THE EDISON DIAMOND DISC PHONOGRAPH--

PERFECT FIDELITY, SIXTY YEARS AGO!

by

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When Thomas A. Edison introduced his improved cylinder record, the superb "Blue Amberol" in 1912, the rest of the phonograph industry could not have cared less. Internationally the trend in records was toward needle-played discs, or what we might call "standard disc records." Even though Edison's cylinder clientele responded cordially to his new product, there was a widespread feeling that cylinder records were on their way out. Edison's own associate, Walter Miller, shared this feeling. Technically, the Blue Amberol was superior to most needle-played discs. Substituting celluloid for the fragile "wax" of his earlier cylinders, Edison had produced what was then termed "the master product of a master mind." The reproduction of sound from the Blue Amberols was unsurpassed in brilliance, and their rugged celluloid surface was almost impervious to wear.

The Victor Talking Machine Company had become the giant of the industry, devoting itself from its start to the making of needle-played records. Eldridge Johnson, Victor's guiding genius, had taken Berliner's crude Gramophone disc and had saved it from extinction in 1900 by his improvements. Victor's only domestic rival of importance was Columbia, which had stopped making cylinders in 1909, devoting its efforts thereafter to standard discs. Edison was being forced into the background.

It was a far different story a year later, in 1913, when Edison entered the disc field with his sensational Diamond Disc phonograph and records. That was a challenge to the entire industry. Edison announced that his Diamond Discs were not a mere "shadow" of sound as reproduced by "talking machine records " (needle-played discs), but that these new records

produced "living sound." He boldly placed the living artist beside his Diamond Disc phonograph in "tone tests" conducted from coast to coast. Lights were lowered as a record was played by the same artist who was singing along side the phonograph. Audiences were amazed when the auditorium was lighted again to find that the singer had left the stage and the sound they thought was the live voice was in reality the reproduced sound. Newspaper reviews confirmed these impressions and declared that "comparison with the living artist reveals no difference." That statement became the Diamond Disc's slogan.

Edison is still accused of having taken Berliner's disc form of record and appropriating it for his own use. This arises from the patent granted Berliner in 1887 for his disc Gramophone; but Edison had been granted patents in 1878 not only for cylinder records but for discs and a form of tape! Edison approached his discs with not the slightest imitation of Berliner's conception. What Edison did was to "flatten out a cylinder," for his Diamond Discs, using identical mechanical methods as were employed for the cylinders. Both were vertical-cut recordings. Needle-played discs such as Berliner's were lateral-cut. The reproducer for needle records was propelled by the needle riding in the grooves. Edison records--disc and cylinder--were played by jewel points connected to a "floating weight" that had to be fed across the record by gears.

Further advancement was accomplished by Edison by matching the tone chamber of his disc phonographs to the reproducer and records. This combination accomplished the remarkable "absolute fidelity." Why did the Edison Disc phonograph fail to become the leading phonograph product instead of going out of existence in 1929? Perhaps we should wonder why Edison turned to discs at all in view of his theory that only cylinders provided grooves of constant length--not longer at the outer edge and narrowing to a squeeze near the label as on discs. Was the cylinder form incapable of producing "absolute fidelity"? The answers are complex.

There is little doubt that cylinder records could have met every tone requirement and possibly would

have excelled the discs, but both a manufacturing problem and the public trend raised a problem.

High notes, or overtones, registered on cylinders with unequalled brilliance, but to obtain a deeper bass tone required for the fidelity Edison was seeking, it was necessary to cut a deeper groove in the record. The necessary deeper groove could not have been extracted from the cylinder mold without damage to the grooves. The molding of cylinder records was always a delicate operation. Discs could accommodate the required deeper grooves and could be stamped with little difficulty from the flat molds. And beyond doubt Mr. Edison and his associates realized that a revolutionary record would not attract sufficient market value unless it followed the public trend, which favored discs.

