The "A-B toll" method of handling manual long distance calls

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INTRODUCTION

Before the advent of Direct Distance Dialing, and in fact before the advent of operator toll dialing (*ca*. 1945), long-distance (toll) telephone calls were set up using wholly manual switching. Typically, a manual toll switchboard was used at the calling end to set up the connection and manage the resulting call. A second toll switchboard was used at the distant end to arrange for the "completion" of the connection. And, especially for longer connections, there might be intermediate toll switchboards as well. These were all specialized switchboards, more complicated than the switchboards used for local calls (on a manual basis).

But not always. In many cases, for "station-to-station" calls to cities perhaps not over 100 miles away, another operating method, called "A-B toll", was often used. There, no "toll" switchboards were involved at all. Rather, the connection was established between "local" switchboards at both ends. This was more economical than the "regular" toll operating method.

This article describes this operating method for toll calls and gives insights into its evolution as the landscape of local telephone switching itself evolved from a "manual" paradigm to "dial" operation.

1 ABOUT "TOLL" CALLS

What is known technically as a "toll call", and often known to the customers as a "long distance" call, is a call for which an explicit charge (a "toll") is made, typically dependent on the distance of the call and its time duration.

As a consequence, many of the technical and operational ingredients for handling such calls are also identified by the moniker "toll", such as "toll switchboards", "toll trunks", "toll central offices", and "toll operators".

2 TOLL OPERATING METHODS

In the area of toll calls, we speak of various "toll operating methods". These are different schemes used at various times, and in various situations, of how toll calls are set up and administered.

This article speaks of one of those methods of operation, called the “A-B toll” method (for a reason that will subsequently become apparent), which has a unique property that sets it apart from all the other toll operating methods. For my purposes here I will collectively call all those “other” operating methods collectively the “regular” toll operating method.

Readers interested in the other toll operating methods of the era will find them discussed in detail in the companion article, “Manual toll operating methods in the telephone network”, by the same author, probably available where you got this.

3 TWO “OPTIONS” FOR A TOLL CALL

In general, there were two calling “options” available for a toll call, a matter that figures prominently into our story here. I will identify them by the names they have mostly had from perhaps 1940 on.

- *Station-to-station call*. Here the caller asked the long distance operator for a certain number in the distant city. The call is extended to that “number”, and if the call is answered, the call is charged for (the timing starting nominally when the call was answered.

- *Person-to-person call*. Here the caller asked the long distance operator for a certain number in the distant city and as well for a certain person to whom the caller wished to speak. The call is extended to that “number”, and if the call is answered, the operator asks for the wanted person. If and when that person comes “on the line”, the call is charged for (the timing starting then).

The rate for person-to-person calls was normally higher than for station-to-station calls to the same locality. This reflected the greater labor cost the telephone company incurred in setting up such calls, and the fact that they might receive no revenue for all that work if the wanted person is not available to speak on the call.

To the caller the value of the person-to-person option is that there would be no expense[1] if the person to whom the caller specifically wanted to speak was not available. The higher rate for a call if completed was the cost of “insurance” against that.

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[1] In some cases, the telephone company lodged a small “report charge” if the desired person was not available after perhaps one hour of trying.

4 CALL HANDLING

4.1 Introduction

The story of the A-B toll operating method begins when local telephone switching was, in many cases, handled by manual local switchboards. And in fact the name of the method draws most directly upon that model. So in this section I will begin by reviewing, on a concise basis, manual local telephone switching. Then I will proceed to ways of handling toll calls in this environment. Finally I will do the same thing in a “dial” local switching environment.

4.2 The switchboard icons

The illustrations that follow are peppered with icons representing manual switchboards of various types. These are of a “black box” nature: lines and trunks are shown arriving at a switchboard or departing from it, but there is no hint as to whether these terminate on jacks or cords, nor how switchboard cord circuits fit into the journey of a connection.

But those details, although fascinating, do not play pivotal roles in understanding the principles of the operating methods being described, and showing them would clutter up the illustrations, making them less useful for their intended purpose.

