The names "octatherp" and "octotherp" for the symbol "#"

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ABSTRACT

Starting in 1963, the terms "octatherp" and "octotherp" began to be mentioned as names for the symbol "#", and this practice continued for many years. These terms arose in a very interesting way. This article tells the story, as best it can be reconstructed at this later point in time.

The article also contains, in an appendix, information on the related term "octothorpe".

1. PREFACE

The story told here involves many events, for almost none of which does the author have definitive documentation. It is told from the perspective of the author's current recollection, for part of the story augmented by and synchronized with the recollection of a colleague.

2. BACKGROUND

2.1 Early history of "push-button dialing"

Over the years, the Bell Telephone System looked into the possibility that the familiar rotary/pulse dial could be replaced by a better user input system, presumably involving push buttons for entry of the desired number. It was of course difficult to imagine what kind of mechanism would be economically practical, and of course before the invention of the transistor, it was unthinkable to consider anything requiring electronic circuitry at the subscribers premises (such as tone generating oscillators).

One family of approaches retained the familiar pulse train format, but had clockwork mechanisms for generating the pulse trains under pushbutton control. Especially if these included any type of "digit buffer", the mechanical complexity would have been enormous, and this approach also didn't seriously decrease the time required to send the entire number to the central office.

Decrease of this time period was a major objective, since in the "common control" central offices used at the time in many metropolitan areas, a piece of common equipment that received the dialed digits was "tied up" for that entire duration. Reducing the time

period these units had to serve on each call meant that a far smaller pool of these costly units could be provided to meet the overall calling traffic need.

An approach that promised to decrease this time was based on “tone” signaling, but did not involve electronic equipment at the telephone set. In this system, there were ten buttons (two rows of five), one for each digit value from 0-9. Pressing the button “plucked” a resonant reed with a resonant frequency in the telephone transmission band (a different frequency for each button). The reed moved in a magnetic field (from a permanent magnet) with a pickup coil (reminiscent of that on an electric guitar) such that the damped oscillation of the reed was turned (passively) into an electrical waveform, which was then sent over the telephone line to the central office.

In fact a field trial of this system was conducted in 1948.

But this system had various practical shortcomings. It was never seriously further considered for actual deployment.

2.2 Getting closer

In the late 1950s, various studies suggested that the best transmission and coding format would involve the simultaneous transmission of two tones (perhaps similar to the system for some while used to send address signals over long distance trunks[1]). The appearance of the transistor in this time frame gave the tantalizing prospect that such a scheme might be economically implementable in a mass-manufactured telephone set, but the viable economic model “wasn’t quite there yet”.

For one thing, the favored format would have required two separate oscillators (one to generate each of the two simultaneously-transmitted frequencies for each digit code), thus intimating a minimum of two transistors. (Transistors then cost about $10.00 each, and a basic telephone set about $12.00.)

Top management established an arbitrary bar for the project: if a way could be found to generate the two frequencies with a single transistor, the project would be allowed to move forward.

2.3 Meacham’s breakthrough

In fact, shortly thereafter, Larned W. Meacham of Bell Telephone Laboratories, an ace oscillator inventor, devised an ingenious oscillator

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[1] Although the system that was adopted was different from that one in an important way.

circuit with only one transistor that would in a stable way generate two frequencies simultaneously. And “tone dialing” was on its way.

In the late summer of 1959, it was announced to the staff of Bell Telephone Laboratories that the tone dialing program would move ahead, with the expectation that the system would come into “commercial use” in the foreseeable future.[2] The name “Touch-Tone Calling” had been established for the system, and continued to be used.

2.4 The final field trials

Two “final” rounds of field trials of Touch-Tone Calling were conducted in the 1960-1961 time frame to determine if the scheme as then visualized would be feasible from a technical, operational, user interface, and user acceptance standpoint. The telephone sets used in the trials were equipped with push-button “dials” of essentially the modern layout, using Meacham oscillators. In the first round, the dials had 10 buttons.

