Chapter 6: The High Politics of 1996

"Politics is not an exact science."—Otto von Bismarck (1863)

"Politics is not a science…but an art."—Otto von Bismarck (1884)

6.1 Meeting Rogerson

While Mechler's SEEPP/E was writing Version 1 of the code of ethics, SEEPP's other activities continued. Occasionally, they intersected with SEEPP/E's; more often they did not. Their story reveals both the importance of what Mechler accomplished and some of the political problems that accomplishment bypassed or produced. SEEPP's activities in 1996 also help to explain why Melford resigned as co-chair at the end of the year, why Gotterbarn became the sole chair of a reorganized SEEPP, and why—the next year—the new SEEPP produced Version 2, 3, and 4 of the code.

On January 27, 1996, Gotterbarn received an email from Steve Barber whose help he had asked in recovering "the changes we made [in the SEEPP Task Force 'Guide to Operations'] at the 3/95 meeting in D.C." The computer that the "recording secretary" (Miller) had used to record the minutes had later failed, causing the minutes to be lost.[1] Barber had applied a UNIX "diff program" to compare the February 1994 draft of the Guide with the document Gotterbarn emailed on February 22, 1995.[2] Apparently, Gotterbarn still thought the Guide important enough to deserve this attention.

The first two days of February, 1996, Gotterbarn was in London for PASE '96. ("PASE" stands for "Professional Awareness in Software Engineering".) The conference, though a one-time affair, was a sign that understanding software engineering as a profession was not a mere American eccentricity. It was Gotterbarn's attendance at this conference that provoked Jayaram's angry email. But, more important now, it was at this conference that Gotterbarn met Simon Rogerson (who was there to give a paper).

Rogerson received a BSc (Bachelor of Science) in computer science from Scotland's University of Dundee in 1972. He worked in industry for twelve years, at various levels, on scientific and commercial management systems. He was Computer Services Manager for Thorn EMI when it announced a move to a part of England in which he did not want to live. He decided to change careers. Because the government was then (1983) trying to bring instructors with industrial experience into technical universities, Rogerson soon found a lectureship—at Leicester Polytechnic, an hour train ride north of London. The Polytechnic became De Montfort University a few years later (as part of a general enhancement of technical education in England). There Rogerson remained, adding application-oriented courses and maintaining links to industry by consulting. His industrial experience led him to see "social responsibility" as a necessary feature of doing software the right way. In 1995, he helped to found De Montfort's Centre for Computing and Social Responsibility (CCSR) and became its first director. Rogerson did not consider himself an engineer, not even a software engineer:

> In the UK, the standard job titles are "applications programmer", "systems analyst", and "information systems programmers". Computer scientists are interested in the science of

> computing rather than the application. In the UK, software engineers are interested in building robust systems according to engineering principles. They are more technically oriented than I am. (I think the same is true in the rest of Northern Europe, though perhaps not in France.) If I had grown up in the US, I might answer differently. I'm an applications person—and, in the US, someone who works on applications is a software engineer even if he is, as I am, more interested in the way people and programs react than in the technical qualities of the applications.[3]

By 1996, Rogerson was not only CCSR's Director; he was also (officially) a member of several SEEPP working groups, including Gotterbarn's own. Not having heard much about SEEPP since he sent in his application on October 19, 1994, he asked Gotterbarn what was happening. From what Gotterbarn said in response, and from what Gotterbarn said in his two public talks, Rogerson concluded that "both Don and I were grappling with problems of creating the proper culture for good programming". He therefore invited Gotterbarn to spend a semester as a guest of CCSR. Gotterbarn, then planning a sabbatical for the academic year 1996-97, accepted.[4]

6.2 Try, try again

A few days after PASE (February 16, 1996) and in another city (Philadelphia), SEEPP—or, to be more exact, Gotterbarn, Melford, Barber, and Miller—met from 8 AM till noon during the ACM-sponsored Computer Science Conference. All the SEEPP members present knew that SEEPP had missed its deadline. To this bad news, Gotterbarn added more. He had talked to Frailey, the Joint Steering Committee's vice chair. According to Frailey, ACM was increasingly unhappy with the whole joint project. The other two task forces had also missed the November deadline. The whole three-footed project seemed much larger, indefinite, and difficult than ACM had anticipated. Unless the task forces made significant progress soon, ACM might desert. How the IEEE-CS would respond to ACM's desertion was anyone's guess, but it was certainly possible that IEEE-CS would do as ACM had. Frailey advised developing a "detailed schedule", realistic but strict, to help get the task force working again. He wanted something he could show the ACM Council when someone complained that nothing was happening.[5] Gotterbarn also "distributed a paper [he] had written comparing the work of several professional societies."[6]

By noon, Gotterbarn had a rough draft of a schedule. After polishing it, he sent the draft to Miller for comment (February 21). On the same day, he wrote a letter to "Messrs. Cabrera and Frailey" describing the accomplishments of the Philadelphia meeting and requesting money for two conference calls, for a meeting in the fall (at Brookings in DC), and for hiring a "single skilled writer", or "scribe", to assemble the documents the working groups developed into a "single document". Miller would be the scribe: "He is a practicing software engineer who has had contacts with NASA and published widely on software testing. He is a university professor teaching computer science and working in the area of computer ethics." Gotterbarn describes the document Miller would produce as "standards of practice, standards of conduct, and standards of ethics". Gotterbarn also described what would happen once the document was drafted. There would be a review process involving "one or two people from each of the societies' boards". After revisions, "we would like to follow a process that was helpful in developing the ACM

Code of ETHICS and Guidelines for Professional Conduct...we would like to submit the document to the membership for review and comment by publishing it in the Communications of the ACM and in IEEE Computer." Gotterbarn explained the need for a funded face-to-face meeting in the fall by noting the absence of any conference that all would normally attend and adding: "E-mail, unfortunately, is a very sterile medium for the creative exchange of ideas. (It is also very easy to procrastinate if E-mail is the only means of communication.)"[7] The Steering Committee did not approve the budget request.

On March 3, 1996, Gotterbarn emailed the revised schedule to "SEEPP work group leaders" (and to Little and me) "for comment"—using an SEI listserv (se-ethics@sei.cmu.edu). The introductory paragraph declares:

> Below is an expansion of the detailed schedule which we developed at our meeting in Philadelphia. At the meeting, I indicated that I would like to micro-manage the project for awhile, so please send me copies of the items marked with an asterisk. I am sorry for the short turn around this week, but I am leaving the country for a week on the 9th of March, and I do not want to delay things because of my travel. We have the plan and once we start to follow it, interest in and support for the project will start to increase. Best regards, don.

The first three items provide a good sample of the whole schedule:

> *March 1:
>
> Send a "hello message" to your working group; let them know that we are about to start and thank them for their continued interest in this project.
>
> *March 4-6:
>
> Develop material specifically for your work group which:
>
> 1. contains a statement of purpose for our task force (distributed to you on disk at meeting) & a straw man copy of the purpose of your working group. Invite comment from them on this.
>
> SEEPP Purpose:
> Software engineers make value-laden decisions that affect health, safety, welfare and environment. Standards and principles of ethical and professional practices will guide software engineers making these decisions
>
> SEEPP Scope:
>
> Standards, guidelines and recommended practices of ethical and professional practices for software engineering
>
> 2. Explain the difference between standards of ethics, standards of conduct, and standards of practice. Request their input about issues in your working group's domain which fit any or all of these types of standards. They need

not worry about which category to put them in. We will take care of that. See 3 below.

For example:
Most professions distinguish between standards of ethics, conduct and practice. These standards include a range of statements. Standards of ethics are generally broad and aspirational and do not prescribe specific behaviors—prevent harm. Standards of conduct are more specific and standards of practice are regulative—do not release a product which has not been adequately tested. Violating this later type of standard is generally a foundation for legal action. These three types of standards exist for people as members of a profession, employees, and as individuals. We are looking for a range of statements and examples of these types of standards as they apply to professional competence. (my working group). Please send any examples of these you can think of. They can be one line statements or paragraphs. We are trying to brainstorm the standards on email. I will organize your contributions and circulate the organized list to all of you for further comment.[8]

March 8

Don will put his two cents in to coordinate all these materials that you have sent and share other's insights among work group leaders. If you do not hear from him by the 8th, he probably has nothing to say. Proceed to March 15th task.

The schedule ends thirteen items (and seven months) later with, "Oct. 15 [1996]: Latest revision from scribe to Don and Bob. Begin discussion of materials with joint committee."