4.3 In a manual local switching environment

4.3.1 *Interoffice local calls*

To set the stage, Figure 1 illustrates on a greatly simplified basis the handling of a local (thus, “not toll”) call from a subscriber in the Wabash central office in Middletown to a subscriber in the Melrose central office, also in Middletown.

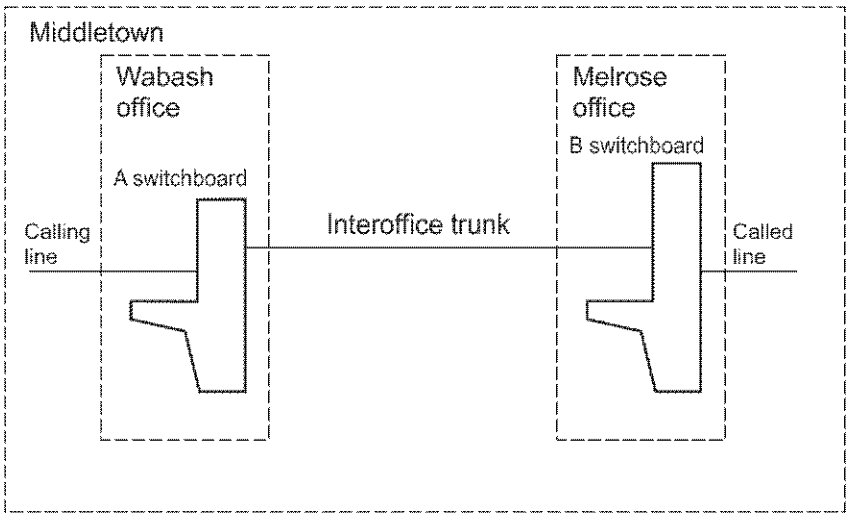

Figure 1. Interoffice local call between manual offices

At each of the two central offices, Wabash and Melrose, both in the town of Middletown, there are two switchboards (each typically with many positions), called the “A” switchboard and the “B” switchboard (we see here only one position of each of those at each office). The “A” switchboard is responsible for answering the service request” when a caller takes his telephone “off-hook”. She might (depending on the configuration), if the call is to another number in that same office, complete the call to a jack for that line in her own switchboard.

In any case, if the call is to another office, she extends the connection to the “B” switchboard there. That operator completes the connection to a jack in her switchboard.

In some situations, for calls to a number in the same office, the “A” operator does not complete the call (her switchboard not having jacks for all the lines in the office), but rather extends the connection to the “A” switchboard in that same office, where the connection is completed.

Suppose the Wabash subscriber wants to call a friend served by the Melrose office (a “not-toll”, or local, call). When he takes his telephone off-hook, an operator at the Wabash “A” switchboard answers and says, “Number, please”. He gives that operator the *wanted “Melrose” number. She extends the call over an * to the Melrose “B” switchboard, and passes to that operator the wanted number (the line number part only–the Melrose part is not needed, the connection already having arrived at the Melrose office). The “B” operator there extends the connection to the desired line, and that line is rung.

4.3.2 *Toll call to a distant city*

Now suppose our Middletown Wabash subscriber had wanted to call, for example, a friend in Riverdale, a quite distant city (and here we assume a “regular” toll operating method, not the A-B toll method). He would have asked the answering “A” operator for “Long Distance”. We see the setup of this scenario in Figure 2.