There had, however, long been interest in the introduction of “signals” beyond those for the 10 digits that could be used as syntactical elements in protocols though which customers could control emerging new and sophisticated telephone system functions. The proposed coding system had 16 distinct tone combinations, so it could support additional buttons when needed.[3]

To allow testing of the “extra key” concept, in the second round of field trials the dials were equipped with 12 buttons. The two extra buttons were marked with a five-pointed star (called “star)”) and a diamond (called “diamond”). These symbols were chosen for their ease of recognition and the familiarity of their names.

The results of the trial were very encouraging, and, after completion of a thorough economic and technical analysis, it was decided late in 1961 to gradually introduce this new addressing modality into the Bell Telephone System generally. The actual rollout for general service commenced in 1963.

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[2] The announcement was made on the very day I reported to Bell Telephone Laboratories to prepare to begin an 18-month graduate-level training program in advanced telecommunications for telephone company engineers (I was with Ohio Bell Telephone Company at the time).

[3] In an earlier prototype design, there was an 11th key, marked “DIST”. The thought was that this could be used to indicate that the number about to be dialed was a long distance number, a matter that was actually later taken care of with a “1” prefix (a very fascinating story in its own right).

The telephone set dials that were then deployed had only 10 buttons. It seems the Bell System management, considering that there was yet no explicit plan for the use of the extra buttons, was concerned that they might confuse the users, so they were not included in the design. (Fortunately, the coding system was kept intact, so that there remained code combinations for more buttons—16 in all.)

3. RESTORATION OF THE TWO EXTRA BUTTONS

3.1 It wasn’t such a good idea

Within a year or so after the “rollout”, it became apparent that eliminating the two extra buttons had been a bad idea; plans for advanced calling services were beginning to take shape, and the use of extra buttons for their control seemed very desirable—almost a necessity. Thus it was decided that future general-purpose telephone sets would have 12 buttons after all. A committee was formed at Bell Telephone Laboratories to decide just how to do that.

3.2 How to mark the “extra” buttons

Of course, a major issue was what two graphic symbols should be used to designate the extra “buttons”.

At this time, I was at Bell Telephone Laboratories, responsible (among other things) for codes and character sets for data communication. Accordingly, I insinuated myself into the committee deliberations with regard to considerations in that area.

Not surprisingly, there was considerable interest in using star and diamond, given that those has worked quite well in the field trial.

But I pointed out that it would be very desirable for the symbols used to be from the ASCII character set (a new development at the time).[4] That way, when information would be sent directly from a general purpose telephone set into a computer (a process that we thought would become very important before long), there would be no uncertainty as to which ASCII character would be used in the computer to represent each of these “extra” buttons. Thus the five-pointed star and diamond used in the field trials would not do.

The final conclusion was that the only two symbols that met (almost) all the criteria were “*” and “#”, and it was decided to use those.

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[4] I was in fact at the time a member of the committee that was completing and refining the definition of ASCII.

I endorsed that conclusion, but called attention to a problem. Many people could not say or spell “asterisk”. Regarding “#”, its two common names in the U.S., “number sign” and “pound sign”, both suggested a specific meaning, not desirable for buttons that could have many meanings depending on the context.

The asterisk problem was solved by deciding to officially call that symbol, in its context on telephone dials, “star” (a practice still in effect today). Somebody suggested that since the center of the symbol “#” (at least in its common oblique rendering) was actually a diamond, we could justifiably call that symbol “diamond”, This would restore the apparently-beloved “historical” symbol names (which had been seen for a few months by a few hundred people in a field trial). Fortunately, this latter approach did not get much traction (I certainly discouraged it).

3.3 The rollout

Starting in 1968, all general purpose Touch-Tone telephone sets had 12-button dials. The additional buttons were marked “*” and “#”.

4. THE EMERGENCE OF “OCTATHERP”, OR WAS IT “OCTOTHERP”?

4.1 Preface

It is in this phase of the story—the whole point of this article, actually—that the limitations of recollection over many years came to bedevil me. My recollections didn’t seem compatible with those mentioned, over the years, by another principal figure in the matter, Lauren Asplund. I’ll give a further introduction to him and his role shortly.

Recently, in November, 2014, I began a series of telephone conversations and e-mail exchanges with Lauren, in which we attempted to figure out exactly why certain pivotal parts of our recollections didn’t seem to match. The result of this was a “harmonized joint recollection”, upon which this section of the article is based. That is quite a story in itself (about which more later).