This email may leave one of two impressions. The first is that it is just another of Gotterbarn's schedules, indeed, one with fewer prospects of realization than the others because the first of the deadlines, March 1 ("hello message"), was two days passed by the time the email went out. Was the schedule merely a device to buy SEEPP a little time? Time for what? The message does nothing to clear up the relation between what Mechler was doing and what the other working groups might do. Indeed, it says nothing about Mechler's group (and Mechler was not to receive a copy). Gotterbarn shows no intention of adding Mechler's SEEPP/E to the list of working groups. Yet, given what Mechler's group was doing, it did not fit neatly into Gotterbarn's Professional Competence working group (or into any other); SEEPP/E's work cut across the domains of the other working groups. The plan for eight working groups that Gotterbarn had announced as "written in jello" had (it seems) long since hardened into concrete.

The second impression this email may leave is that Gotterbarn had learned something from Mechler, though not enough. While Gotterbarn is still trying to get the working groups to develop purpose and scope statements first, he has also begun to think of the process to follow the preparation of those statements as less formal (much less formal) than he had earlier. He is now advising his group leaders to collect standards from the group, to "brainstorm", not worrying much about what kind of standards they are coming up with or even how rough. He is also trying to set an endpoint to the seemingly interminable working-group process, a date on which everything (whatever there is) would be handed over to a "scribe".[9]

As it turned out, these details did not matter. Only Miller seems to have taken even the first step the email called for. On March 3, two days behind schedule but on the day he received

Gotterbarn's email, he wrote his working group a "hello message" (one indicating, in passing, that his working group had been entirely inactive until then):

> Thank you for your interest in ACM and IEEE effort to professionalize software engineering.
>
> Ages ago (we're talking YEARS, not months) you expressed some interesting working on the Software Engineering Ethics and Professional Practices (SEEPP) Task Force, specifically the Working Group on Reliability and Safety.
>
> You may have thought this working group would never get down to work. (I certainly had MY doubts.) But it looks like we may have a plan now.
>
> Before I waste bandwidth telling you about our plans, are you still willing to work with us. I hope so. Please let me know.

On March 8, Weil emailed back: "I, Michael Davis, and Ilene Burnstein, all from IIT, are still very much aboard. Please make sure we three *each* get all the e-mail messages in the Working Group on Reliability and Safety. We will join in. I have already sent Gotterbarn a message [in response to the long email of March 3 to Working Group Leaders]. Please convey your plans to us. Best, Vivian." Miller's March 3 email even reached Mechler (who was not in Miller's working group); Jayaram (who was in that group too) had passed it on.[10]

That is the last message that IIT (or Mechler) received from Miller for several months. There is a mystery here. Gotterbarn's archive contains a March 13 email from Miller addressed to "Dear Working Group Members". March 13 is two days *ahead* of Gotterbarn's schedule for this message. Among the designated recipients (beside other working group leaders) are the members of Miller's working group (including Jayaram and "Weil, Burnstein, and CSEP [Davis]"). The email should have gone to everyone on the address list, if it was sent at all (as it seems to have been), yet no one at IIT received it. We know of it only because a copy survives in *Gotterbarn*'s files (in at least three versions).[11] Because this email was not (according to the header) distributed through Gotterbarn's list, none of the usual troubles with that list can explain what happened to it. Could it be a draft that Miller sent Gotterbarn for comment?

Gotterbarn's files contain a similar document addressed to his own working group; it seems to have been sent out two weeks late (if it was sent at all).[12] It should, like Miller's, have gone out on March 15. Mechler, a member of Gotterbarn's working group, should have been a recipient. Yet, on March 18, 1996, when Mechler emailed his volunteers the "final outline", he began: "I have not heard from Don Gotterbarn since his e-mail dated 12/15/95; if any of you have heard please let me know." Jayaram responded the same day that all he knew about "the elusive Don Gotterbarn" was his visit to Jayaram's neighborhood (February 1-2). (This was the email Mechler passed on to SEEPP/E to explain why SEEPP/E members should visit other members when nearby.) Jayaram must also have communicated with Miller after March 3 (since the March 3 email was not addressed to Miller and yet Jayaram reports):

> There is another group chaired by Keith Miller who has contacted me re: Reliability and Safety standards-related work within the Ethics framework. You will not be surprised to

note that he also cc: our beloved Don! I moaned about Don's insular habits these days to Miller in a cynical way. He seems enthusiastic with this reliability and safety work!

I suggest we all produce a single e-mail message to Cabrera about Don' refusal to communicate with us.

I feel that the whole exercise—plethora of workgroups is fast becoming a big joke.

On April 6 (using the ETSU list), Gotterbarn emailed his volunteers the plan that he was supposed to have sent out on March 15. Mechler (and IIT) received it, but Jayaram (and perhaps others) did not.[13] The next day Gotterbarn emailed working group leaders (and Little and me)—using the SEI list:

Howdy,

I hope you are all enjoying Spring! Cold and snow here. Please let me know how you are doing with you[r] work groups. I know the schedule we put together in February is demanding. I have already missed some of the deadlines. But it is important to get started even if we are a little late at doing it. I used to say, I will get to that when things slow down…but they never slow down. At least life is not boring.

Please let me know if there is anything I can do to help with your work with the groups.

Best regards,

Don

Gotterbarn does not seem to have received any response to this email.

On May 15, 1996, Mechler emailed SEEPP\E: "This is the message I received [from Gotterbarn] after e-mailing Felipe Cabrera the new head of the Steer Comm. I will be sending our work soon. Please let me know if you get it." At the end of March, Mechler had decided to do as Jayaram suggested, write something to Cabrera about "Don's refusal to communicate with us". That message does not seem to have survived, nor does Cabrera's response, if there was one. But a few days later (April 8), Gotterbarn emailed Mechler:

Ed,

I am alive and apologetically slow to respond. Thank you for your work on the project. Please send your results to the list. It may serve to bring some other folks into action. I will later work your sub-groups contributions and whatever else we get into a strawman for everyone's consideration.

Again, thanks for the help.

don[14]

Apparently, not much had changed since 1995. The only group, beside Gotterbarn's own (and Mechler's), to show any life in early 1996 was Miller's. But that was in March. Miller does not seem to have communicated with his working group in April, May, or June (or to have reported anything to Gotterbarn). Miller seems to have missed a number of deadlines. For example, like all other group leaders, he was supposed to send a "[revised] draft of…group's [substantive]

document to members of SEEPP task force" on June 15. He did not (or, at least, there is no evidence that did).[15]

6.3 The exceptional Miller

Just because Gotterbarn sent SEEPP no emails from early April to early June, we must not suppose he was inactive. He was certainly continuing to work to make software engineering a profession. For example, he was in St. Louis, June 21-22, 1996, for the National Software Council (NSC) Forum on the Licensing of Software Professionals. Lawrence Bernstein, a member of several SEEPP working groups, a vice-president at AT&T, and also NSC president, summarized what happened by email (August 26, 1996).[16] Gotterbarn was not the only one involved in the joint IEEE-CS/ACM project present. There were at least three others (beside Bernstein himself): Zweben, by then ACM President; Chikofsky (apparently representing IEEE-CS); and Shaw (apparently, like Gotterbarn, there simply as an individual). Norm Gibbs was also there, identified as at Guilford College, North Carolina, but "recently [head] of the software education program of the SEI". Shaw argued against licensing (as she regularly did) because "software engineering is immature compared with civil or chemical engineering". For software engineering to mature, it would have to consolidate and validate its "body of knowledge". She "asked whether software engineering was closer to mathematics than engineering." She also "discussed standards" calling for "codification of our body of software engineering knowledge". Gotterbarn responded that "such a body of knowledge existed". What was lacking was an "accepted ethics of software engineering." He warned that "if the software engineering community does not step [in and] certify and license its professionals, the professional engineering community will." That would not be good because "[today's] state licensing examinations have little relevance to software engineering." Bernstein ended his report with his own recommendation for registering software engineers (rather than licensing them). Among the details of his recommendation is the requirement that registered software engineers "advocate and practice [a] code of software engineering ethics for safe systems". Except for Gotterbarn's, his is the only reference to "ethics" to appear in the report.

According to the (admittedly ambitious) schedule announced in March, Gotterbarn was to receive revised (substantive) documents from the working groups on July 15. July 15 came and went without one document arriving. Even Gotterbarn's own working group on professional competence did not report. Then, on July 16, he received an email from Miller, with a report attached, two-and-half pages single-spaced, on "Testing, Reliability, and Trustworthiness: Informed Consent and the Computing Profession". Miller had done what he was supposed to do—and he had done it almost on time. Perhaps he had even done it on time. There was some confusion. The email referred to a "grievous error" of "yesterday", misspelling the name of Thomas Hilton, a member of the group, "whose work I found so helpful". Yet the document itself contains no references whatever—to Hilton or to anyone else. So, there seems to be no reason why the report (rather than the covering letter) should have had to be revised since "yesterday" (or why its title should be "Revision 2"). Gotterbarn does not seem to have received Miller's email of the day before, nor does anyone in IIT's research group. Perhaps, the retracted email had never been sent (or, perhaps, it went where so much of 1996's email already had).