Experiments on disc records had begun in Edison's laboratory as early as 1910, at first, strange as it seems, without his knowledge. When Edison learned what Walter Miller and others were doing, he gave those experiments his support. The resulting product was the Diamond Disc, which along with improving the cylinders, cost $3,000,000.

The fact that Edison adapted all the cylinder principles to his new discs proves that he was on the very final step of achieving the long-sought perfect reproduction of sound on his cylinders. The Diamond Point Reproducer used for his discs was identical to the reproducer used for the Blue Amberols, except it had a heavier weight for the discs.

To withstand the heavier weight, a harder surface than celluloid had to be developed for the discs. It was accomplished with a substance named Condensite--a forerunner of modern plastics. Another Edison "first."

Needle-played discs were made largely of shellac and were thin. They were recorded with a lateral cut which Mr. Edison considered inferior to the vertical or hill and dale cut already in use on all cylinders. Edison also knew that to produce the fidelity he required, his discs needed "mass" to make them solid.

Accordingly, the Diamond Discs were comprised of playing surfaces of Condensite laminated to a solid core one-quarter-inch thick. They were expensive records to manufacture and the cheapest sold at $1.00. Standard discs could be bought at prices from 60¢ up. However, because of their finer grooves--150 to the inch--the Diamond Discs, although only ten inches in diameter, had the playing time equal to twelve-inch needle discs, about four minutes. Twelve-inch needle discs sold at prices from $1.00 up, so the value was actually the same.

The Diamond Discs were launched with grandeur. Edison was playing for the more sophisticated trade, a trade that he had not been able to attract too well with his cylinders. The cylinders might be said to have appealed more to the "old home trade," whereas Victor's discs had penetrated circles formerly hostile to the phonograph as a worthy instrument. Cabinets for Edison's disc machines were masterpieces of the woodcrafter's art. Elegant models sold at $1,000. The "recommended" models started at $300. The cheapest machine was $60; at the same time the lowest priced cylinder machine was $15.

The sensational debut of the Edison disc had shaken the industry, but it was scarcely out of trade-paper headlines when World War I started in Europe, and vital supplies for the Condensite were cut off. Domestic substitutes proved inferior, resulting in records with very high surface noise. The "less-forward" sounds were lost in this distracting "grind." This setback prevented Edison from making twelve-inch discs which would have had the great advantage of six minutes of playing time. During this crisis, the Blue Amberols with their celluloid surfaces were practically without surface noise!

Recent experiments indicate that Mr. Edison may have made a mistake by increasing the weight of his disc reproducer. Had he used the lighter weight developed for the Blue Amberol cylinders and given his discs the same celluloid surface, he might have avoided the surface noise on his discs that became a major cause of their eventual downfall.

It is conjectured that Edison did not become aware of how bad his discs were until complaints from dealers finally reached him personally. By then, a lot of prestige as well as sales had been lost. Edison ordered all unsatisfactory discs returned to the factory in West Orange, New Jersey. It must have been a shock when literally carloads of discs came back. "Bad" records were still to be found in stores as late as 1921, although Edison did improve the surfaces right after World War I ended; it was to be nearly 1924 before a really satisfactory surface was developed. The original Condensite surfaces had been reasonably good, but that material proved to be incompatible to the center core and the bond loosened, causing many records to separate, curl up and crack. Later records did not have this fault.

It is difficult to find an unbiased excuse for what the Edison Company did to the Blue Amberols after the Diamond Discs had become the Edison record. In 1915 under the poor excuse that it was necessary to economize in making the cylinders, the Blue Amberols were thereafter dubbed from the Edison discs and were denied the advantage and purity of tone that only the live performance could give. Walter Miller, whose loyalty to Edison can never be disputed, is alleged to have disliked the cylinders and wished to get rid of "those damned things." I personnally believe that the Edison Company knew that the Blue Amberols with their wonderful clarity and almost silent surfaces were too close a challenge to the Diamond Discs, and were purposely made inferior to keep them a secondary product. Perhaps this is being too harsh, especially to Mr. Edison, to whose credit must go the continuing of cylinder manufacture until his last year in the record business.