4.2 Meanwhile, at AT&T headquarters

4.2.1 *The project*

Sometime in the early 1960’s, Lauren Asplund, at the time a member of the data communications marketing group at the AT&T headquarters in New York City, with his AT&T headquarters

engineering counterpart (whose name neither of us can recall)[5], planned to conduct a demonstration of the transmission of business data from a Touch-Tone telephone. In keeping with common data processing practice at the time, the transmission was not to be directly into a computer. Rather, the data was sent to an IBM card punch (a modified keypunch), equipped with a prototype of a “receiver” for the Touch-Tone tone signals that was being developed for this purpose by Bell Telephone Laboratories.

4.2.2 *The telephone sets*

Of course the Touch-Tone telephone sets that were then in general use had only 10 buttons. Asplund and his colleague realized that for any reasonable operation of the procedure he was demonstrating there needed to be at least two extra buttons. For example, it might be that after all the data for one “record” (one customer order item, for example) had been sent, a non-numeric signal would be sent to advise the receiving punch that the record was done, that the card that carried it should be ejected, and a new card should be fed to receive the next record. Perhaps the second button would be used to mean “Oops—abort this record’s card.”

So, for the demonstration, Asplund’s engineering counterpart arranged to have some telephone sets built whose dials had 12 buttons. It turns out that the extra buttons carried the symbols star and diamond, just as in the second field trial.[6]

4.2.3 *Not all good*

Asplund was very disappointed by this “choice” of symbols. The issue was not the fact that these were not ASCII characters; this was not a real consideration in his specific context of the time. Rather it was much more pragmatic: since these symbols did not appear on most typewriters, it would be very cumbersome for the administrators of systems for the entry of data from Touch-Tone telephones to prepare instruction sheets or manuals!

But soon Asplund learned of the decision that the symbols to be used on the extra buttons of the 12-button dials that would soon become standard were “*” and “#”. He was very relieved by this—they of course both appeared on conventional typewriters.

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[5] I had held that very position in 1961-1963 before being transferred to Bell Telephone Laboratories.

[6] There were no doubt molds around to make those buttons, from the manufacture of the final field trial sets, and that may have been what led to that choice.

4.2.4 *Still not all good*

But Asplund realized that there was still a clinker. For the symbol “#”, its two common names in the U.S., “number sign” and “pound sign”, all suggested a specific meaning, not desirable for buttons that could have many meanings, depending on the context.[7]

4.2.5 *Meeting the problem head-on*

Asplund decided that the best way to resolve this deficiency was to coin a new, “meaning-neutral”, name for the symbol “#”. He, along with his engineering counterpart, devised the name “octotherp”. He tells me that the inspiration for “octo” was the eight free ends of the four strokes in the symbol. “Therp” did not have any logical premise, but just sounded sort of “Greek-ish”, and thus might confer some scientific stature upon the name.

His plan was to promote the official adoption of that name to identify the symbol “#” as it would appear on telephone set dials. But that effort met considerable resistance, and he finally let the effort go.

4.3 Back in my court

4.3.1 *The “gift”*

Shortly after this had happened, John Schaak, an office mate of Asplund’s, and a long time personal friend of mine,[8] called me and said that he had a gift for me.

The next time I was in New York City, I went to his office. He called to mind that, in my various reports on the choice of symbols for the two extra buttons, I had repeatedly fretted about the fact that the two common names for the symbol “#” implied specific meanings, which was not desirable for the intended usage.

Schaak said that his gift to me was a cure for that worry: the name "octatherp"[9]. He presented it in the vein of a joke (or at least I took it that way); perhaps he did not think the name was a serious candidate

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[7] Great minds run in the same track, it seems!

[8] He and I had in fact been classmates, and apartment house neighbors, when we were both in the advanced training program I spoke of before.

[9] That is the spelling, rather than ”octotherp”, that I recall. It is possible that Schaak had picked up the spelling wrong from hearing Asplund talking about it, or perhaps I picked it up wrongly from Schaak.

for official adoption. I’m not sure now just where he said the name came from.[10]

Asplund tells me that he was not aware of this branch of the matter at all.