Miller's document ("Revision 2, July 16, 1996, 11am") seems to be what Gotterbarn would describe as a standard of practice. There are eight unnumbered sections, beginning with an

Introduction of four paragraphs describing a problem of "computer professionals"—determining "how good is good enough"—and a proposal to solve the problem through a procedure of "informed consent". The next section, three sentences long, states the "Guiding Principle":

> A software developer should obtain informed consent from the client. A software user should have available information about the safety and reliability of software. The public should be able to obtain detailed information about the testing and reliability measures of any commercial software.

The section after that ("Definitions") defines five key terms in the Guiding Principle ("software", "software developer", "client", "user", and "public") and sends the reader to the next (five-paragraph) section, "Informed Consent", for the definition of that term. The section defining informed consent is followed by "Implementation of Informed Consent" (a single six-line paragraph) and a (half-page long) section "Contents of an Informed Consent" (divided into three subsections: "I. Product Measurements", "II. Process Description", and "III. Assessment Implementation". The final two sections (each a paragraph long) are "Contract Ramifications" and "Informed Consent Documents as Public Archives". The last quarter page of the document (three short paragraphs) is a commentary entitled "Why I Think This Might Work".

Miller's document is clear, compact, and (seemingly) practical. It shows that Gotterbarn was justified in suggesting him as SEEPP's "scribe". The document is, however, probably not the work of a "working group". Miller speaks as "I", not "we"; and the very quality of the exposition suggests that he has not had to make the compromises that working with a committee generally requires. He mentions no votes or approval (though he sent a copy to every member of his group, as well as to Melford, Gotterbarn, and himself). He seems to have solved the problem of getting his working group to work by doing the work himself (perhaps consulting with Hilton or just reading something he wrote). Miller's solution to the problem of getting the working groups to work, the only one achieved so far, is further evidence that division into working *groups* may have been a mistake (even apart from the assurance problem discussed in 4.8).

Miller's report also suggests a problem with developing standards of practice within a project to make software engineering a profession. The document never speaks of "software engineers" but of "computer professionals" and "software developers". The definition of "software developer" is quite broad: "any professional involved in the production of computer software; this includes but is not limited to designers, coders, testers, managers, and salespeople." The definition of "software" is even broader. Software includes "computer programs, internal documentation, design documents, test plans, user manuals, online help, and the like." "Professional", while not defined, seems to mean nothing more than someone hired to do a certain job, "a role" having "responsibilities and privileges". Put all this together and even a technical writer editing a user manual may count as a "software developer" for the purposes of Miller's document. Though the very broadness of definition is part of what would make the document useful, the document is not, as written, a contribution to the professionalization of software engineering. (Technical writers, for example, belong to a different profession—with its own code of ethics.) Indeed, Miller's document says nothing about software engineering as such. That, perhaps, is why we hear nothing more of Miller's achievement.

6.4 Getting back into the loop

Gotterbarn does not seem to have received or sent any messages to SEEPP, to his own working group, or to Mechler's group during the rest of July, all of August, and (almost all) of September. This is odd because the schedule he sent out in March had the following deadlines:

Aug 15: first draft of complete, coherent document to task force.
Sept 1: revisions from task force to scribe.
Sept 15: Scribe submits revisions to working groups and task force
Oct 1: suggestions back to scribe from working groups and task force.
Oct 15: Latest revision from scribe to Don and Bob.
Begin discussion of materials with joint committee.

As September came to an end, Gotterbarn (now on sabbatical leave at George Washington University) would have had reason to think that (once again) he would have very little to show the Steering Committee when it next met. Miller's document, whatever its merits, was not the document promised, "a code of ethics and professional practices". It was, at best, a modest element of a much larger code of professional practice. The other seven official working groups, including Gotterbarn's own, had reported nothing. Mechler's group had last reported to Gotterbarn in April. What that group had shown him then (Version 0) was not a "coherent document" but a disordered list, neither a code of ethics nor a code of practice. Since then, Mechler seemed to have disappeared. The project seemed doomed.

Then, on September 30, Gotterbarn received Mechler's email announcing "the [attached] final product of the Ethics group". Since Cabrera received the same email (as did Mechler's working group), SEEPP was, in a way, now fifteen days ahead of schedule: "discussion of materials with joint committee" had (it seemed) begun. Cabrera soon sent the code to the rest of the Steering Committee. During the next week, there was that flurry of emails described in 5.6-5.7: Frailey's critique (October 4), Mechler's response (October 6), Shaw's critique (October 7), Mechler's response to Shaw (October 7), and some lesser exchanges between Mechler and Cabrera. Because Frailey had sent a copy of his critique to Gotterbarn when he emailed it to the rest of the Steering Committee, Gotterbarn had seen it on October 4, even before Mechler had. In a few days Gotterbarn had gone from worrying that there would be no code of ethics to worrying about whether the code would be rejected—without ever passing through relief at having something to show. Frailey had seemed to be a strong supporter of SEEPP's work. If he was as unhappy with the code as he sounded, others on the Steering Committee must (it seemed) be unhappier. Something had to be done, and soon, or the code would be dead.

Evidence of that wider unhappiness arrived on October 7, Shaw's critique, which Frailey had himself passed on to Gotterbarn with the covering note: "Don, I think the steering committee would like to hear some response to my comments and Mary's from those who formulated the draft code of ethics."[17] Frailey was right. Indeed, what was needed was a careful response like the paper Gotterbarn had helped with Anderson and Johnson prepare for the ACM Council when the ACM code was in danger. That would take time to prepare, especially if the response was to come from SEEPP (as it should). Right now, Gotterbarn seemed to be in an odd position. He was neither on the Steering Committee's mailing list for discussion of the code nor on SEEPP/E's. He was "out of the loop". He knew what passed between those two groups if, but only if, some

member—Frailey (for the Steering Committee) or Mechler (for SEEPP/E)—sent him a copy of the relevant document. He seemed to have lost control of the process for which he (as chair of the Professional Competence working group) or he and Melford (as SEEPP co-chairs) were responsible.

The next morning (October 8), Gotterbarn announced to his working group a listserv he had been preparing for some time, PRFCMP-L-Request@UTKVM1.UTK.EDU.[18] More than a single-spaced page of instructions explained how to use it. Three hours later, Gotterbarn used the listserv to send Version 1 to his working group and begin a process of review that might at least convince the Steering Committee not to make up its mind right away:

> Dear professional competence working group member,
>
> Below is a draft of a code of ethics developed by a sub group lead [sic] by Ed Mechler of the professional competence working group.
>
> We are soliciting comments from you on the code. We are especially interested in distinguishing between those imperatives which are aspirational and those which can be embodied in a code of practice. It would be helpful if your suggestions were accompanied by suggested rewording rather than just sending a general suggestions [sic]. Please apply your special expertises to this.
>
> A copy of this draft has been seen by the steering [committee] and it was suggested by one of their members that they review it in NOVEMBER!!, so your brilliant and rapid responses are encouraged.
>
> Thanks for your help and continued interest.
>
> don Gotterbarn

This message, though evidently written in haste, is more complicated than it may seem on first reading. Gotterbarn' explicit reference to distinguishing between imperatives that are "aspirational" and those that can be "embodied in a code of practice" suggests that he thought that the chief problem with Mechler's code was that it had failed to distinguish between those provisions which, being merely aspirational, belonged in a code of ethics and those which, being meant to be enforced, belonged in a code of practice. Frailey and Shaw both seemed to object to "aspirational" provisions because they thought they were intended to be enforced. They both seemed to envision a code much like the current ACM code. Gotterbarn too had expected SEEPP's work to end in something like that document. It was, after all, "state of the art" in code writing. The problem, then, was how to move Version 1 in that direction. Technically, SEEPP was the body that should do that. But working through SEEPP would have meant working with Melford, SEEPP's co-chair, and working with Melford would be slow. Melford was now taking a very long time to respond to messages, when he responded at all. Indeed, Gotterbarn had not heard anything from Melford since they had met in London in February. Gotterbarn certainly did not have the time to wait for Melford now. Gotterbarn did not need Frailey to suggest that the Steering Committee might vote on the code in November. Such a vote would only be natural given that they had the code in hand and the other two task forces were still far from having anything like it to present.

Gotterbarn nonetheless seems to have done his best to make clear that he was only addressing his working group, even using the salutation "Dear professional competence working group member" rather than his usual "Volunteers". This satisfied the letter of the requirement that he address SEEPP only with his co-chair's consent, but escaped the consequences. His working group included most of the members of the other working groups, including all the chairs of SEEPP's working groups. He could reach almost everyone, certainly everyone who mattered, while officially addressing only his own working group.