Surface noise was only one of the handicaps of the Edison disc. The records could not be played on any other machine without damage. This naturally limited sales to owners of Edison disc phonographs. On the other hand successful attachments were made--not by Edison--for playing needle-type discs on the Edison machines. Thus the Edison customer might readily turn to other makes of records even though he had bought a Diamond Disc phonograph.

The Brunswick Company, around 1920, did make what was supposed to be a machine for playing all types of records with a reproducer adaptable to Diamond Discs as well as Pathe's vertical discs and standard needle discs. However, the Brunswick did not do justice to the Edison disc when compared with the reproduction from a genuine Edison machine.

Mr. Edison ruled his record business with near despotism. Only records he approved could be issued. He had engaged many of the world's leading operatic singers to make discs, then decided for reasons only known to him that most of those recordings could not be sold. Instead, he loaded his catalogue with recordings by artists who had "perfect recording voices" in his opinion, with little regard to their popularity or standing in the musical world. The Edison disc catalogue did contain many great names and remarkable recordings, but it was limited when compared with the world-wide coverage of talent offered on needle-type discs.

Many Edison discs were "overrefined." One instance is a harp used in accompanying a ragtime song. Edison's personal quirks as to who was worthy of making Diamond Disc recordings were unpredictable. Typical was the case of Bob Roberts, a comedian who had made dozens of cylinders. When Edison heard Roberts' disc test recording, he is reported to have said, "This man does not know how to sing. Don't use him." John Young, a popular tenor of that time, told me that the striving for perfect diction and pitch often led to so many takes that by the time a recording was accepted, "all the 'ping' was gone."

Cesare Sodero was engaged by Edison as musical director of the discs soon after their introduction. Sodero was an accomplished musician but lacked the showmanship and verve displayed by Victor Herbert and Fritz Ecke when they were managing the musical arrangements for the cylinders.

Edison contributed outstanding methods for recording. He developed the "dead studio" which cut out all ambient sounds and thus enabled the solo voice or

instrument to register fully. He was also bent on capturing instrumental recordings with the same perfection he had achieved with the voice. An oft-described experiment was the recording through a horn 125 feet long, large enough at the bell end to encompass the sounds of a fair size orchestra or a piano. Piano records played by Rachmaninoff for the Edison disc were acclaimed to have "perfect piano tone."

In 1921 Edison's monthly magazine, Along Broadway, boasted of having 2,400,000 readers. That publication took special care never to mention the Blue Amberol cylinders which fared poorly in the better recordings. Earlier slower processes of getting the records from studio to dealer had been speeded up so that "hits" were delivered promptly. But the volume of sales was dropping. This is reflected in a record made for dealers in 1924 called "Greetings From The Bunch At Orange." Christmas messages on it from department heads sound encouraging and Mr. Edison himself promised better things for the "future." Dealers were not selling Diamond Discs in profitable quantities.

In 1926 Edison brought out a long-playing disc which was a marvel of mechanical intricacy. The records had 450 grooves to the inch, double the number in present LP's. The records failed to attract attention and were too delicate to be practical. Instead of recording new selections that would have taken advantage of unbroken rendering of long compositions, the records were dubbed from programs assembled from regular Diamond Discs. A story is told that just as the final part of a twelve-inch twenty-minute record was being dubbed, the factory whistle blew and registered in the recorder, ruining the recording.

In that same year of 1926 the future of the standard needle disc was advanced by the great discovery of electric-process recording. By this process microphones could catch sounds that acoustic-process horns and mechanical diaphragms had been unable to record. The whole industry was revitalized--except Edison, who refused to have anything to do with the new process. Edison not only had the knowledge but held essential patents that would have enabled him to enter the new

field immediately. Evidently considering that his own methods were perfect, he discounted the electric process by advertising "No distortion on Edison Records."