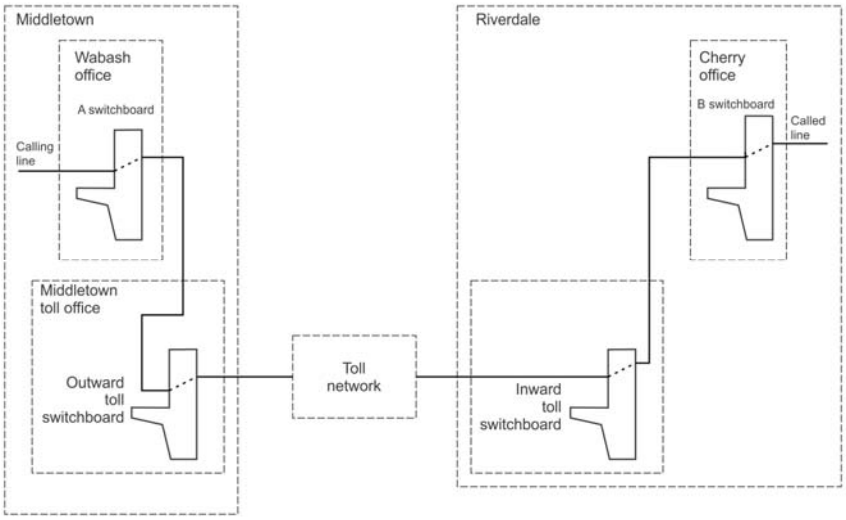

Figure 2. Manual “regular” toll call between manual offices

The “A” operator would extend the connection to the cognizant *outward toll switchboard* (“Long Distance”), whose operator would answer, “Long Distance”. The caller would give that operator the city and number he wished to call (in the example, Riverdale, a Cherry number)..

The toll operator would launch the call into the toll network, the connection eventually reaching the *inward toll switchboard* serving Riverdale. The wanted “Cherry” number would be passed to that operator by the Middletown outward toll operator.

The inward toll operator would extend the connection to the “B” switchboard at the desired Cherry office, and give the “B” operator the numeric part of the wanted number. The “Cherry” part was not said; it was not needed, the connection already having arrived at the Cherry office. The Cherry “B” operator would complete the call essentially just as would be done for an interoffice local call.

The resulting call would be overseen during its life by the outward toll operator, who also makes a *toll ticket*, with the details of the call, which will be used to bill the caller for the call.

4.3.3 *A-B toll calls*

However, in the case of “station-to-station” toll calls (only) to cities not very far way (although far enough away that calls to them are “toll” calls), the calls were often handled by a different operating method, called the “A-B toll” method, the actual topic of this Article. We see the setup, in simplified form, in Figure 3.

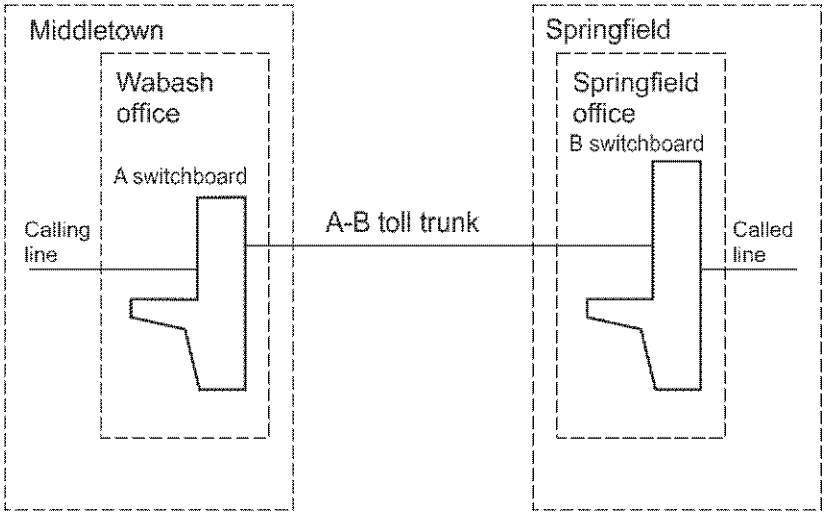

Figure 3. Simple A-B toll call between manual offices

Here a caller served by the Wabash office in Middletown wants to call (on a “station-to-station” basis) someone in Springfield, a fairly-nearby city but to which calls from Middletown are toll calls.. We assume that, as is often the case in this scenario, Springfield is a small city, with only one central office, which we speak of as “Springfield”

Based on the calling instructions in the telephone directory for making station-to-station toll calls to Springfield, the caller does not ask the answering “A” operator for “Long Distance”. Rather, he asks her for the wanted number in Springfield (giving both the city and the number).

The “A” operator extends the call over an *A-B toll trunk* to the Springfield (local) “B” switchboard. She passes to the “B” operator the wanted number. The “B” operator completes the call to the wanted line.