For the same reason, Gotterbarn explicitly treated what Mechler liked to think of as a working group, as a "sub group". Gotterbarn would have had to consult Melford to deal with someone else's working group, even a spontaneous and unauthorized one like Mechler's. But, as a "sub group", Mechler's group was Gotterbarn's business alone. There was no need to involve Melford—and therefore no need to wait until Melford responded.

6.5 Politicking

After this email, Gotterbarn wrote another, this one to Mechler personally. In it, Gotterbarn offered to help with drafting a response to Frailey and Shaw. Mechler did not receive that response until the next morning. By then, he had already responded. An important opportunity to mollify the critics had been missed. Gotterbarn nonetheless tried to explain to Mechler the politics of the Steering Committee, urged him to take a look at the two codes the Steering Committee would likely use as standards against which to test Mechler's, and otherwise tried to prepare him for the work ahead.

Mechler did not get around to sending Gotterbarn a copy of his comments until two days later (October 11). By then, Gotterbarn had received both from Frailey. When Gotterbarn read them, he had been appalled. They did not strike him as polite, cool, or carefully argued. They were not at all likely to soften the opposition. They also seemed explicitly to deny the distinction between an (aspirational, general) code of ethics and (mandatory, specific) code of practice that Gotterbarn, like Frailey and Shaw, took for granted. For Mechler, a code of ethics was mandatory—and as specific as it could be. Did Mechler's working group think the same way? Or was Mechler (more or less) on his own? Gotterbarn could not tell. Over the next few days, indeed, over the next few weeks, no one in the Professional Competence working group responded to his October 8 call for criticism. Did that mean that everyone in the working group (including Mechler's "sub group") approved of the code? That no one cared one way or the other? Or merely that no one in the working group had time to read and comment on so long a document? Or that the message had vanished into the ether?

Last, Gotterbarn decided to see whether he could prevent the Steering Committee taking up the code in November. He emailed Frailey that he had "just got your response to the code of ethics" and agreed "with many of the concerns expressed. The original plan was to distinguish codes of ethics from codes of conduct and codes of practice."[19] Gotterbarn then explained that the code "was developed by a sub-group led by Ed Mechler", that he (Gotterbarn) was "surprised when it was distributed to the steering committee before going through the kinds of revision and distribution we [had] with the ACM code", and that he was therefore "concerned about your suggestion to approve by November". While "sending it directly to the top is one way to get things moving"), there are "sensitive issues that need to be worked out and some restructuring of the code that needs to be done before it is ready":

> For example, given the current ambiguous state of copyright legislation, that item has to be filled out in the code. Are we ultimately to have three types of code—ethics, conduct, and practice or follow the ACM model of a code and put standards of conduct in the guidelines. For a code to be effective, there needs to be sanctions such as removal from membership in a society. Which society is sponsoring this and will there be similar sanctions from each society. Before the ACM code was approved it was submitted to the membership in the CACM [*Communications of the ACM*] and responses were solicited.

Having thus reminded Frailey (the ACM-appointed vice chair of the Steering Committee) that "that is not how we do things at the ACM", Gotterbarn admitted, "I am belaboring my point—one month from draft to approval seems rather fast." He then added one other consideration: He could not be at the November meeting (because he will "be attending an international computer ethics conference").[20]

This email seems to have had its intended effect. Within a few minutes of receiving it, Frailey forwarded Gotterbarn's email to Cabrara (with a cc to Gotterbarn and everyone else on the Steering Committee). The covering note: "as you can see from the attached, the proposed code of ethics we received had not gone through the ethics task force and thus can best be considered a draft. I suggest the steering committee be apprised of this and that we send it to Gotterbarn with an indication that it is in much too immature a state to approve at this point."[21] The immediate crisis had passed.

On October 18, Frailey emailed Gotterbarn again. He needed "a few things [by October 25]". One was a description of contacts with "external" organizations (apparently, meaning "foreign" rather than non-ACM organizations). Frailey helpfully provided a "model entry" using PASE'96 (Professional Awareness for Software Engineers, a conference held in 1996). Frailey needed this list because he was putting together "a chronology of all external organizations with whom the software engineering activity has interacted" for Chuck House, the new ACM president. The other item Frailey needed was an "update on plans for 1996", noting that the plan Gotterbarn had drawn up in January called for "a meeting in Washington in October or November to have the group do a final run through of the document" and "[delivery of] the document to the steering committee."[22]

Gotterbarn's response tells us at least as much about his state of mind at this time as about the state of SEEPP. After acknowledging that Frailey would not "be happy with the level of detail that follows", he explained why he could not then do better:

> I am now in Leesburg VA teaching at George Washington University [Ashburn campus] while on Sabbatical leave….This is my first sabbatical and it is an organizational nightmare. Some of the names and email address[es] you requested are locked in a file cabinet in Tennessee but they are also in one box or another of materials I have been forwarding to England [where the second half of his sabbatical year would be].

Gotterbarn's list of "external contacts" is short, consisting in large part of the panelists with whom he shared the stage at PASE'96 (beginning with the two, Tracy Hall and Colin Myers, whom Frailey had mentioned in his "model entry"). There are, however, four exceptions. One is Rogerson. Gotterbarn will be at his Centre "developing standards of practice in project

management and… revising and developing materials for the task force." The second contact is an unnamed representative of the (British) Institute of Electrical Engineers (IEE). Gotterbarn was "looking for guidance on the development of standards and soliciting their participation in the development and the review process. The individual I spoke with declined the offer and indicated that such participation was not a high priority for IEE." The third contact is "Tony Cowling, one of the developers of the BCS [British Computer Society] undergraduate software engineering degree; the fourth, "Duncan [Langford], an author of an applied computer ethics text." These last two are described as among other "volunteers in England who have already been contributing to the documents developed."[23] Gotterbarn does not say what the "documents" in question are or how Cowling and Langford contributed. (The two had, of course, nothing to do with the drafting of Version 1, though Langford would soon begin contributing.)[24]

Gotterbarn concludes this email with another note (marked by another salutation):

> This does not fit easily into your template. First week of November I am going to a computer ethics conference and will do some specific recruiting, in particular I want to involve people from the US based center for Computing and Social Values [the Research Center for Computing and Society at Southern Connecticut State University]. Later in November I am doing a videotape for the SEI on ethical issues in project management and will take the opportunity to meet with some of my working group who are centered in Pittsburgh [e.g., Mechler]. <- I know Pittsburgh is not a foreign country.[25]

The information Gotterbarn provided Frailey, however thin, clearly assumes that SEEPP's work will not end in November. Gotterbarn will be working on the code while in England, starting January 1997. But the information, whatever its assumptions, sounds strangely like what Gotterbarn could have written a year or two earlier. He cannot report that his working group is actually working on the code. Or even that his working group (or any other) is working. The most he can report is that he will recruit people (for SEEPP's working groups)—as if he had not recruited enough people already.

6.6 More comments on Version 1

Between the time Frailey asked for a report and the time Gotterbarn answered, Gotterbarn received two responses to his request for comment on Version 1. One, from Langford, an early SEEPP volunteer, began by declaring the code "impressive". The eight specific suggestions for improvement that followed the declaration show how impressive Langford actually thought the code. He had one overall suggestion: "I'm not sure that 'assure' is the right word; would 'ensure' be better?" The specific suggestions, though all minor, reveal a careful reading of the code. He proposed amending Rule 1.03 ("Asssure that they are qualified, by education and experience, for any project on which they work") by appending "or propose to work"; Rule 1.14 ("Avoid fads, departing from standard practices only when justified") by inserting "technically" before "justified"; Rule 2.01 ("Disclose to appropriate persons any danger…") by inserting "actual or potential" before "danger"; and so on, always adding to the precision of the rule or raising the standard it set.[26]

The same day (October 22), Gotterbarn also received a long email from Milton Fulghum, Senior Staff Engineer at FlightSafety International (Missouri), another early SEEPP volunteer.[27]

Fulghum offered no overall evaluation of the code, but his page and a half of suggestions, as specific as Langford's, clearly take the code's overall structure for granted. Most of his suggestions are organizational—and minor—for example: Clauses 1.05 and 1.14 should be combined since "1.14 seems to be a specific case of 1.05." Clause 2.03 "might better fit under another rule, perhaps Rule 3". Clause 2.04 should be moved to Rule 1. But one of the organizational changes is major. He notes that many of the clauses in Rule 6 (in particular 6.07, 6.08, 6.09, and 6.14)

> address management issues instead of peer-to-peer relationships as implied in 'Colleagues' title. The clauses [in 6] should focus on peer-to-peer issues. Perhaps another rule should be drafted to address management issues.

