The First Public Discussion of the Secret Colossus Project

Michael R. Williams
University of Calgary

Editor:
David Walden

This is a tale about how the Colossus was first revealed to the computing community. It centers on the first conference to be devoted to computing history, held in Los Alamos, New Mexico, in June 1976. The most important player was Brian Randell, a professor of computer science who was one of the first who might be considered a "computer historian." It begins in 1976 and finishes in 2016 when Randell and I discovered a recording of that event.

The British Colossus electronic code-breaking computer is now known to most people interested in computer history, particularly because it has been mentioned in many discussions of Alan Turing's work during WWII. This was not always the case. Brian Randell had become interested in the origins of digital computers and had accumulated a large collection of papers relating to that subject in preparation for his book *The Origins of Digital Computing*. In 1972, he published a paper[1] that gave a few hints about Turing's work during the Second World War on code-breaking at Bletchley Park and revealed a few details about how the code-breaking there had involved the construction—by a team from the Post Office Research Station led by T.H. (Tommy) Flowers—of a set of special-purpose electronic computers, the Colossus series. However, Randell's attempt at this point to persuade the UK Government to declassify the Colossus Project was unsuccessful, and he called a halt to his investigation, fearing it would be many years before any further information would become available about Colossus.

But, in fact, the general British public became aware of the great extent and significance of the code-breaking work carried out Britain at Bletchley Park, just two years later. This was when Group Captain Winterbotham published his book *The Ultra Secret*.[2] The resulting extensive publicity that Bletchley Park, and the work there by Turing on breaking the Enigma, received prompted Randell to reopen the issue of declassifying the Colossus, this second time with some success.

In July 1975, Randell was called to the Cabinet Office where he was shown a set of photographs of the Colossus that the UK Government planned to release, and was given permission to interview the engineers who had developed the Colossus and to submit (after clearance) a paper on their work to the Los Alamos Conference on the History of Computing. This paper had to concentrate on Colossus as a computer and avoid revealing any information about code-breaking—it was many years before it was finally revealed that the Colossus had been developed for the task of breaking high-level German teleprinter traffic, which had been encoded using the Lorenz SZ-42 cipher machine.

Dr. A.W.M. ("Doc") Coombs, who succeeded Flowers as head of the Colossus Project in its later stages, was due to be in the US on vacation at the time of the conference, and at Randell's request, he was invited to attend, though he was under strict instructions from the UK Government regarding what he could reveal about the project.

When Randell presented his formal paper at the conference in June 1976, he was immediately overwhelmed by questions relating to both Turing and Colossus. Given the great interest in his talk and the multitude of questions, the conference organizers arranged an informal evening session at which Randell and Coombs would try to answer all the questions as far as they were allowed to.

It was Bob Bemer who best described the shock that this revelation about Turing and Colossus caused. His description reads, in part:[3]

> I was there at a very dramatic moment of the invitational International Research Conference on the History of Computing, in Los Alamos, New Mexico, beginning 1976 June 10.
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> Among the many that I conversed with was a medium-sized Englishman named Dr. A. W. M. Coombs, who was so excited about something that he was literally bouncing up and down. Not being bashful I asked (and he didn't mind) about the cause of his excitement, and he replied "You'll know tomorrow morning—you'll know."
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> Saturday morning we regathered in the Auditorium of the Physics Division. On stage came Prof. Brian Randell, asking if anyone had ever wondered what Alan Turing had done during World War II? From there he went on to tell the story of Colossus—that day at Los Alamos was close to the first time the British Official Secrets Act had permitted any disclosures. I have heard the expression many times about jaws dropping, but I had really never seen it happen before.
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> But my English friend (who told us all about it later) was the man doing the day-to-day running of Colossus. I saw then why he was so terribly excited. Just imagine the relief of a man who, a third of a century later, could at last answer his children on "What did you do in the war, Daddy?"

Bemer's remark about Coombs "who told us all about it later" refers to the several-hours-long, informal evening session in which Randell and Coombs answered questions about the technical design of Colossus and told stories about Turing and the others that worked at Bletchley. While they occasionally politely declined to answer some questions because doing so would have put them in jeopardy of violating the Official Secrets Act, they were as frank and open as possible in their answers. This informal session was attended by most of the people who were registered for the conference, but because it was hastily set up and not part of the official program, it was not officially recorded, despite being an historically important event. That evening session was much more informative and detailed than Randell's official presentation, not the least because Coombs would sometimes be in the middle of a technical description when Randell would lean over and say, "Remember the Official Secrets Act"—an action that was sometimes ignored by Coombs to the delight of those present. It was really this informal evening session that first revealed much of what Turing had been doing during the war and the details of the electronic Colossus.

