen in strange places such as:

```
class X {
    static int i;
    class Y;
    ...
    };
void f() {
    static int i;
    class X::Y { f() { i = 5; } };
    }
```

In this example, to which *i* does *X::Y::f* refer?

6. operator name hiding. If a base class defines binary & and the derived class defines unary &, does the unary & hide the uses of the binary &?

7. multi-scope operator overload resolution. For example, in

```
struct B { };
struct D : B { } ;
struct X {
    X operator +(B &);
    };
X operator +(X &, D &);
void f() {
    X x;
    D d;
    x = x + d;
    }
```

which *operator+* is called on the last line?

8. resolution of operators for nested classes. For example, given

```
class X {
    operator new();
    class Y { ... };
    };
```

can you use *X::new* to allocate a *Y*?

Miller said there were 60 unresolved Core Language issues on his list. Koenig said the WG will defer all other issues until the name lookup issues are resolved.

O'Riordan offered to write paper(s) on items 6, 7, and 8, above.

Several members agreed with Koenig's insistence on doing the naming issues before doing anything else.

Miller withdrew his earlier proposal on name resolution (91-0058), and suggested that Armstrong will probably want to revise his proposal (91-0057).

Insinga asked how much of the naming problem is caused by the addition
of nested classes to C++. Tiemann said the problem was there already.
Nested classes were added to correct a deficiency in the language, and
in turn made the name lookup problems much more apparent. Koenig added
that nested classes cleaned things up so that the name lookup problem
shined through.

Koenig returned to Miller's first example:

```
struct X {
    static int i; // 3
    struct Y {
        int i; // 2
        void f();
        };
    };
int i; // 4
void X::Y::f() {
    int i; // 1
    i = 5;
    }
```

He said the proposed rule applies to member functions that are textually
removed from the class (out-of-line member functions). Miller said that
the initialization of static members follows the same name lookup rules.

Tiemann asked what happens if you hide 1 and 2 and remove *static* from 3?
Koenig said the translator finds 3, but it's a semantic error.

Schwarz said that hiding 1 and 2 is one of those cases where he
previously argued it should be an error because it's unclear what the
programmer intends. He changed his mind, and now supported the
proposal.

Straw vote: How many people would like to incorporate these lookup rules
as presented? lots yes, 1 no, 1 abstain.

Miller referred to item 4 on his list of open issues. He gave this
example:

```
class X {
    void f();
    };
class Y {
    friend void X::f() { ... }
    };
```

He asked if anyone thinks there's any merit to allowing this? C++ does
not currently prohibit it.

Ball said that if we could throw out confusing constructs without losing
utility, it would be good. Koenig explained the name lookup problems
this example introduces. Shopiro said he'd be willing to disallow all
inline friends if that solves the problems facing the Core Language WG.

Miller showed another example:

```
class X {
    static int i; // 1
    class Y {
        void f();
        };
    };
class Z {
    static int i; // 2
    friend void X::Y::f() {
        i = 5;
        }
    };
```

Miller said it's not at all clear as to which one should be found.

Straw vote: Who thinks this feature should be in the language? 1 yes.
Straw vote: Who thinks this should be illegal? lots yes, 1 no.

--- Libraries ---

Schwarz listed topics which the Libraries WG worked on during this
meeting:
-- strings
-- conformance preamble
-- standard exceptions

The WG discussed strings, particularly problems with internationaliza-
tion. They considered a class (tentatively called) *Text* that can hold
either chars or widechars and whose representation mutates at run-time.
Text is an alternative to separate *string* and *wstring* classes. Schwarz
presented this short table of relative merits:

Text	vs.	string/wstring
+	flexibility	-
-	efficiency	+
-	richness of operations	+
-	existing practice	+

Ball said a string class might be useful as a template, irrespective of
chars and widechars. Insinga said the WG proposed that two meetings
ago, but people complained that we had insufficient experience with
templates.

Plum said that *Text* strings (whose type changes at run-time) is
Smalltalk-like. He suggested a type *Text* that is either *string* or
wstring, and can be chosen by the programmer at compile time to be
appropriate for the current locale. Tiemann said *typedefs* inside #ifs
solve Plum's problem.

Insinga will produce a new write-up on strings for the next meeting.

Schwarz explained the Libraries WG's current position on reserved
identifiers:
1. Every *extern* name in the C library is reserved with *extern "C"*
   linkage, and is also reserved as an *extern* with its 'actual'
   signature.
2. All class names are reserved (even if the header declaring that name
   is not included).
3. All signatures of *extern* functions in the C++ library are reserved.
   (Not many of these are expected.)