Fulghum ends by wondering how "does this [code] compare with" the new ACM and IEEE codes.[28]

On November 7, Mark Kanko, Major, US Air Force, used the listserv to ask whether "you are still accepting inputs".[29] Kanko had assigned the code to his "graduate students (some with real-world experience, some not)." He would be happy to send the results. Gotterbarn responded two days later (using the listserv): "I would love to see them. Sorry about the delay in responding, I was at Ethicomp 96 all week [Madrid]. I would also appreciate your comments."[30]

The next day (November 10), Gotterbarn received another response to his call for comments (an email sent directly to his "gwu" address). It came from one "Peter Ron Prinzivalli, IEEE member", of San Jose, California. Prinzivalli was the Principal Software Consultant of his own company. He had been involved in "software development, QA, maintenance, and production" since 1966, served as Treasurer of the IEEE-CS Standards Activity Board 1984-87, and been a member of Gotterbarn's working group (and three others) since November 17, 1994.[31] Like Kanko, he was an engineer rather than a computer scientist.[32] And also like Kanko, he had never before responded to any of Gotterbarn's emails. But his response now, over two pages of "comments" and "edits", followed by some extremely kind words, made up for his two years of silence.

Prinzivalli's concerns seemed different from the other commentators', positive as well as negative. He began by asking what would happen next "after this working group is finished with it". Will it go to IEEE-CS "Governing Board and DC Staff"? What will be done about its "propagation and maintenance"? He then wonders to whom it will apply: "programmers with no formal education or programmers who are not software engineers by university/trade school degree?" What he really wants to know is whether "software engineer herein mean[s] EE-SWEng"? As an engineer, he is concerned that the term "engineer" be reserved for engineers who have graduated from an ABET-accredited program—or, at least, something very close, not for mere "programmers with no formal education". (He is therefore interested in how the code's "term"—"software engineer"—connects with the body of knowledge and curriculum the Steering Committee is also working on.) The specific changes he suggests are (mostly) quite minor and distinctly his own. For example, he suggests substituting "must" for "shall" in the Introduction ("Software engineers shall commit themselves…"); "authorities" for "persons" in 2.01; and "required" for "appropriate" in 2.02. But some of his suggestions resemble those Frailey and Shaw made. For example, Prinzivalli prefers "documented" for "put in writing" in 1.01 (to "cover all electronic documentation"); he does not think Rule 1 is "possible" (unless

there is an "acknowledged 'professional' process of supervision"); and he is not sure what 6.11 means ("Not supplant another software engineer after steps have been taken for employment"). Overall, Prinzivalli's suggestions seemed to move the code language away from the ethical and toward the legal, but his overall evaluation was much the same as Langford's and Fulgum's:

> Don, congratulations on getting the process this far. I have participated in several IEEE software development standards, Software Standards Conferences, as well as on the Society's Standards Activity Board. Consensus and participation is always difficult to shepherd into productive useful Standards and Codes. Good luck with the final stages of authorization and publication.
>
> I'd suggest that the Society provide sessions at all of our Conferences and Tutorials to propagate the Code. Each member and non-IEEE member should be able to attend these sessions, and the Society should maintain a Registry of all individuals who have form[al]ly agreed to follow the code.

6.7 Kanko's student comments

Gotterbarn met with Mechler for lunch, November 18, a get-acquainted meeting without agenda or definite outcome. When Gotterbarn got back to Leesburg, Kanko's "comments", all thirty-two single-spaced pages of them, were waiting. Kanko had asked his class of fifteen students to read Version 1 and a) comment on the code generally, b) identify "no more than three individual imperatives that should not be part of the code, and c) identify "no more than six of the individual imperatives that are aspirational". Kanko's students were all officers enrolled in a course in the Department of Electrical and Computer Engineering, Graduate School of Engineering, Air Force Institute of Technology. They were therefore likely all to have trained as engineers and to have had most of their practical experience, if any, inside the Air Force. Their responses were unlikely to provide a good indication of how software engineers generally would respond. Worse, Kanko's assignment itself also seemed unlikely to provide a representative evaluation of the code. The assignment included some clear biases, for example, that there must be at least three imperatives that should not be part of the code. At best, Kanko had provided one data set among the many that would be needed to evaluate the code—but, on that November day in 1996, Kanko's was by far the largest data set Gotterbarn had. Gotterbarn read on.

The responses, each about two-pages long, did not sound particularly "military". Though some of the students explicitly identified themselves as young officers ("lieutenants"), they do not seem much more obedient to orders than their civilian counterparts. One student flatly refused to identify any imperative to be removed: "I feel all the imperatives have a place in the code." Another identified only two imperatives for removal. Another, after listing three imperatives for removal, suggested adding one ("1.15 Assure the quality of the product meets the quality requirements of the user and/or employer"). And one went far over the quota (naming five imperatives for removal plus "most of 3.0x"). Kanko's students responded with equal unpredictability to part c of his assignment (six aspirations).

Overall the students' evaluation of Version 1 was mostly either favorable (7) or "mixed" (6), with only one student clearly negative and one that simply did not state a position. The overall pattern of recommended deletions is interesting. None of the imperatives suggested for

removal are in Rule 2 or Rule 7. The most targeted (with 6) is 1.14 ("Avoid fads, departing from standard practices only when justified"); the next (with 5) is 5.07 ("Only accept a salary appropriate to professional qualifications"). There were two imperatives three students would delete: 4.01 ("Provide service only in areas of competence") and 5.11 ("Serve in civic affairs constructively"). Five imperatives were named twice (1.13, 4.02, 5.03, 5.10, and 6.11). Thirteen others were named only once (among them some, but only some, that Frailey or Shaw complained about). Ignoring the answer "most of 3.0x" (that is, one student's vague suggestion to remove most of the provisions under "Judgment"), most of the code (49 out of 71 imperatives) seemed to have passed muster—or, at least, to have passed without comment.

The students' attempt to identify "aspirational" provisions suggests some trouble with the term or the concept. Some students explicitly defined "aspirational": a provision was an aspiration if it stated a standard the satisfaction of which is "hard to measure" (because it is open to interpretation, is not a "yes/no", or not easy for others to check performance on). For others, the aspirational imperatives seem to be those that, though "laudable", are "unrealistic" or at least hard to satisfy. One student identified the *Rules* as aspirational (even though he also thought there was one too many). One said that the entire code was aspirational; one singled out "everything in 7"; and one just did not answer. Not one of the students equated "aspirational" with "general" (as Gotterbarn had in his March 3 email).

Most of the specific imperatives identified as aspirational were either under Rule 1 Product (30) or Rule 5 Profession (22). The imperatives under Rule 6 Colleagues came in a distant third with only five mentions. The imperative most often identified as aspirational was 5.01 ("Associate only with reputable businesses") with six mentions. Runners up were imperative 5.04 ("Help develop an organizational environment favorable to acting ethically") and 1.04 ("Assure proper goals and objectives on any project on which they work") both with five. Two more, 1.02 ("Assure that they understand fully the specifications for software on which they work") and 3.01 ("Maintain professional skepticism with respect to any software or related documents they are asked to evaluate"), received four mentions. Four others received three (1.05, 1.06, 5.03, and 5.11); seven, two mentions; and the remainder one or none (ignoring the answer "all the rest").

Kanko's data suggest at least four comments. First, his students were not inclined to delete imperatives they regarded as aspirational. So, for example, the imperative most often picked for deletion (1.14) received only two votes for "aspirational", and the highest ranking imperative for aspiration (5.01) received no votes for deletion. Kanko's students seem not to object to a code of ethics containing aspirations.

Second, while we might explain the high number of mentions of imperatives under Rule 1 by location (first come, first picked), we cannot explain the status of imperatives under Rule 5 that way. Something else made the imperatives under Rule 5 salient—both for deletion and as aspirations. We can only guess what. The students do explain why they chose the imperatives they chose but not why they did not choose the imperatives they did not choose.

Third, the students seem *not* to have found the distinction between "standards of practice" and "aspirations" a natural way to divide up the code's imperatives. They also seemed not to share an unequivocal understanding of what the distinction is.