4.3.2 *A bigger joke*

Always up for a good joke, I picked up on the name and began to circulate it, intimating (but never actually saying) that it was a recognized name for the symbol. For example, when the symbol was mentioned in memoranda or articles I would prepare (for both internal and external use), I would reference a footnote reading, "Often called octatherp."

4.3.3 *What had I done!*

Before long, mentions of the name “octatherp” (or, more commonly, “octotherp”) abounded in industry publications. There was a cottage industry of commenters who sought to explain the origin of the name. Some of these stories were truly “creative”. Several commenters recognized the significance of the “octo” component. One story was that the name was actually “octothorpe” (developed by a different person than as discussed above) and that the latter part was an homage to Olympic great Jim Thorpe. (I discuss this in detail in Appendix A.)

4.3.4 *RIP*

Perhaps thankfully, mention of the names ”octatherp” or “octotherp” has died out in recent times. Part of the reason is that today the symbol is often called “hash”, as for its role in “hashtag”.[11]

4.4 Whodunit?

In 2006, I published an article that told the story as I then recalled it, including the notion that John Schaak (with a co-conspirator) had coined the term for my benefit “as a joke”. [12] Lauren Asplund came forth to say that in fact he had coined the term (not in any way connected with me, and certainly not as a joke). And a memorandum

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[10] For many years, I had thought that he had said that he and a colleague (not Asplund) had done it, “for me”, but it now turns out that this was not so.

[11] “Hash” had apparently been used as a name for the character for some while in Great Britain, it supposedly being a corruption of “hatch”, as in “crosshatch”.

[12] Sadly, John Schaak died a few years ago, so we could not draw upon his recollection to help sort this out.

appeared that described how someone else (not known to me), had coined the term (as “octothorpe”) (as I mention just above).

I ignored all of this. Until just recently, when I heard from Lauren Asplund.

5. ACKNOWLEDGEMENTS

Many people were involved in the actual events, but I here want to acknowledge the contributions of those who made this article possible.

First of course is Lauren Asplund. I am so grateful for his willingness to try and resolve what seemed to be some serious conflicts between our two recollections. It was wonderful to link up with him after all these years. I’m sure the two of us will share some further “war stories” in the weeks to come.

Next I would like to express my thanks to Avery Trufelman, a producer at NPR (National Public Radio) station KALW in San Francisco. She had interviewed me about the “octatherp story” in connection with a radio “piece” she was preparing about the many lives of the symbol “#”.

As we talked, I told her that she needed to know that there were somewhat contrary recollections afloat of what happened, notably that of Lauren Asplund. She said in fact she had seen references to that. She said, “So did you contact him when you heard of his differing recollection to see if you guys could reconcile the differences?“ I said, a little sheepishly, “No, I hadn’t”. She said, “Well, I’ll track him down and ask him to call you.” Later that afternoon Lauren called me! So thanks so much, Avery.

Finally, I want to thank my wife, Carla, whose connection with my technical writing is usually only in the line of copy editing (at which she is superb). I had been keeping her up to date about the frustrations of trying to reconcile the details of my recollections with Lauren’s.

Finally she said, “I think you guys both probably recollect the details mostly correctly. It’s just that you are both recalling two totally different parts of the whole larger event.” She was absolutely right. Lauren remembered what he had done, in his frame of reference. I remembered what John Schaak had told me, in my frame of reference. They were only connected by the word “octotherp”.

That turned out to be the key to development of a joint harmonized recollection of what had happened.

In addition, I thank Carla, the Cherokee Red Pencil, in that capacity, for her insightful copy editing of this difficult manuscript.

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Appendix A

Another view of the matter

Another fascinating view of this matter was given by Ralph Carlsen of Bell Telephone Laboratories in a 1995 open letter to the editor of the online journal “Telecom Digest”.

He first discusses the matter of the choice of the symbols “*” and “#” for the two buttons on a Touch-Tone Dial.

In this phase of his story he refers to Link Rice and Jack Soderberg of Bell Telephone Laboratories. Let me for reference talk a little about them. I knew them both very well. (My late first wife used to play cards with Soderberg’s wife.)