The Middletown local operator makes a *toll ticket*, with the details of the call (including the time of answer and the time of disconnect), which will be used to bill the caller for the call.

Note that this looks almost like a manual local interoffice call. The moniker “A-B toll” was given to this operating method because this involves an (ordinary, local) “A” operator and an (ordinary, local) “B” switchboard/operator, no “toll” operators being involved. This is the unique feature of this operating method to which I earlier alluded.

Differences from a local interoffice call include:

- The “A” operator makes a toll ticket, with the details of the call, which will be used to bill the caller for it.

- Because the A-B toll trunk was typically quite a bit physically longer than a local interoffice trunk, it might not have been implemented just as a plain physical pair, as would be used for a local interoffice trunk, but perhaps rather over one channel of a multiplex (“carrier”) transmission system. As a consequence, the signaling over that trunk might well have been different that that used on a local interoffice trunk.

The “B” switchboard position involved might be a position in a section of that “B” switchboard dedicated mainly to completing toll calls.

4.3.4 *Tandem operation for A-B toll calls*

In some cases, most efficient use of the A-B troll trunks to a “cluster” of nearby smaller cities is attained with the use of an intermediate switchboard located within the cluster (typically in the central office of one of the cities in the cluster). We see this “tandem switching” form of A-B toll operation in Figure 4.

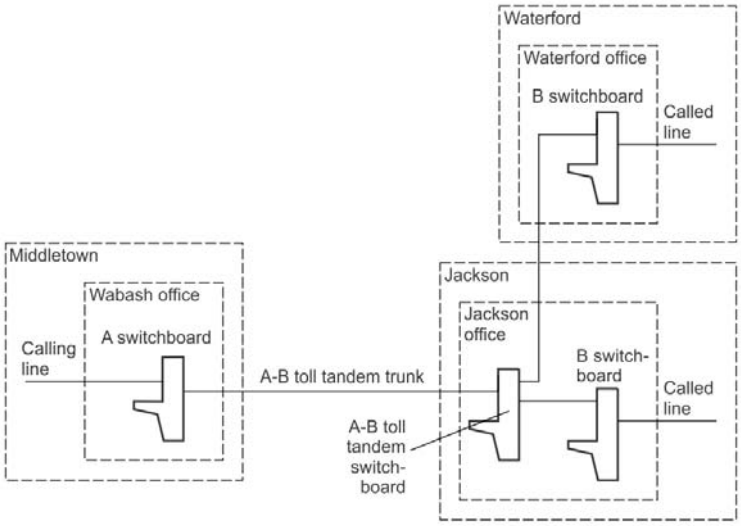

Figure 4. A-B toll tandem switching

Here A-B toll calls from Middletown to either Jackson or Waterford are sent over a trunk in a common group to a manual *A-B toll tandem switchboard* in Jackson. The operator there can extend the call to the “B” switchboard in either Jackson or Waterford.

4.4 In a “dial” local switching environment

4.4.1 *Interoffice local calls*

Again by way of setting the stage, Figure 5 shows the setup for a typical interoffice local call between step-by-step (SXS) offices.

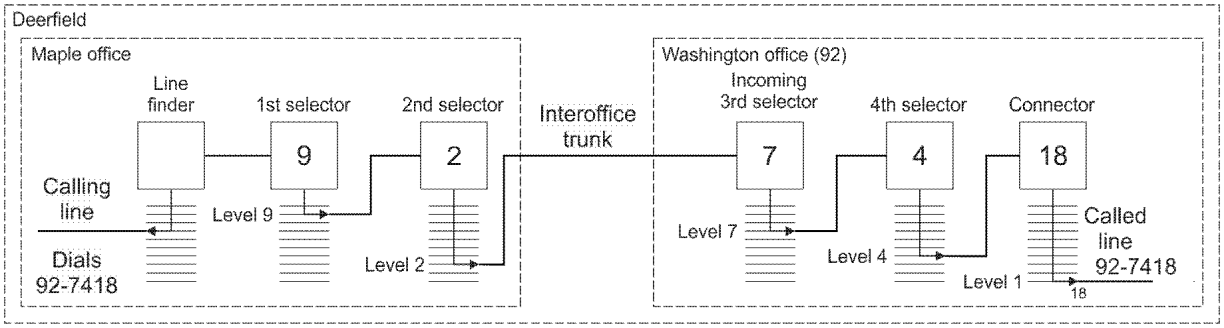

Figure 5. Interoffice local call between SXS offices

The digit(s) in the “head” of each step-by-step switch symbol are the dialed digits that control the motion of that switch.