Fourth, the students seem not to have paid much attention to the clause introducing the imperatives. Their evidence that a particular imperative is aspiration almost always comes from the language of the imperative itself. So, for example, though the imperatives under Rule 1 are

introduced with what might be taken as aspirational language ("In particular, software engineers shall, as *appropriate*:"), no student quoted that language as evidence for the imperative being aspirational (not specific, requiring interpretation, or the like). In this respect, and only in this, Kanko's students seem much like Frailey and Shaw. They too seemed to read the code one "bullet" at a time rather than as an integrated document. The students did not even try to read the particular clause in light of the general rule it came under. Apparently, Version 1 is not as easy to use as Mechler (and, apparently, the rest of SEEPP/E) thought.[33]

6.8 Computer scientists v. engineers?

Gotterbarn now had a riddle to solve. Mechler seemed to have a point when he had responded to Frailey and Shaw by talking about engineering codes of ethics. All the engineers responding to the code at all (and even most of the engineering students) liked the code. Whatever the merits of the individual criticisms Frailey and Shaw made, there seemed to be little, if any, overlap between them and the "engineering response". For engineers, the code had no obvious flaw. Gotterbarn could see why computer scientists like Frailey and Shaw would respond differently. The codes they were used to didn't look much like Version 1. But it was not possible to explain their response simply by the contrast between engineers and computer scientists. Langford, a Research Fellow in the Computer Laboratory of the University of Kent at Canterbury, held a Ph.D. in Computer Science (University of Kent, 1991)—with an undergraduate degree in social work.[34] In no sense an engineer, he too liked the code. Could the Frailey-Shaw response constitute nothing more than a statistical anomaly?

The Steering Committee (minus all but one ex officio) met in Pittsburgh on Thursday, November 21. The "action items" (November 25, 1996) suggest that the Committee had been thinking about some of the things Mechler had said in defense of Version 1, especially his references to the "PE code of ethics". The first action item (for Cabrera "due 11/24/96") was to send "Stuart Feldman [a computer scientists at IBM] a copy of the "code of Ethics of Professional Engineers and Civil [Engineers]". Melford (in town for another reason) undertook to rewrite (by "1/20/97") "the proposal for a Code of Ethics and Professional Practices for Software Engineers following the canonical form of those for Professional and Civil Engineers." He was to "produce a document that complements and expands those previously mentioned [to] align this proposal with that of sister disciplines [and be] different only when there is need to be different." Chikofsky (by "1/1/97") was to [identify] and secure relevant statements that address the issue of licensing software engineers [and send] the material to Felipe and e-mail to the whole steering committee regarding the findings." Melford also had two large assignments concerned with *licensing*. By "11/24/96", Melford was to provide Cabrera with "an initial statement of the question whether software engineers should be licensed engineers, to be used as the basis to present the forthcoming discussion on this subject."[35] By "2/20/97", Melford was also to report "on the Computer Engineer example [including] in the report their top-level definition of the field." (Mixed in with these items were similar items, but far fewer, concerned with the body of knowledge. For example, Frailey and Shaw were (by "12/13/96") to produce "a set of paragraphs that describe the field of real-time software engineering".

Though addressed to "Ed", this email was intended for Melford (as Cabrera explained in a later email sent the same day). It is worth quoting in full:

> Many thanks for your participation in our meeting last Thursday. I appreciate your involvement and your work.
>
> I did regret to be unable to talk longer with you about the stressing life situations that you have been going through. I look forward to spending some time at the next meeting in February.
>
> FYI I enclose the complete list of action items that you helped us draft. There are several that belong to you and [I] will appreciate it very much if you let me know if clouds appear in the horizon and the work cannot be done.

Melford must have read this email soon after his return to California, looked at the demands his consulting business had been putting on him for well over a year ("stressing life situations"), and realized that (given that business was unlikely to slow down any time soon) he could not do what he had promised. Within a few days, he informed Cabrera of all "the clouds…in the horizon" and resigned as SEEPP's co-chair. On December 10, 1996, Gotterbarn learned that he was now the sole chair.[36]

Frailey seems to have been the one to inform Gotterbarn of his new authority. This he did by phone on December 12.[37] Frailey also asked Gotterbarn to prepare the three documents that Melford had undertaken to provide. Gotterbarn did not accept the assignment as Frailey originally presented it. Other phone calls followed. It was only on December 15 that they agreed on what Gotterbarn was to do. There would be three documents: 1) a statement describing the roles, structures, and functions of codes of professional ethics; 2) a detailed comparison of Version 1 to other relevant professional codes (including but not limited to engineering's); and 3) a revised code. Gotterbarn would have nothing to do with licensing—even though he had long been an advocate of licensing. The code was in enough trouble without connecting it with the extremely contentious question of licensing.

6.9 Sole chair

On December 18, 1996, Gotterbarn began to exercise his new powers. He sent an email ("Dear Task force members") using both a formal list "seep workgroup" and individual addresses for himself and most of the original members of SEEPP (Little, MacFarland, Miller, Sullivan, Barber, and Weisband—with Melford omitted, of course). The email also listed Mechler and his seven as individual addressees, with Cabrera and Frailey each receiving a cc. (Noticeably absent is Gotterbarn's own Professional Competence working group.) Though Gotterbarn alone signed the email, there is no other indication of Melford's departure. (Gotterbarn believes he notified the task force leaders of it two days before this email, in an email that has not survived.)[38]

The list of addressees is nonetheless a bit odd. Laurie Werth, one of the original eight SEEPP members is missing. One of those on the list, Weisband, had not attended a SEEPP meeting, or even responded to an email, in well over a year. Little, McFarland, and Sullivan had also long since ceased to attend SEEPP meetings. Apart from Gotterbarn and Melford, SEEPP had become only Steve Barber and Keith Miller. Having heard nothing from Barber in months, Gotterbarn had emailed him, asking whether he received Version 1 ("I am really looking forward to you[r] perspective on it"). Gotterbarn also asked for a report "telling me the status of your group…and where you are in developing a preliminary statement." Barber wrote back on

October 21: “We should probably talk. My life is getting busier, and SEEPP is having a hard time finding it to the top of the list. My strategy of procrastination is not serving any of us particularly well.” Having left law for software a year before, he found giving time to SEEPP increasingly hard.[39] So, by November, he too had become one of SEEPP’s phantom members.

Gotterbarn’s December 18 email begins on a high note (“It is time to move the code to the next step”) but soon gets down to business (“It is evident from the comments [presumably, those of Frailey and Shaw] that we need to do some foundation building”). He then describes in detail the three documents he had promised to deliver by February 1997 and sets out another one of his schedules (“The plan”):

> By the first week in January
>
> Send references to sources for imperatives in draft code to Don.
>
> (Don) write draft statement about professional codes
>
> By Mid January
>
> Comment on draft about codes
>
> (Don) distribute statement about relationship of SE code to other codes
>
> By beginning of February
>
> Achieve consensus on structure of code and start to revise it in the light of that consensus.
>
> By Mid February
>
> Revised draft of code ready for comment by Steering Committee.
>
> By the middle of March
>
> Have a discussion draft ready for distribution on the net and in professional journals
>
> Have survey form ready for distribution with the code.

Gotterbarn concludes the email: “I know this [is] a lot to ask during this time of the year, but we have at last achieved something positive with the draft code and if we lose this momentum I am concerned that we will lose all credibility. But even more importantly, if we don’t get the job done the concept of professional ethical standards will also lose credibility. I look forward to getting your responses…[etc.]”

Mechler responded the next day (December 19, 1996), giving Gotterbarn his new email address (again), and providing seven sources for the “Code we developed”. The first on the list was the “IEEE and IEEE CS Code of Ethics”; the next (identified as the source of the “initial outline”) was the National Society of Professional Engineers Code of Ethics (presumably, for version 0). The ACM code was listed fourth, just before the American Institute of Certified Public Accounts Professional Standards Manual. Listed last (after the “PA State Registration Board of Professional Engineers, Land Surveyors and Geologists The Code of Ethics and the Law” was a publication of the American Society of Mechanical Engineers, *The Unwritten Laws of Engineering* by W. J. King. The next email Mechler received from Gotterbarn was a two-page form letter (January 1, 1997): “You have been added to the PRFCMP-L List”.[40] The only evidence that Gotterbarn ever received Mechler’s December 19 email, if he did, is that Gotterbarn later used the references in the memo on sources of (7.3). But, by then, Mechler had resent the list (January 30, 1997). Mechler’s December 19 email seems to be another of the lost emails of 1996.

No one but Mechler seems to have responded to Gotterbarn's December 18 email. So, as Gotterbarn prepared for the second semester of his sabbatical, the prospects for SEEPP would have looked neither as bright as two years ago nor as dark as one year ago. On the dark side, SEEPP no longer seemed a large organization—or, at least, one that responded enthusiastically to Gotterbarn's call to action. On whom could he count? Mechler, Miller…who else? Gotterbarn would be spending the remainder of his sabbatical, the first half of 1997, in England—at Rogerson's center. Staying in England meant he could attend few of the meetings he usually attended, could not count on many of the face-to-face meetings that seemed to have kept SEEPP going so far, and so might have the least help when he needed help the most. What could England offer instead? On the bright side, Gotterbarn at last had a draft of the code of ethics, a much simplified decision process, and a relatively undemanding schedule during which to work on the code. He could organize SEEPP as he thought best, without having to wait for Melford's approval. He was now in charge.