The WG also proposed that a conforming implementation may
1. add members to library classes, with that constraint that added
   private virtuals must be in the implementors' name space, and
2. derive library classes from other classes and/or implement library
   classes as instances of templates.

Koenig illustrated a problem with (1) immediately above. Given a
library class

```
class X {
    int foo(double);
    ...
};
```

consider what happens if an implementation extends *X* as

```
class X {
    int foo(double);
    int foo(int);
    ...
};
```

Without this extension, calls to *X::foo* with an *int* argument invoke
X::foo(double). With the extension, they invoke *X::foo(int)*.

Jackson cited another problem with allowing implementors to add members
to library classes. If the new member names are not in the imple-
mentor's name space, they could conflict with user-defined macro names.

Bruck asked what will happen if we add a module facility. Schwarz said
we'd consider putting the library stuff in a module with a name like
Standard, but this is not an issue until we have such a facility.

Schwarz listed the "open" conformance issues:
1. Can a standard header include another standard header? Schwarz said
   that C prohibits this, probably to keep the name space down. In C++
   this is not as much of a problem.
2. May an implementation make something virtual?
3. Can inheritance be virtualized?
4. Are *#defines* for functions allowed (in C headers)? Schwarz said no
   C++ function will be a macro, but the C standard allows some library
   functions to be macros. Will C++ allow some functions to be macros?

With respect to (2), O'Riordan said that if the standard doesn't dictate which members are virtual, then users can't write portable programs that derive from standard classes. Schwarz replied that, in effect, we would be saying that a strictly conforming program cannot derive from these classes, and we should make an explicit decision about that.

Schwarz discussed the use of standard exceptions. He suggested that we find the places in the reference manual where the language does "funny" things, and change it to say the program will throw a standard exception. Most code using new doesn't check for a return of zero, so the Libraries WG suggests that the default *new* handler throw a standard exception.

Charney said he was reluctant to put standard exceptions into the library because exceptions won't be available to most users for some time. Several members disagreed, saying they are or will be available soon.

Straw vote: Who favors that the default *new* handler throw a standard exception? 17 yes, 4 no, 1 abstain.

The Libraries WG will prepare new documents for the next meeting on strings (Insinga), iostreams (Schwarz), conformance (O'Konski), standard exceptions (Schwarz), C compatibility (Clamage), and vendor libraries (Allison).

Lenkov closed the committee of the whole.

The committee recessed at 5:08 pm Thursday and reconvened at 9:15 am Friday.

Lenkov opened the committee of the whole.

12   International Concerns WG

Carter presented the WG's report:
-- WG21 resolutions are listed in 91-0087.
-- a "joint session" means that WG21 and X3J16 are in session in the same room at the same time
-- WG21 chair = X3J16 chair = Dmitry Lenkov
-- the chair can specify:
    1. negotiated straw poll voting rules
        a. one vote per WG21 technical expert
        b. one vote per X3J16 primary representative in good standing (meets attendance and dues requirements)
        c. no one may vote more than once
    2. X3J16 formal voting rules - WG21 technical experts without X3J16 standing observe but do not vote
    3. WG21 voting rules - X3J16 technical experts without WG21 standing observe but do not vote

Miller observed that nothing prevents WG21 from having separate meetings. Carter agreed. WG21 will have a separate meeting on Sunday before each joint meeting. Carter asked future hosts to be sure meeting facilities have another small room available for separate WG21 meetings.

Carter continued with his summary:
-- mailings are to the union of X3J16 and WG21 memberships
-- documents are numbered both as WG21 and X3J16 documents
-- there will be a single ISO document edited by Shopiro
-- differing outcomes between X3J16 and WG21 formal votes must be
   negotiated (considered an infrequent occurrence)
-- X3J16 and WG21 formal votes will be synchronized at the beginning
   and end of meeting weeks (at least)
-- WG21 members will be added to X3J16 e-mail reflectors
-- WG21 technical issues will be discussed at joint WG21 and X3J16
   meetings

Carter proposed dissolving X3J16's International Concerns WG because:
1. its has fulfilled its goals
2. its members are involved with WG21
3. its members can't be in two places at one time
4. liaison reports (previously presented as part of the International
   Concerns WG report) should be presented in joint sessions

Carter suggested that all members of the US TAG be authorized to serve
on the US delegation, understanding that only a small number will serve
at any one time (91-0074). He suggested that a delegation size of three
or four is the right size, with a turnover of one or two people every
six months.