4.4.2 *Toll call by the “regular” toll operating method*

In Figure 6 we see, in a simplified way, the overall situation for a toll call between two step-by-step (SXS) dial offices, using the “regular” toll operating method.

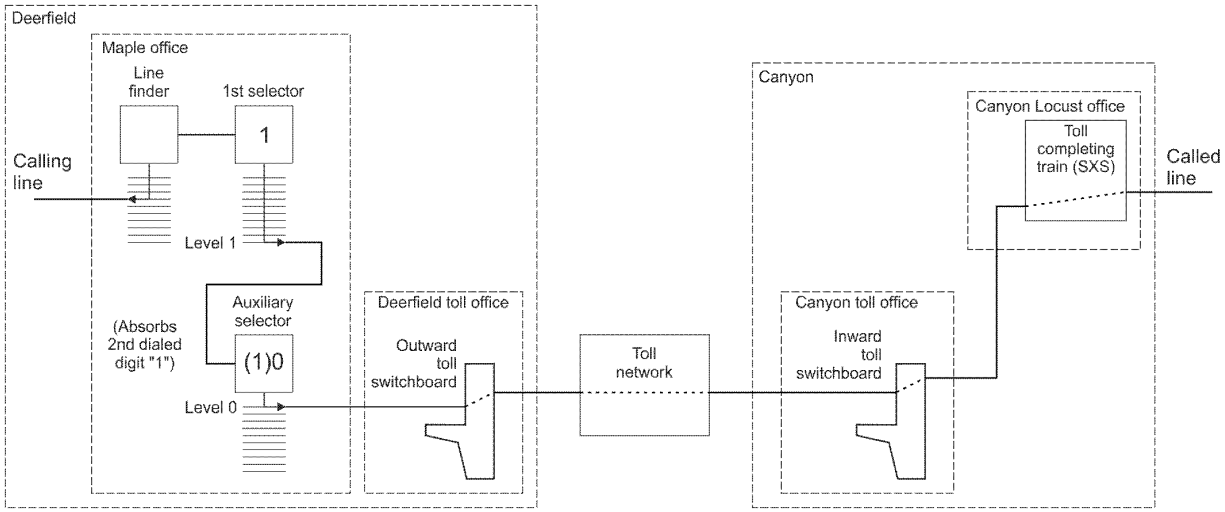

Figure 6. “Regular” toll call between SXS offices

The caller (in the Deerfield Maple office) dials “110” to reach the “Long Distance” switchboard (the *outward toll switchboard*. (The second dialed “1” is just “absorbed” by the auxiliary selector to save switch stages.[2])

[2] Here, the only valid numbers that start with “1” are service codes, and all start with “11”. So if the first digit dialed is “1”, then a second digit of “1” is “no news”, and it can just be ignored (“absorbed”).

The *outward toll operator* extends the call through the toll network to the cognizant *inward toll switchboard*. (There might well be intermediate toll switchboards involved in that.)

The inward toll operator extends the call to the called line by dialing into the step-by-step *toll completing train* (often called just the “toll train”) at the destination office (Canyon Locust),.

I show that train as just a “block” It typically actually comprises two or three consecutive step-by-step switch stages. Here we need not be concerned with its details.

The Deerfield outward toll operator makes a *toll ticket*, with the details of the call, which will be used to bill the caller for the call.

4.4.3 *A-B toll call to a nearby city*

In Figure 3 we see, simplified, the situation of this scenario in a typical form.