6. **APPENDIX:** CODE OF ETHICS FOR SOFTWARE ENGINEERS v1.0 September 1996

INTRODUCTION

Computers now have a central and growing role in commerce, industry, government, medicine, entertainment, and ordinary life. Because the utility of computers depends in large part on the instructions written for them, those who design, develop, and test software have enormous opportunities both to do good and to cause harm. To assure, as much as possible, that this power will be used for good, software engineers commit themselves to making the design, development, and testing of software a distinct, beneficial, and respected profession. In accordance with that commitment, software engineers shall adhere to the following standards of conduct. The seven main paragraphs state general rules. Each subsidiary clause is a specific application of its general rule, one experience has shown needs express statement; but no set of subsidiary clauses exhausts the general rule.

Rule 1: PRODUCT. Software engineers shall, insofar as possible, assure that the software on which they work is useful to public, employer, customer, and user, completed on time and at reasonable cost, and free of significant error. In particular, software engineers shall, as appropriate:

1.01. Assure that specifications for software on which they work have been put in writing, satisfy the user's requirements, and have the customer's approval.
1.02. Assure that they understand fully the specifications for software on which they work.
1.03. Assure that they are qualified, by education and experience, for any project on which they work.
1.04. Assure proper goals and objectives for any project on which they work.
1.05. Assure proper development methodology on any project on which they work.
1.06. Assure proper management on any project on which they work, including proper procedures for control of quality and risk.
1.07. Assure proper estimates of cost, schedule, personnel, and outcome on any project on which they work.
1.08. Assure adequate documentation on any project on which they work, including a log of problems discovered and solutions adopted.
1.09. Assure proper testing, debugging, and review of software and related documents on which they work.
1.10. Assure that software and related documents on which they work respect the privacy of those who will be subject to the software.
1.11 Assure that raw information used in software is accurate, derives from a legitimate source, and is used only in ways properly authorized.

1.12. Assure ethical, economic, cultural, legal, and environmental issues are properly identified, defined, and addressed.
1.13. Promote maximum productivity and minimum cost to employer, customer, user, and public.
1.14. Avoid fads, departing from standard practices only when justified.

Rule 2: PUBLIC. Software engineers shall, in their professional role, act only in ways consistent with the public safety, health and welfare. In particular, software engineers shall:

2.01. Disclose to appropriate persons any danger that the software or related documents on which they work may pose to the user, a third party, or the environment.
2.02. Approve software only if they have a well-documented belief that it is safe, meets specifications, and has passed all appropriate tests.
2.03. Affix their signature only to documents prepared under their supervision and within their areas of competence.
2.04. Cooperate in efforts to correct problems in software or related documents.
2.05. Be fair and truthful in all public statements concerning software or related documents.
2.06. Not put self-interest, the interest of an employer, or the interest of a client or customer ahead of the public's interest.
2.07. Accept full responsibility for their own work.

Rule 3: JUDGMENT. Software engineers shall, insofar as possible, protect both the independence of their professional judgment and their reputation for such judgment. In particular, software engineers shall, as appropriate:

3.01. Maintain professional skepticism with respect to any software or related documents they are asked to evaluate.
3.02. Reject bribery.
3.03. Accept no payback, kickback, or other payment from a third party to a contract, except with the knowledge and consent of all parties to the contract.
3.04. Accept payment from only one party for any particular project, or for services related to the same project, except when the circumstances have been fully disclosed to the parties concerned and they have given their informed consent.
3.05. Neither solicit nor accept a contract from a governmental body on which a principal or officer of their employer serves as a member.
3.06. Participate in no decision of a governmental or professional body, as a member or advisor, concerned with software, or related documents, in which they, their employer, or their client have a financial interest.

3.07. Disclose to all concerned parties those conflicts of interest that cannot reasonably be avoided or escaped.

Rule 4: CLIENT AND EMPLOYER. Software engineers shall, consistent with the public health, safety, and welfare, always act in professional matters as faithful agents and trustees of their client or employer. In particular, software engineers shall:

4.01. Provide service only in areas of competence.
4.02. Assure that any document upon which they rely has been approved by someone qualified to approve it.
4.03. Use the property of a client or employer only in ways properly authorized.
4.04. Not knowingly use pirated software on equipment of a client or employer or in work performed for a client or employer.
4.05. Keep as confidential information gained in their professional work that is not properly in the public domain.
4.06. Identify, document, properly report to employer or client any problem in the software or related documents on which they work.
4.07. Inform client or employer promptly if, in their opinion, a project is likely to fail, to prove too expensive, to violate copyright laws, or otherwise to turn out badly.
4.08. Accept no outside work detrimental to the work they perform for their primary employer.
4.09. Represent no interest adverse to their employer's without the employer's consent.

Rule 5: PROFESSION. Software engineers shall, in all professional matters, advance both the integrity and reputation of their profession. In particular, software engineers shall, insofar as possible:

5.01. Associate only with reputable businesses.
5.02. Assure that clients, employers, and supervisors know of this code of ethics.
5.03. Support software engineers who do as this code requires.
5.04. Help develop an organizational environment favorable to acting ethically.
5.05. Report violations of this code to appropriate authorities.
5.06. Take responsibility for detecting, correcting, and reporting errors in software and associated documents on which they work.
5.07. Only accept a salary appropriate to professional qualifications.
5.08. Be accurate in stating the characteristics of software on which they work, avoiding not only false claims but claims that might

reasonably be supposed to be deceptive, misleading, or doubtful.

5.09. Not promote their own interest at the expense of the profession.

5.10. Obey all laws governing their work, insofar as such obedience is consistent with the public health, safety, and welfare.

5.11. Serve in civic affairs constructively.

5.12. Improve public knowledge of software engineering.

5.13. Share useful software-related knowledge, inventions, or discoveries with the profession by reading papers at professional meetings, by publishing articles in the technical press, and by serving on the profession's standard-setting bodies.

5.14. Make no political contribution, gift, or commission for award of a contract.

Rule 6: COLLEAGUES. Software engineers shall treat all those with whom they work fairly. In particular, software engineers shall, as appropriate:

6.01. Assist co-workers in professional development.

6.02. Review the work of other professionals only with their knowledge.

6.03. Credit fully the work of others.

6.04. Criticize the work of others in an objective, candid, and properly-documented way.

6.05. Give a fair hearing to the opinion, concern, or complaint of a colleague.

6.06. Assure that employees are informed of standards before being held to them.

6.07. Assure co-workers know the employer's policies and procedures for protecting passwords, files, and other confidential information.

6.08. Assign work only upon considerations of professional qualifications.

6.09. Provide for due process in hearing charges of violation of an employer's policy or of this code.

6.10. Develop a fair agreement concerning ownership of any invention an employee makes.

6.11. Not supplant another software engineer after steps have been taken for employment.

6.12. Attract employees only by full and accurate description of the conditions of employment.

6.13. Offer only fair and just compensation.

6.14. Not prevent a subordinate from taking a better job for which the subordinate is qualified.

Rule 7: SELF. Software engineers shall, throughout their career, try to enhance their own ability to practice their profession as it should be practiced. In particular, software engineers shall continually endeavor to:

7.01. Improve their knowledge of recent

developments in the design, development, and testing of software and related documents.

7.02. Improve their ability to create safe, reliable, and useful software at reasonable cost and within a reasonable time.

7.03. Improve their ability to write accurate, informative, and literate documents in support of software on which they work.

7.04. Improve their understanding of the software and related documents on which they work and of the environment in which they will be used.

7.05. Improve their knowledge of the law governing the software and related documents on which they work.

7.06. Improve their knowledge of this code, its interpretation, and its application to their work.

NOTES

[1] Interview of Barber, November 14, 2002, answer to question 8.

[2] The difficulties in the way of reconstructing what had happened in March 1995 were considerable; their description reveals as much about the importance Gotterbarn still assigned the Guide as about Barber:

> Let me know if you need help interpreting the diff output, but hey—man diff. The diff output shows more changed text than there actually is because I re-justified the paragraphs I changed. I've annotated the diff output to indicate the Guide paragraph in which the change belongs.
>
> These changes have been reconstructed using my notes made at the time. The notes were not complete, and in many cases were but a few words intended to convey the idea or the change. I've written new language using the notes as a basis, but do not pretend that my language here replicates the language we came up with together at that meeting.
>
> There were two instances where I merely noted the word "change" with an arrow pointing to the affected text. I have not attempted a reconstruction in these instances, but have merely highlighted the area. Perhaps the identification will jog someone's memory; I have no independent recollection of those changes.