Carter presented the proposed joint meeting schedule for X3J16 and WG21
for the next year:
    Nov 11-15, 1991 in Dallas, TX USA, hosted by TI
    Mar 9-13, 1992 in London, UK, hosted by BSI and Zortech
    Jul 13-17, 1992 in Toronto, Canada, hosted by IBM
WG21 will convene the day before each joint meeting in a separate
session.

Carter also presented future meeting needs:

Date	Potential Hosts	Location
Nov 92	Bellcore, NIST, OSF	East US
Mar 93	Apple, US West	West or Central US
Jul 93	Fujitsu, ITJSC or Rank Xerox, AFNOR	Japan or Europe
Nov 93	US West, Apple	Central or West US
Mar 94	Sun, Tektronix, NCR Mentor Graphics	West US
Jul 94	SCO Canada, Watcom, CSA, Siemens, Nixdorf	Outside US
Nov 94	CDC, Unisys, Bellcore NIST, OSF, HP	East or Central US

Lenkov closed the committee of the whole:

Motion by Insinga/Bruck:

"Move that we endorse the WG21 resolutions (91-0087)."

Motion passed: 22 yes, 0 no, 0 abstain.

Motion by Insinga/O'Riordan:

"Move that we untable the motion to convert to a type I project and direct the chair to issue a letter ballot."

Motion passed: 21 yes, 0 no, 1 abstain.

Motion by Shopiro/Allison:

"Move that we dissolve the International Concerns WG with our thanks to the members."

Motion passed: 21 yes, 0 no, 2 abstain.

Motion by Carter/Charney:

"Move that X3J16 schedule its next three meeting dates as follows:
1. Nov 11-15, 1991 in Dallas, TX USA, hosted by TI
2. Mar 9-13, 1992 in London, UK, hosted by BSI and Zortech
3. Jul 13-17, 1992 in Toronto, Canada, hosted by IBM

Motion passed: 23 yes, 0 no, 0 abstain.

Lenkov opened the committee of the whole.

13   Items postponed at the March meeting

13.1   Report on the Workshop on Objects on Data Management - Dmitry Lenkov

Lenkov presented his report on the Workshop on Objects on Data Management sponsored by X3 (91-0015).

13.2   Object reference model and liaisons - discussion, recommendations, decisions

Lenkov asked if anyone is interested in participating in the development of a reference model for object systems. O'Riordan said that Vilot (who was not present) has expressed interest in participating this sort of thing. Polisetty also expressed interest.

Goldstein advocated boycotting such meetings. Tiemann agreed, adding that this sort of investigation belongs in academia.

Some members spoke in favor of supporting the development of C++ bindings for various other standards efforts. After a little more discussion, Lenkov concluded that the committee did not want a formal liaison, but individuals should feel free to participate and report back to us.

Lenkov also said he expects to receive a request for coordinating liaison from the SQL standard committee.

13.3   Request for coordinating liaisons from X3T2

Lenkov explained that X3T2 is forming a standard for language-independent data types. They are also working on standard arithmetic and standard calling sequences. He asked if we need any presence on these committees.

Carter noted that Simonsen is participating in WG11 which is the ISO counterpart of X3T2, and thought that would be sufficient participation for us.

14   New business

14.1   Format of document list

Miller reported that he has received feedback that the document list (9x-0000) would be more useful if it contained more information. He proposed that the list contain the following fields:
-- X3J16 Number
-- SC22/WG21 Number
-- Document Date (supplied by author)
-- Distribution Date (supplied by Miller)
-- Title
-- Author (plus reply to "via")
-- Previous Version (blank for new documents)
-- Working Group(s) (who it's assigned to)
-- Response
-- Status (Active (Date), Tabled (Date), Revised Document #, Accepted
    (Date), Amended (Date), Rejected (Date), Informational)
-- Keywords

The committee approved. Miller said a document register will be available via an *x3j16-ping* daemon, and on disk like the minutes. It will be sorted by various fields.

Miller also presented new guidelines for obtaining document numbers. He said the rule of thumb is: if you can give a specific date for a document, ask for a number. If he (Miller) is unavailable, send the document to him unnumbered, with a notification that it needs a number.

The committee discussed the possibility of getting documents electronically. Swan offered to attempt to obtain copies of documents in flat file form from the authors in response to requests. That is, committee members who would like an electronic copy of a document should contact Swan. He will try to contact the author to obtain an electronic copy for distribution.