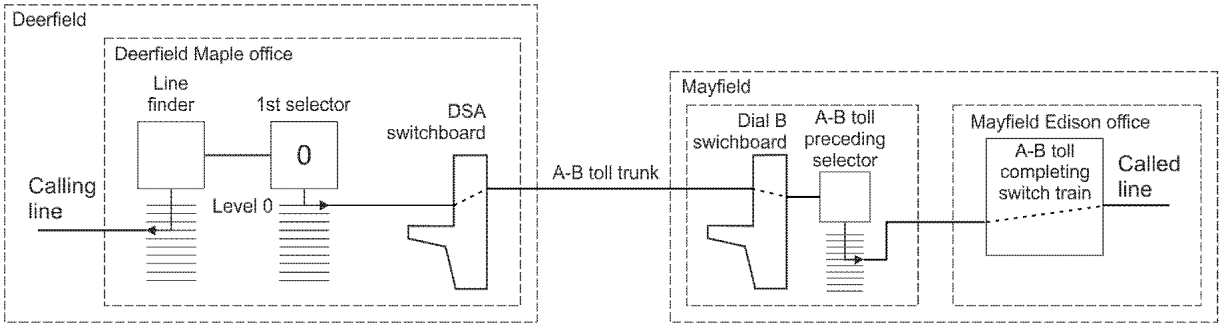

Figure 7. A-B toll call between SXS offices

Here our subscriber in Deerfield (with dial service) wants to call someone in another nearby city, Mayfield (what has more than one central office), also with dial service (a toll call). He dials “0” to reach the Deerfield “local operator” (formally, the DSA switchboard [3] operator). He tells the DSA operator that city and number. She

[3] The original formal name of this switchboard was the “dial system A” switchboard, from which that abbreviation came. It was so-called because it was the closest thing to a “A” switchboard that a dial office had, and its operator provided many of the supporting services which were done, in a manual office, by the “A” operator. Later, when that historical connection to a real “A” switchboard had faded, the formal name was changed to the “dial service assistance” switchboard (still, conveniently enough, abbreviated “DSA”).

extends the call over an A-B toll trunk to a dial "B" switchboard serving Mayfield).[4]

The Deerfield DSA operator passes the desired number to that "B" operator. By dialing into a *toll preceding selector* (we will shortly see the premise of that name) she extends the connection to the A-B *toll completing switch train* of the Mayfield office involved, and dials the station number into that train to complete the connection.

The Deerfield "DSA" operator makes a *toll ticket*, with the details of the call, which will be used to bill the caller for the call.

We see here why the moniker A-B toll again seems apt: the call passes from an "A" operator (the DSA operator) to a "B" operator (no "toll operators" being involved at all).

The title "toll preceding selector" comes from the fact this switch immediately *precedes* the toll train.

The "B" switchboard position will very likely be a position in a section of that "B" switchboard dedicated mainly to completing toll calls.

Note that the toll preceding selector in Mayfield might also allow calls to be directed to offices in nearby cities, somewhat paralleling the A-B toll tandem operation between manual offices seen in Figure 4.

4.5 Overall

4.5.1 *Why is this mode attractive*

To the telephone company, this mode of handling certain toll calls is attractive because, compared to the "regular" toll methods of operation, it involves less labor cost for handling the call and utilizes lower-cost switchboard equipment.

To the customers, by virtue of the lower cost of handling applicable toll calls by the A-B toll method, the rates were often lower then for the same calls if handled by the "regular" toll operating method.

4.5.2 *Why only for "station-to-station calls*

The switchboards and connecting trunks used in the A-B toll operating method are not set up to perform various "gymnastics" often needed for the handling of person-to-person toll calls.

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[4] Sometimes called a "DSB" (dial system B) switchboard. Its orignal "main" job might have been to complete, through the local completing trains in the various Mayfield dial offices, local calls from manual offices in that same city.

For example, often the outward toll operator must call back the calling station to establish a path that has the desirable transmission characteristics for a toll connection. But in doing so, she may wish not to yet ring that station until, for example (in the case of a person-to-person call, the wanted person at the far end has “come on the line”.