Gotterbarn\SeepOld 94-96\draft of guide Jan 96.GDE (January 27, 1996).

[3] Interview of Rogerson, February 24, 2003, answers to questions 1-3. Rogerson statement that he is not an engineer is odder in England than in the US (and therefore suggests that he has given the question considerable thought). The British Computer Society is a member of the (British) Engineering Council. Any graduate of an accredited computer science program is as eligible to become a Chartered Engineer as the graduate of a mechanical, civil, or electrical engineering program. See Trevor Burridge, "Certification in the United Kingdom", *IEEE Software* November/December 1999: 46.

[4] Interview of Rogerson, February 24, 2003, answer to questions 5-6.

[5] Gotterbarn, General Comments on Chapters 2 and 3, June 6, 2003.

[6] Gotterbarn\SEEPP1996-97\SEEPBIL\Meet1 ("Dear Messrs. Cabrera and Frailey").

[7] Gotterbarn\SEEPP1996-97\SEEPBIL\Meet1.

[8] While three-part distinctions between kinds of codes are common, this particular one (between ethics, conduct, and practice) is not. Compare Mark S. Frankel, "Professional Codes: Why, How, and with What Impact?", *Journal of Business Ethics* 8 (February-March 1989): 109-115; or the various articles in Margaret Coady and Sidney Block, editors, *Codes of Ethics in the*

Professions (Melbourne University Press: Carlton South, Victoria, 1991), important works Gotterbarn might have drawn on.

[9] Of course, this "scribe" is a standard feature of IEEE standards development. SEEPP's Guide 4.1.4 specifically provides: "The WG Chairperson should then identify an individual to author an initial draft. The author should be permitted to prepare the draft with or without additional input or assistance from any other WG members, at his or her discretion." Gotterbarn Archive, 94-96 MISC, OPGUIDE feb 96. The only novelty is having a *task-force* scribe, another indication that the working groups were not working as they would in any ordinary IEEE standard-writing project.

[10] Mechler's archive E960318B.

[11] Gotterbarn\SEEP1994-96\Miller to R&S WG; and Gotterbarn\SEEP\1996-97\Miller (with the time stamp and other formatting of an emailed actually sent); and Gotterbarn\SEEP1996-97\COMPET from GD and KM.

[12] Gotterbarn\SEEP1994-96\MCOMPACS (in four different forms, but all with files dated April 6, 1996).

[13] Mechler (March 20, 1996): "It is funny that you did not get Dons e-mail, I thought it was caused by a[n] e-mail from you and you were on the original mailing list." Jayaram was on the original mailing list, but his address, like almost everyone else's, had changed a bit since. Gotterbarn could only update the list if informed of a new address.

[14] IIT Archive, April 8, 1996.

[15] Of course, missing such deadlines may, or may not, mean a group is working. By June 15, Mechler was in the last stages of polishing Version 1. Though he had sent a copy of most drafts of Version 1 to Cabrera when distributing them to SEEPP/E, he had not communicated with Gotterbarn for several months. The same may, as we shall see, have been true of Miller.

[16] Bernstein seems to have used a mailing list having nothing to do with SEEPP. At IIT, only Burnstein received Bernstein's message.

[17] Gotterbarn\Version 0\ACODE4.

[18] There were a number of reasons for this new listserv, including the advance of technology. But one of them was that Gotterbarn, on leave, was no longer in a position to keep the close watch on what came in and should go out as he had been when back at East Tennessee. As he later recalled (email, February 17, 2004): "I went on leave—Summer & Fall 1996 I was at George Washington University—it took two months before they had me on E-mail so I was using a commercial E-mail address for a while—need to notify the Univ of Tennessee [in order to do anything with listserv]." Gotterbarn does not recall when he received his official GWU

email address. The earliest email from Gotterba@seasva.gwu.edu seems to be September 9, 1996 (to Mechler). E9696.

[19] This, of course, is Gotterbarn's reconstruction of events. In fact, the original plan does not seem to have distinguished between codes of ethics, conduct, and practice—until Gotterbarn's meeting with Barbacci and Melford in January 29, 1994 (3.4).

[20] Gotterbarn\Version 1\ACODE1.

[21] Gotterbarn\Version 1\ACODE1.

[22] Gotterbarn\SEEP1996-97\RENEPTW.

[23] Gotterbarn\Steering Committtee\df-myplan.

[24] Cowling is neither on any of Gotterbarn's early address lists nor on the final list of code "authors". There is nothing in the archives to suggest he ever contributed anything. The first of Langford's contribution seems to have arrived a day or two before Gotterbarn reported him as a contributor (as explained below).

[25] Gotterbarn\Steering Committtee\df-myplan.

[26] Gotterbarn\Version1\CMTDUNCAN.

[27] Gotterbarn\1994-96 MISC\SEEPVOLS-list 2-95, pp. 26-27 (Fulghum).

[28] Gotterbarn\Version1\CMTFULG.

[29] This is the Kanko ("the Major") who had a year earlier told Mechler (Ch. 4.6) that he was not in the Professional Competence working group but in Sullivan's on Privacy. Apparently, neither Kanko nor Mechler ever informed Gotterbarn of his preference for another working group. Now, the failure to cleanse the mailing list of the silent paid off. The moral here seems to be: *you never know what people will do if you give them the opportunity to do something both useful and within the bounds of what they want to do*.

[30] "ETHICOMP" is the acronym for the "International Conference on the Social and Ethical Impacts of Information and Communication Technologies", a conference held annually in a European city. The first, organized by Rogerson and Terry Bynum (Southern Connecticut University) was held in 1995 at DeMontfort.

[31] Gotterbarn\1994-96 MISC\SEEPVOLS-list 2-95, pp. 56-58 (Prinzivalli).

[32] Gotterbarn\SEEP 1994-96\VOLAFIT 2-23-95.

[33] I too was disappointed. The lesson I took from the response to Kanko's assignment is that codes are not self-interpreting; those who are to use a code should be taught how to interpret it. Gotterbarn may have taken a similar lesson from the comments, adding to his reasons for wanting the Preamble to provide a detailed guide to interpreting the Code.

[34] Gotterbarn\1994-96 MISC\SEEPVOLS-list 2-95, pp. 42-43 (Langford); Email (Langford to Davis), March 15, 2004.

[35] Apparently, licensing was a subject that the Steering Committee could not separate from its thinking about professionalization—even though the subject had officially disappeared (two years before) between the Board of Governor's approval of the "blue ribbon committee" (2.4) and that committee's first report (2.5).

[36] Gotterbarn thinks my treatment of Melford here—and in the preceding chapters—too lenient (Gotterbarn\2003 SEEPP\Three more Chapters 5-7, September 1, 2003):

> I guess what irritates is that your description of his "resignation" seems to indicate that he was working hard all along and that it just became too much work for him. Even when his company was floundering- he had the same 'work' pattern. Remember this had been smoldering since February of 1996 at the ACM meeting. Did he ever even organize his own working group? etc. Two documents of boiler plate at the front end of the project.
> No need to dig deeper, just please change the tone of the poor down trodden over worked Melford description - Without further corroboration you can see that Melford set himself a bunch of tasks on the spur of the moment at that meeting, but fortunately this time he realized that he was- (MD pick one) totally out of the loop as far as the code was concerned and as far as any work with the other working groups was concerned, unprepared to do what he said he would do, realized his own work pattern related to this project- set dreamy goals without intention to do what needed to be done to deliver, said things as usual just to impress the IEEE power brokers, and THIS TIME did so in an individual way where HE would be responsible...

Gotterbarn's interpretation may be right (based, as it is, on closer contact with events), but I find my interpretation better given the evidence I have—and the feeling, hard to defend, that I am reconstructing events akin to those that led to a messy divorce, the sad end being read back into all that went before.

[37] Gotterbarn\History of SE Code\History expanded. See also Gotterbarn Chapter6cmt: "I remember the following. Before I left Virginia, in the basement of the house we were staying in, via email and phones, there was a discussion about the future of SEEPP. I was given charge of SEEPP and the tasking for the three papers before I left."

[38] IIT Archive, December 18, 1996. In any case, Gotterbarn notified everyone in SEEPP (and its working groups) of his assuming SEEPP's chair (and of his English address) in an email of January 6, 1997.

[39] Gotterbarn\Steering Committee\Barber. See also Interview of Barber, November 14, 2002: "I stopped paying much attention to SEEPP sometime in 1996. I switched back to software from law in September 1995. The career change left me with less time for SEEPP and other 'extra-curricular' activities — I had to focus on learning a lot of software technology that I missed during my five-year excursion into the law."

[40] The (automatic) listserv may have been working on its own. On January 6, 1997, I received this message from Laurie Werth (through the listserv): "I would like to be added to the mail if I am not already on it."