Late in 2016, I was interested to see that I had an email from Randell. We had both been interested in the history of computing and had managed to keep in touch for the past 40 years. I was, however, very surprised when I read his note:

I've just come across a fascinating 32-page typescript that I'd completely forgotten I had in my files. This is a transcript of a recording of the "Evening Session on COLOSSUS" at which I and Doc Coombs, one of the Colossus engineers, answered questions at the 1976 Los Alamos Conference on the History of Computing. This was the evening of the day on which I had revealed the Colossus.

The transcript is headed "Taped by M. Williams." Is that you?

That simple question led to both of us scouring our archives and old boxes to see what else we could find. We were interested in doing this because this event was the historic first public discussion of the British code-breaking activities at Bletchley Park and caused a complete reconsideration of these developments.

While I knew that the official conference sessions were recorded,[4] I also knew that, in 1976, trying to get copies for my own research use was likely to be difficult, and remarks were made that implied recording them yourself would be frowned upon. For this reason, I drilled a small hole in the side of my briefcase, mounted a microphone in that hole, and put an audio cassette recorder in the briefcase out of sight. This was not just to flaunt the remarked prohibition but simply to get a personal-use copy so that I didn't have to take vast quantities of notes. Like all the other participants at the conference, I was fascinated by the thought of hearing someone who had actually worked on the Colossus Project, and thus came, briefcase in hand, to the informal evening session. It was memorable in the extreme with many early computing pioneers from several different countries asking questions with, as Bemer noted, their jaws hanging further open after each answer.

When Randell indicated that he had found a transcript of a recording evidently done by me, I readily confessed my guilt, and when I actually also located the original recording in my basement, we both realized that we should make these items available to historians.

After a long series of email exchanges, we put together the story of how this all happened.

After the Los Alamos Conference was over, Randell took a sabbatical leave from his University of Newcastle professorship and moved to work at the University of Toronto for the best part of a year. Although neither of us remember it, I evidently gave a copy of my secret recording to Randell, and a search of his archives revealed that, on 5 November 1976, he wrote to his secretary, Mrs. Betty Smith, and sent her a copy of my tape with the request that she transcribe it. She put the transcription in his files, and there it stayed until he discovered it again in 2016.

Here the mystery deepened because, when I compared the transcript to my original recording, I discovered a gap in my recording where material was missing because I had to remove a full cassette and insert a new one. Somehow that gap had been filled in on the transcript and neither Randell nor I could think of how this had been possible.

A careful review of my recording indicated that, near the end of the evening, a soft "clunk" was heard, and it also recorded Randell's comment, completely unrelated to any other discussion at that moment: "It just switched itself off." The remark seemed completely out of place until we realized that it was likely the sound of another recording machine running out of tape and switching itself off.

A further search of Randell's archives revealed a 19 May 1977 letter from Nick Metropolis, one of the organizers of the Los Alamos Conference, thanking Randell for a copy of the transcript of my recording (likely sent to him by Smith) in which he indicated that: "I have explored the situation here and we do indeed have our own recording. I am having a copy made that we can send you."

Smith must have used that to fill in the missing gaps in the transcript of my recording.

My audio recording and transcript of this informal evening Colossus session has now been made available to the Computer History Museum (catalog no. X8216.2017) to complement its recordings of the formal sessions of that conference.

The recording of this unofficial session made by Metropolis was thought to be lost, but in the summer of 2017, I received another note from Randell saying:[5]

I have now, in the process of clearing out my office, ready for our move to a new building, come across some tape cassettes myself, labelled as follows:

- Los Alamos Disc. of Colossus

- Dr. A.W.M Coombs (copied from master tape of Mike Williams)

- Colossus (Evening session with Coombs)

These have now been presented to our Library's Randell Archive.

The last of those is likely a copy of the tape recorded by Metropolis and sent to Randell's secretary.

The full story of how Brian Randell gained knowledge of the Colossus and how he convinced the British Government to allow him to first publish the details of this machine is fascinating. He reveals how it all came about in an hour-long lecture he gave in the, then new, Colossus Gallery in the National Museum of Computing in Bletchley Park on 7 February 2013; that talk was videotaped and can be watched at http://tinyurl.com/randell-colossus.

ACKNOWLEDGMENTS

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3. B. Bemer, "Colossus--World War II Computer (The First Word Processor),"; www.bobbemer.com/COLOSSUS.HTM.
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ABOUT THE AUTHOR

Michael R. Williams first became interested in computing history in 1968 when he was a graduate student at the University of Glasgow, and with only a few occasional exceptions, it has been his main teaching and research focus since that time. He has been fortunate to work at several major museums and has held many volunteer positions with the IEEE including being the 2007 President of the Computer Society and editor in chief of the *IEEE Annals of the History of Computing* from 1996 to 2000. He is currently a Professor Emeritus of the University of Calgary.