14.2 E-mail issues

Koenig asked what he should do about e-mail that bounces. After a brief discussion, he arrived at this policy: if a particular e-mail address bounces messages for a week, take the address off the list, and send a letter to the postal address of record that the e-mail address has been taken off line. Then the user must negotiate with the ping daemon.

Insinga asked Koenig to include e-mail error messages with the notice.

15   General Session (continued)

--- Environments ---

Wilkinson discussed the initialization order of static objects (91-0053). The discussion focused on initialization by constructor or initializer, not default initialization by zero. Wilkinson demonstrated a problem with the current rules for static initialization in 3.4p5 of the Working Paper (91-0059). He said that according to the current rules, given

```
int x = f(); // first use of f
```

x must be initialized before it's initialized.

Wilkinson suggested these new rules:

Nonlocal static objects defined in a translation unit must be initialized in the order that the definitions appear in the translation unit.

The nonlocal static objects defined in a translation unit must be initialized before any object or function defined in that unit is used by any other translation unit; the nonlocal objects defined in the translation unit containing main() must be initialized before control enters main().

Shopiro observed some initializations are traditionally done at load time, some are done at the beginning of run-time, and for others it's not clear when they're done. For example,

```
int i = f();
```

is always done at run-time, and

```
int j;  // default initialization to 0
```

is always done at load time. However, for

```
int k = 3 + 5;  // or some other constant expression
```

it's unclear. It's essential to resolve the unclear cases. The ARM is imprecise.

Plum noted that, if the host and target arithmetic are different, it's preferable to have *float* objects initialized at run-time. C decided not to add a run-time "initialization-hook" just for this one special case, but C++ already requires this capability. Plum said he'd like to see *floats* initialized using run-time arithmetic.

Gibbons thought Wilkinson's proposed rules might break conforming C programs. He will try to send Wilkinson an example via e-mail on how a conforming C program might fail under the proposed rules.

Wilkinson suggested another implementation technique which involves putting all translation units, except the main one, into a dynamic shared library.

Koenig noted that this technique requires a check at every reference to an object in another translation unit to see if it's been initialized. Wilkinson agreed, but said it was no worse than if you already have a dynamic shared library.

Ball said some of the checks can be optimized away, but Wilkinson is assuming the hardware can do the remaining checks for little cost. Schwarz said the cost of implementing this technique varies widely across systems, but there's some cost on every system.

Wilkinson presented Schwarz's example showing this initialization rule sometimes produced unintuitive results:

```
// main.c
T t1;
extern int f(int);
int count = 0;
T::T() { count = f(count); }
main () { ... }

// f.c
T t2;
int f(int x) { return x + 1; }
```

Schwarz said the value of *count* should be two upon entering *main*, but it turns out to be one. The problem is that the call to *f* goes off and does "funny things" before it executes *f*. More specifically, the call to *f* in the constructor for *t1* binds the actual argument (*count*, with value zero) to the formal argument, but then goes off and constructs *t2* before executing the body of *f*.

Wilkinson also said the group has not decided what constitutes the use of something. Is taking the address of something a use? Wilkinson presented Goldstein's example involving circular references:

```
// a.h
struct A {
    A *ap;
};
```

```
// file1.c
extern A m;
A n = { &m; }

// file2.c:
extern A n;
A m = { &n; }
```

Lenkov asked people to get involved in this discussion on e-mail.
Lenkov said he will, and asked Goldstein, Ball, Schwarz and Gibbons to
also participate. Wilkinson will summarize some of the preceding
discussion in opening the e-mail discussion.

Wilkinson also invited members to send their opinions on translation
limits via e-mail.

--- C Compatibility ---

Plum reported that the WG has two action items:
1. Plum will meet with Shopiro to produce a list of definitions, with a
   note for each term as to whether it was included in the draft, or
   why it wasn't. The meeting is planned during week of July 15.
2. The WG will continue to the produce list of differences between C++
   and C.

--- Formal Syntax ---

Charney listed proposals to be presented for vote at the next meeting:
-- reconcile some grammar rules that aren't connected with the syntax
-- propose additional non-terminal name changes (91-0082)
-- rename "expression" to "comma-expression" (91-0085)

Stroustrup said that the changes made at the last meeting were made
without sufficient principles, and so he predicted at the meeting that
we would be presented with more random name changes. He observed that
the new names hadn't even been checked with the names in the C grammar.
At that meeting, he promised to propose reverting to the original names
when further random name changes were proposed.