Or, for various reasons, she may wish to “re-ring” the called station, or the calling station, on the same connection after the party there has hung up. All these require various special switchboard arrangements, special signaling arrangements, and (if dial switching is in the picture) special capabilities in the switches involved.

Part of the economic advantages of the A-B toll operating method was that these special capabilities did not have to be provided in the equipment that was used, making it simpler and less costly than the equipment used for toll calls done by the “regular toll” methods

In addition, while the onset of A-B toll operation certainly required additional training for the local “A” and “B” operators, it did not have to include the wide range often quite complicated scenarios that could arise in a “person-to-person call, for which “toll” operators would have to be trained.

5 “STEERING” OF TOLL CALLS

In many cases, for station-to-station calls to “nearby” toll points, the telephone company would only want to handle them via the A-B toll operating method, and so would want to only “allow” that scenario for such calls.

Assume for the moment a local office operating on a manual basis. How did a caller, wishing to place a toll call, know to either:

- Ask the answering “A” operator for “Long Distance” (if the “regular” toll operating method was the method of choice for that call), or

- Ask the answering “A” operator for the city and number (if the A-B toll method was the method of choice for that call)

Generally, this was (ideally) done by way of the table in the directory that told how to place calls to various other cities. There might be separate columns for “station-to-station” calls and “person-to-person” calls, and a row for each distant city.

For each combination, the table cell might say (perhaps by some reference mark) either “Ask for Long Distance” or “Ask your local operator for the city and number wanted”, or some such.

Suppose the caller doesn’t look at that. Suppose he wants to place a call that must be handled by the “regular” toll operating method (such as a person-to-person call), but has given the city and number to the answering “A” operator. She would likely have said:

> I’m sorry, that call must be placed through Long Distance. I will connect you”

Now, conversely, suppose the caller wants to place a call that should be handled by the A-B toll operating method, but he has asked the answering “A” operator for Long Distance. She connects him. He gives the Long Distance operator the city and number. She would likely have said:

> I’m sorry, that call must be placed through your local operator. Please hang up and call again. Then give the city and number wanted to the local operator.”

6 PERSON-TO-PERSON TOLL CALLS TO NEARBY CITIES

Suppose that “station-to-station” calls to a certain fairly-nearby city are handled on an A-B toll basis. But what about person-to-person calls?

These would probably have to be handled by the “regular toll” operating method. The caller would be “steered” to that scheme as described in Section 5.

7 COLLECT CALLS

Collect toll calls are calls that, with the assent of the called subscriber, will be billed to the called subscriber rather than the calling subscriber.

The “gymnastics” of this might be a bit complicated. For example, the called subscriber might ask that he be advised of the charge for the call (after the call is finished). In that case, the operator may wish to re-ring the called station (on the same connection) to advise the subscriber there of the actual charge for which he will be billed.

As a result, some telephone companies required all collect calls to be handled via the “regular” long distance operating method.

But some telephone companies, using the A-B toll operating method for applicable calls, were willing for such calls to be on a collect basis.

But how would the originating “A” operator re-ring the called station at the end of the call (on the same connection)? She couldn’t. In this situation, she would have to establish a new connection to the called station to deliver the charge information. Which is why telephone

companies often did not allow collect calls to ne made via the A-B toll operating method.

8 USAGE

According to an article in the Bell System Technical Journal, in 1915, 47% of toll calls were handled on an A-B toll basis. In 1934 (the last year shown), 64% of toll calls were handled on an A-B toll basis.

Even though for various reasons this mode was mostly used for station-to-station toll calls to “fairly-nearby” cities (and was the preferred mode there, perhaps the only mode allowed), such toll traffic was a large fraction of all toll traffic (subscribers were more likely to make a toll call to a nearby city than to a more distant city, owing to the cost difference involved).

9 LONGER DISTANCES?

The reference information I have suggests that, generally speaking, the use of the A-B toll operating method was limited to calls to relatively nearby cities. (One reference cites “100 miles” as the general limit for the A-B toll method.) Why this limitation?

I have no real idea. I conjecture that, with regard to longer routes, it was not efficient to have two sets of “long distance” trunks, one for only A-B toll calls (and thus, only for station-to-station calls) and one for “all other” (notably person-to-person) calls.