Belatedly, in 1927, Edison did adapt the electric process but made no announcement of it nor were the Diamond Discs so marked. They can be identified by matrix numbers in the 18,000's. Actually the electric process was not the great advantage to the Diamond Discs that it was to needle-type discs. Early attempts have many faults in them. Later ones gained definite brilliance, but in some instances the new process produced a strident tone. It is doubtful whether the electric Edison discs could have measured up to the voice quality necessary for the earlier tone tests despite their increased vitality.

Edison gave his answer to Victor's Orthophonic Victrola and similar instruments with his "Edisonic" phonograph in 1927. The only essential difference between the Edisonic and earlier models was a larger tone chamber. Older machines played the electric discs just as well, if somewhat less loudly. Edison brought out radios, "the set the world has been waiting for." Theodore, one of his sons, had invented a remarkable pickup that played Diamond Discs and standard discs. New combination Edison radio-phonographs included this equipment.

Standardization of all records was inevitable. The public was satisfied, and rightly so, with records which could be played on all makes of machines. The days of special instruments and unique records were over. The needle-played disc had won the competition. Edison's associates must have realized that the company's only chance of survival was to conform. In 1928 a third type of record was added to the Diamond Discs and Blue Amberols--a "Needle-Type Electric-Process" standard disc. What Edison might have developed in that line as a superior record came to an abrupt end when Mr. Edison himself ordered all record manufacturing stopped. The last issue of Edison records of any type was in September, 1929.

It is thought that the aging inventor renounced

all records when his pet, the Diamond Disc with its "perfect fidelity" was done for. His dislike for the lateral-cut process and "talking machine" type records may have caused him to not wish them to bear his name. By 1929 Edison, as a name to reckon with in phonographic science meant little in the market place, despite its earlier prominence.

There are a few avid collectors of Diamond Disc records, but by and large, they are going begging. Some dealers refuse to handle them in antique shops. Thousands of records have been destroyed and handsome cabinets have been hacked into kindling. Two dealers told me gleefully how they had shoveled tons of Edison discs into their coal furnaces for fuel.

For the collector who would venture into a truly exciting field that still is not expensive, the Diamond Discs offer much in treasure hunting. It will be necessary to "listen through" the surface noise in many cases, but that "living sound" is there nevertheless. Many other records, especially ones with white paper labels, are reasonably quiet. I recommend that the collector explore the whole range of what was recorded and not confine himself to opera records. Take note of the piano selections, pipe organ solos, xylophones, and salon orchestras. Many musical comedy numbers were recorded more authentically on Edison discs than on other makes. Avoid discs with damaged surfaces for they can injure the diamond stylus.

At the present rate of discard, Diamond Discs and machines will soon be scarce and expensive. The patient collector will be rewarded for his efforts in preserving these records, and will discover the truth of the claim that the Diamond Disc did indeed achieve "perfect fidelity" sixty years ago.*