Shopiro said he'd be glad to change back to the original terms on a
moment's notice. Koenig appealed to the Syntax group to not give us
incremental changes. Stroustrup said he wasn't claiming the original
terms were the best possible, only that the rationale for the last set
of changes is incomplete. We need a strong reason to change from the
ARM.

16   Review of the meeting

16.1 Review of decisions made and documents approved

      See Appendix B.

16.2 Review of action items

The action items are covered in the working group plans discussed under items 11 and 15.

17 Schedule of mailings and volunteers to help

Miller reported that Johnson (who handled the last mailing) said that mailing cost $2300 in duplicating costs alone. X3 rules say that observers don't have to get all the mailings. Miller asked the committee to consider restricting the mailings to reduce costs. He noted, however, that observers have been led to believe that if they pay their service fee, they'll get all the mailings.

Plum urged the committee to continue asking for volunteers to handle the mailings.

Lenkov summarized the results of Tuesday's discussion on mailings:
1. Each organization will receive one copy of the mailing, and must make copies for all alternates and observers in that organization. (Observer organizations will also get one copy.)
2. Carter will handle the WG21 mailings. Neil Martin of BSI will handle X3J16 and WG21 mailings in Europe, and Nobuo Saito of Keio University will handle the mailings in Far East.
3. We only need volunteers to handle all other mailings.

Lajoie (IBM) offered to handle the mailing after this meeting. Documents to be included in the mailing must be delivered to Miller within two weeks of the close of this meeting (July 5).

Carter (Bellcore) volunteered to mail documents before the next meeting. Documents to be included in that mailing should be received by Miller by September 20.

The following members responded to Lenkov's call for volunteers to handle future mailings:
-- post Nov '91 meeting: Gibbons (Apple)
-- pre Mar '92 meeting: Landauer (Sun)
-- post Mar '92 meeting: Druker (Zortech)
-- pre Jul '92 meeting: Koenig (AT&T)
Lenkov appealed for more volunteers for the future.

Lenkov asked for a volunteer to be liaison to X3J11. Schwarz volunteered. Plum is already liaison from X3J11.

Schwarz said we need a liaison to NCEG (Numerical C Extensions Group). Swan volunteered.

18   Plans for the future

18.0   Format of meetings

Charney suggested that future meetings take place in the morning and
evening, leaving the afternoon free. Carter supported this for one day
a week. Jackson was reluctant to meet in the evening, because he
thought every decision X3J11 made in the evening was wrong.

Koenig asked for more time to meet in small groups at a blackboard.

Saks suggested the agenda should be based on the estimated duration of
the meeting, not the exact meeting time. He said we can change the
exact meeting times during the week of the meeting. He also said
there's no need for three representatives from one organization to be in
plenary session. The alternates should trust their principal and skip
out to smaller groups. We may get more done that way.

Straw vote: Who favors evening meetings: 2 yes, lots no.

Straw vote: Who wants to schedule more time for working group meetings
and informal sessions? lots yes, 0 no.

18.1   Agenda items for the next meeting

None.

20.3   Technical sessions for the next meeting

Koenig offered to hold a two-hour session on templates. Insinga offered
to hold a session on strings on Monday night of the next meeting.

18.3   Confirming hosts for the next three meetings

Done.

18.4   Call for hosts for meetings in 1992

Done.

·19   Adjournment

The committee thanked the Dag Bruck and the Lund Institute of Technology
for hosting the meeting.

Motion by Ball/Miller:

"Move we adjourn."

Motion passed without objection.

The committee adjourned at 3:42 pm.