10 A DISTINCT SERVICE?

In some cities, during certain eras (Denver in 1912, for example), the telephone company advertised a service, described as distinct from, and a attractive alternative to, their “Long Distance” service, for “station-to-station” (only) toll calls to fairly-nearby cities.[5] One advantage given was that the rates for such calls were less than even the “person-to-person” rates for their “regular” long distance service. It was also described as “quicker”.

This service was presumably conducted via the A-B toll method, whose costs were less than for handling the same call via the regular long distance methods, thus leading to the lower rates, and which in fact typically had shorter setup times than for the “regular” long distance methods of operation.

But elsewhere, as suggested above, there was no such distinct “service”. Rather, the A-B toll operating method was the preferred

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[5] Thanks to John Haralson for initially bringing this to my attention.

method for the telephone company to handle person-to-person calls to certain fairly-nearby cities. (See Appendix A for a way to learn this in a historical telephone directory.)

In many such cases, at the time, what we later came to call “station-to-station” calls were described as “two-number” calls. And when the distinct service mentioned just above was offered, it was often spoken of as the “Two Number toll service”.

Of course in that case, “two-number” not only meant “station-to-station” but implicitly also the handling of the calls by a distinct method, the one we know as A-B toll.

A possible motivation for the telephone company choosing to character these calls as a separate “service” is given in Appendix B.

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Appendix A
A hint that the operating method was A-B toll

When this operating method was not characterized as s separate service, we can nonetheless determine from the a historical telephone directory if this method was used for station-to-station calls to certain (fairly-nearby) cities from a clue in the list of rates for various kinds of calls to various cities.

Recall that typically the rates for calls handled that way were less than they were (or would have been) for the same type of calls handled by the “regular” toll operating method.

Almost always, for “regular” Long Distance calls, the initial time period was three minutes. But one way that the telephone company often made the rates for calls to be handled by th A-B toll method lower was to make the initial period five minutes.

Thus, if we see in the list of rates for various toll calls the listings for station-to-station calls to certain cities marked to indicate that the initial period for such calls was five minutes (rather than the generally-applicable three minutes, we can be fairly certain that these calls were conducted by the A-B toll method.

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Appendix B
Station-to-station calls to fairly-nearby cities as a distinct service–Why?

I mentioned in Section 10 of the body of this article that in certain cities, at certain times, the telephone company for various reasons characterized what we now call "station-to-station" toll calls to fairly-nearby cities as a separate service from the "Long Distance" service. An advantage cited for using this service for such calls, rather than the Long Distance service, was that the rates for such calls were significantly lower than under the Long Distance service.

We can well imagine a justification for this. We assume that such calls were handled by the A-B toll operating method, rather than by one of the "regular" toll operating methods of the time. The A-B toll method had lower operating costs, both by minimizing operator labor and by moving away from the consumption of the capacity of the more complex and costly "toll" switchboards and switching equipment.

But why did some telephone companies choose to characterize this as a distinct service, rather than just making the A-B toll method their norm for this type of toll call, resulting in lower rates for them than otherwise. My own guess is that this came from the realities of the regulatory process.

The rates charged by a telephone company (including for toll calls within a single state) were usually governed by the state utilities regulatory bodies[6]. The agreed "price list" was the result of complex, arduous, and lengthy negotiation, and was typically valid for several years.

The telephone companies were understandably loath to apply to the regulatory agency for any amendment to the rates for existing services. Doing so might "open the door" to the company being forced to make price concessions from the currently valid "agreement."

So. having discovered that, by the use of the A-B toll operating method for station-to-station calls to fairly-nearby cities, those could be done at lesser cost than for the "regular" way of handling those calls, it might have seemed "safest" to characterize this as a new service, made possible by advances in technology, with its own (lower) costs and the corresponding (lower) rates.

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[6] Except in Texas, where for many years here was no state utilities regulatory body, and telephone rates were governed by counties or cities.

The regulatory body could consider that as a separate matter, without this process jeopardizing any parts of the existing agreements for “Long Distance” calls.

Maybe.

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