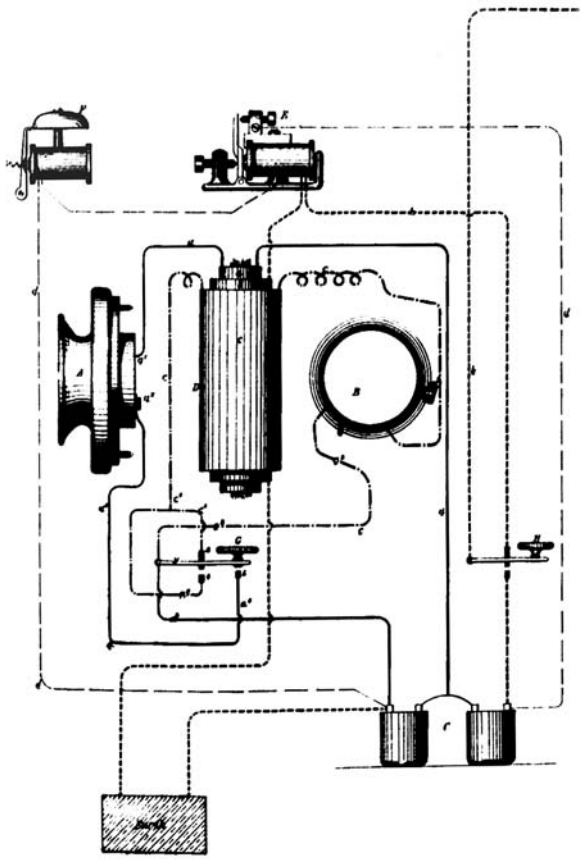
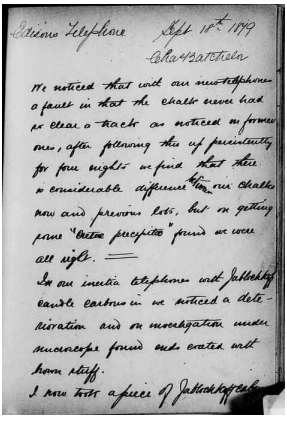
*Edison's British Patent 5,335 (1879) showing the push-buttons (**G** and **H**) in the circuit of the tertiary induction coil (**D**).*



–1807–

Notebook Entry: Telephony



[Menlo Park,] Sept 18th 1879

Edisons Telephone

We noticed that with our new telephones a fault in that the chalk never had so clear a track as noticed in former ones, after following this up persistently for four nights we find that there is considerable difference ~~in~~between our chalks now and previous lots, but on getting some "Cretae precipitae" found we were all right.[1a]

In our inertia telephones with Jablochkoff candle carbons in we noticed a deterioration and on investigation under microscope found ends coated with brown stuff.

I now took a piece of Jablochkoff carbon and heated it in bunsen burner and on examination under microscope it showed itself covered with brown fluffy stuff; scraped this off and heated again and same stuff came out in less quantity.

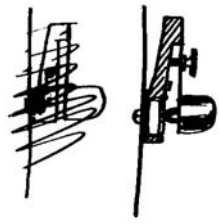
A piece of Wallace carbon under same treatment gave a white stuff and also showed some pieces of Silica scattered over

its surface also in telephone we noticed that some of the Wallace carbons were perfect insulators, probably due to one of these pieces of silica being in contact with platina instead of carbon

A piece of carbon stick that came from Dr Cleland[2] and looking just like Thompson carbon[3] gave out[b] no other stuff when heated but the grain was much coarser than either of the others Used[b] all these for transmitters also[a]

Used Plumbago which is very good but there is little margin of adjustment

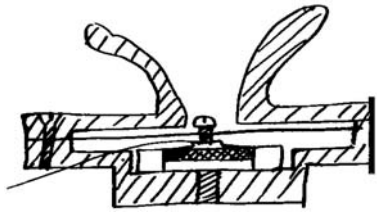
We now altered the inertia cup to 5/16 and I cut a carbon button of our old Style to size and put it in so:—



This worked well but not so loud as old transmitter we now altered the weight making it four times heavier but without any great difference.

We now took the ordinary inertia again & put in a Platin~~a~~um black button We made a brass sleeve to hold the carbon and forced into the inertia cup in order to make one end of brass sleeve and also one end of carbon touch one[b] platina permanently and get our vibration all from the other face, these were very sensitive at a distance but were no improvement close too We tried this with Jablochkoff candle carbon, Wallaces, Dr Clelands, plumbago, platinum black.

We now made some more tests on the old carbon transmitter and found that it kept its resistance more uniform, was louder, could stand a larger battery power, and in many ways was preferable to the inertia and decided to put them on our English telephones This telephone transmitter which has never been beaten in loudness or distinctness by anybody else's make owes its superiority to the fact that its adjustment is perfectly rigid and its ~~suf~~ surfaces perfectly flat— As the movement of the diaphragm at any time during talking cannot be more than the .001 of an inch, it stands to reason that if there is any[b] shake in adjustment or any rounding of surfaces, it uses this movement all up in taking up such slack etc We propose to use it so:—[4]



One of the great difficulties with our inertia telephones is that after using some time a number were taken down and tested for resistance with same pressure on each. They varied from 40 ohms to 6 ohms and some were insulators. This variation would kill them entirely.

Chas Batchelor

X, NjWOE, Lab., N-79-04-09 (*TAEM* 32:1106; *TAED* No45:60). Written by Charles Batchelor. Document multiply signed and dated. [a]Followed by dividing mark. [b]Obscured overwritten text.

1. In another 18 September notebook entry, Charles Batchelor described experiments with wetting one-ounce buttons that had been pressed to different degrees. He moistened the first batch with 90 minims of a 75% solution of phosphate soda in water, noting that "as we turn away a great part of the chalk we must put in the same percentage of the 90 minims as there is percentage of the chalk left after turning." He then obtained somewhat better results with "5 pair of chalks of old formula" wet with 15 minims of a 50% phosphate soda solution. In the latter case, a button made using seven spacer washers to increase the effective force of the press performed "red hot" (N-79-09-18:27–33, Lab. [*TAEM* 35:932–35; *TAED* No86:14–7]). None of these notes clarifies the meaning of "Cretae precipitae" but it was most likely precipitated chalk with Batchelor playing on the Latin word *creta* ("chalk"), the root of the English "cretaceous" (*OED,* s.v. "Cretaceous").

2. T. Cleland, a medical doctor, was the Eastern agent for Edison's electric pen and for Western Electric Manufacturing Co.'s electromedical department with offices at 267 Broadway in New York. See *TAEM-G1–2,* s.v. "Cleland, T."

3. Elihu Thomson and Edwin Houston devised an arc light in which two opposing solenoids regulated the distance between the carbon rods in order to maintain a steady arc; nothing is known of the carbons used in this device. Carlson 1991, 124–27; Prescott 1879, 498–501.

4. Figure label is "straight glass plate [in?] here for screw to strike against." On 20 September John Kruesi wrote an order for the shop to "Make a new carbon Transmitter for english Telephone order See drawing"; the measured drawing of the transmitter was made the same day by either Kruesi or Samuel Mott. Cat. 1308:175 (Order No. 242), Batchelor (*TAEM* 90:754; *TAED* MBNo03:61); Vol. 14:171, Lab. (*TAEM* 4:327; *TAED* NV14:179).