Appendix A - Attendance

Name	Affiliation	Status	M	Tu	W	Th	F
Pieb, Wolfgang	Amdahl	P	V	V	V	V	
Gibbons, Bill	Apple Computer	P	V	V	V	V	V
Koenig, Andrew	AT&T	S	A	A	A	A	A
Shopiro, Jonathan	AT&T	P	V	V	V	V	V
Stroustrup, Bjarne	AT&T	A	A	A	A	A	A
Carter, Steve	Bellcore	P	V	V	V	V	V
Swan, Randall	C-Team	P	V	V	V	V	V
Comeau, Greg	Comeau Computing	P	V	V	V	V	V
Tiemann, Michael	Cygnus Support	P	V	V	V	V	V
Simonsen, Keld	Danish Standards	O		A	A		
Insinga, Aron	DEC	P	V	V	V	V	V
Allison, Chuck	DECUS	P	V	V	V	V	V
Yamaryo, Masakazu	Fujitsu	P	A	A	A	A	A
Miller, William M.	Glockenspiel	P	V	V	V	V	V
Holman, Richard	Hewlett-Packard	A	V	V	V	V	V
Lenkov, Dmitry	Hewlett-Packard	P	A	A	A	A	A
O'Konski, Tim	Hewlett-Packard	O	A	A	A	A	A
Lajoie, Josee	IBM	A	V	V	V	V	V
Saito, Nobuo	Keio University	O		A	A		
Polisetty, Gotham	KnowledgeWare	P	V	V	V	V	V
Munch, Max	Lex Hack & Associates	O		A	A		A
Schwarz, Jerry	Lucid	P	V	V	V	V	V
Bruck, Dag	Lund Inst. of Tech.	P	V	V	V	V	V
O'Riordan, Martin	Microsoft	P	V	V	V	V	V
Rowe, Keith	Microsoft	O	A		A	A	
Chang, Lily	Microtec Research	P	V	V	V		V
Johnson, Andy	OSF	P	V	V	V	V	
Plum, Thomas	Plum Hall	P	V	V	V	V	V
Charney, Reg	Program Conversions	P	V	V	V	V	V
Gautron, Philippe	Rank Xerox	P	V	V	V	V	V
Saks, Dan	Saks & Associates	P	V	V	V	V	V
Jackson, Paul	SCO Canada	A	V	V	V	V	V
Meyer, Walter	Siemens AG	O		A	A	A	
Wilkinson, John	Silicon Graphics	P	V	V	V	V	V
Goldstein, Ted	Sun Microsystems	A	A	A	A	A	A
Landauer, Doug	Sun Microsystems	P	V	V	V	V	V
Sloane, Alan	Sun Microsystems	A	A	A	A	A	
Ball, Mike	TauMetric	P	V	V	V	V	V
Waggoner, Susan	US West	P	V	V	V		
Druker, Samuel	Zortech	P	V	V	V	V	V
Total Attendance			36	38	39	35	31
Total Voting Members			28	28	28	26	25

Status: P = Principal, A = Alternate, S = Second Alternate, O = Observer

For each day: V = Voting, A = Attending

Appendix B - Motions Passed

1. Motion by Schwarz/Miller: "Move that we approve the minutes from the previous meeting." Motion passed: lots yes, 0 no, 0 abstain.

2. Motion by Saks/Ball: "Move that we accept the proposed agenda with these additions." Motion passed: lots yes, 0 no, 0 abstain.

3. Motion by Plum/Carter: "Move that straw votes will include X3J16 voting members (one vote per organization) and WG21 voting members (one vote per technical expert)." Motion passed: 27 yes, 0 no, 1 abstain

4. Motion by Allison/Bruck: "Move that we add these names and digraphs to C++ as alternate spellings for their corresponding tokens:"

Existing	Alternate
{	<%
}	%>
[	<:
]	:>
#	%%
&	bitand
&&	and
|	bitor
||	or
^	xor
~	compl
&=	and_eq
|=	or_eq
^=	xor_eq
!	not
!=	not_eq

   Motion passed: 24 yes, 2 no.

5. Motion by Miller/Gibbons: "Move that we ask WG14 to consider replacing *not_eq* with <>." Motion passed: 22 yes, 2 no.

6. Motion by Miller/Gibbons: "Move that we ask WG14 to reserve the keywords as C library names." Motion passed: 14 yes, 10 no.

7. Motion by Bruck/Insinga: "Move that we add a header *iso646.h* to the C++ library." Motion passed: 16 yes, 5 no.

8. Motion by Miller/Druker: "Move we approve the current Working Paper (91-0059)." Motion passed: lots yes, 0 no.

9. Motion by Insinga/Bruck: "Move that we endorse the WG21 resolutions (91-0087)." Motion passed: 22 yes, 0 no, 0 abstain.

10. Motion by Insinga/O'Riordan: "Move that we untable the motion to convert to a type I project and direct the chair to issue a letter ballot." Motion passed: 21 yes, 0 no, 1 abstain.

11. Motion by Shopiro/Allison: "Move that we dissolve International Concerns WG with our thanks to the members." Motion passed: 21 yes, 0 no, 2 abstain.

12. Motion by Carter/Charney: "Move that X3J16 schedule its next three meeting dates as follows:
    1. Nov 11-15, 1991 in Dallas, TX USA, hosted by TI
    2. Mar 9-13, 1992 in London, UK, hosted by BSI and Zortech
    3. Jul 13-17, 1992 in Toronto, Canada, hosted by IBM
    Motion passed: 23 yes, 0 no, 0 abstain.