When I was at AT&T Engineering, in 1961-1963, I was responsible (among other things) for low speed dial-up data sets (what we would today call modems). One series (401-type) had a transmitter-receiver pair that used the same tone signaling code as Touch-Tone telephones. It was typically first used to send data from a punched-card reader at a sales location to a card punch at a sales processing facility. I made many trips to help sort out problems in these early applications.[13]

Another closely-related unit (403-type) was a receiver to receive the tone codes from a Touch-Tone telephone and feed the information into data processing equipment. This was no doubt what Lauren Asplund and his engineering colleague (my successor in that position at AT&T engineering) used for the “card punch” demonstration that figures into this story as I tell it in the body of this article (*cf*. section 4.2.1).

My counterpart at Bell Telephone Laboratories was Lincoln P. (“Linc”) Rice. John H. (“Jack”) Soderberg reported to him). Their group was responsible for the detailed specifications of the lines of data sets I mention above.

Rice and I in fact were involved in various visits with firms interested in utilizing the 401-type data sets for data communication.

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[13] Who knew I would find the best key-lime pie of my life in a little “roadhouse” on the outskirts of Stevens Point, Wisconsin! Or that I would meet the fellow who invented the plastic credit card, who entertained me in his spiffy yacht off Los Angeles!

In 1963, when I transferred to Bell Telephone Laboratories, it was to a slot parallel to that of Rice (we had the same boss and nearby offices), and we worked closely together on various matters.

Now back to Carlsen’s note. He said that in about 1961 Rice and Soderberg had visited people who were interested in sending data from Touch-Tone telephones to computers, and their discussions involved the matter of what symbols should appear on the “extra” buttons (which they thought of only with respect to their use for data communications, not with any notion that they would play a role in general telephone usage).

Carlsen said Rice and Soderberg concluded from what they heard in the field that the symbols should be ones found on typewriters. Carlsen said that the choice of “*” and “#” came out of this study. He did not (exactly) suggest that Rice and Soderberg actually chose, or recommended, those characters.

I think it is very likely that in the work to determine what characters should be used on the “extra” buttons when they were restored for general Bell System use (when I pressed for the characters to be from the ASCII character set) I may well have gotten input from Rice, or discussed my thoughts with him, or he may even have participated directly in the committee discussions.

Carlsen then discusses the matter of a name for “#”. He tells that Don MacPherson of Bell Telephone Laboratories was involved in the introduction of No. 101 ESS, the first software controlled electronic PBX. An early installation (perhaps the first) was for Mayo Clinic, I think in 1963.

MacPherson went to the Mayo Clinic just before system cutover to help train the staff in the use of this dramatically new telephone system. It included many new and advanced calling features (Call Forwarding. Speed Calling, etc.), which involved the use of the “#” button in their control (I think the “*” button as well).

In the course of this training, according to Carlsen, MacPherson became concerned with the lack of what he saw as a suitable name for the “#” button (by way of its symbol), and he decided to coin one. Noting the fact that there were eight free ends on the symbol, he started with the fragment “octo”. But of course he needed another syllable or two to make an entire new word.

According to Carlsen, MacPherson was at the time active in a group that was trying to get the Olympic medals of famed Olympian Jim

Thorpe returned from Sweden,[14] and thus we might assume the name “Thorpe” circulated among MacPherson’s thoughts. In any case, he chose that name as a euphonious completion of his word: “octothorpe”. He began using the term in his training lectures to Mayo Clinic staff.

Carlsen says that when MacPherson returned from this training session to Bell Telphone Laboratories, he began using this new word in memos and letters. Carlsen continues:

> “The term was picked up by other Bell Labs people and used mostly for the fun of it. Some of the documents which used the term Octothorpe found their way to Bell Operating Companies and other public places.”

Carlsen’s note has a very detailed and authentic ring to it (as we would expect from a member of Bell Telephone Laboratories).

Carlsen closes by reminding the reader that this account is based on his recollections, and is not an official statement of any of the organizations involved.

I leave it to the reader to contemplate the almost eerie coincidence between MacPherson’s coining of the term “octothorpe” and Asplund’s contemporaneous coining of the term “octotherp”.

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[14] Thorpe won gold medals at the 1912 Olympics, but they were taken away when it was discovered he had once been paid for playing semi-professional baseball, thus violating the strict Olympic “amateurism” rules of the time. His medals were restored by the International Olympic Committee in 1983, 30 years after his death.