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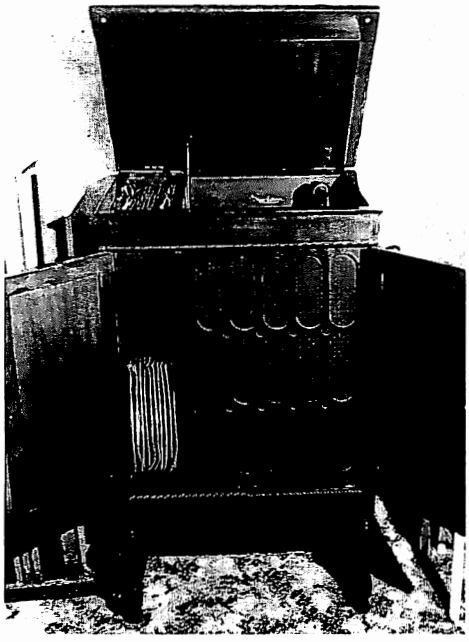
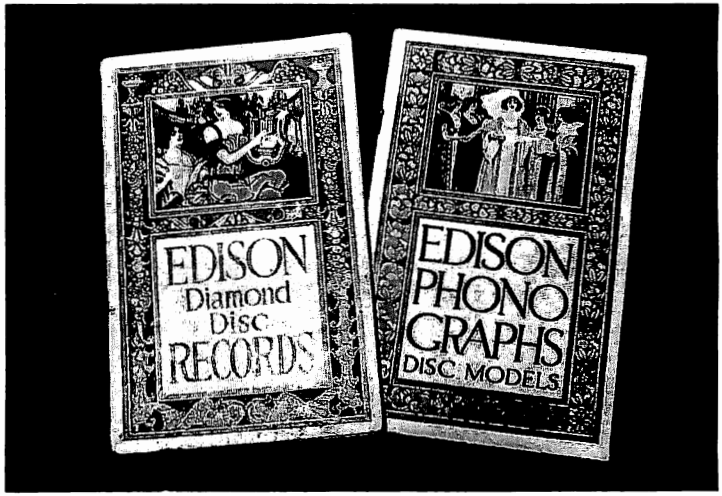
*Grateful appreciation goes to Professor Walter L. Welch, Curator of Audio Archives, Syracuse University, for his invaluable help in preparing this article. Mr. Welch is without peer in his knowledge of Mr. Edison's recording techniques. It has been

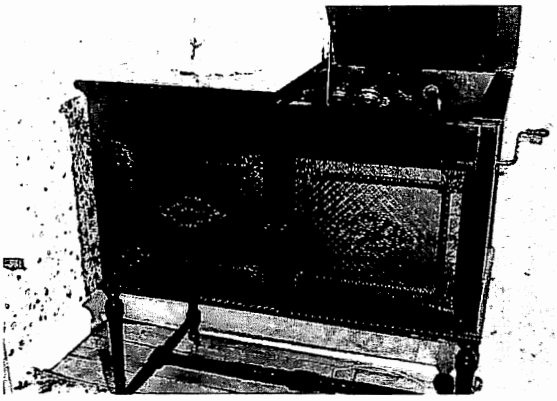


1927 "Edisonic" phonograph (Schubert model) with large tone chamber was Edison's answer to Victor's "Orthophonic" victrola.

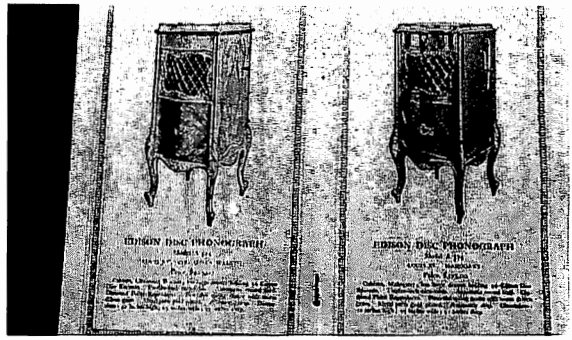


1914 Edison disc catalogues with full color covers and "Classic" approach for introducing Edison's new disc records and machines.

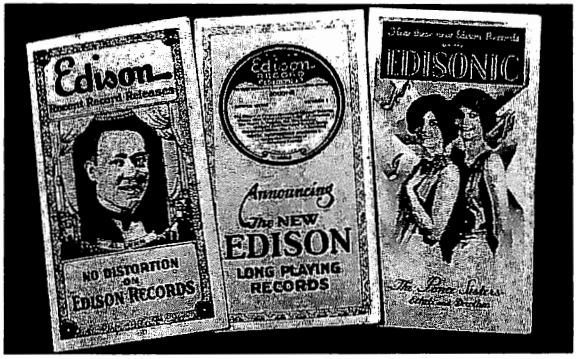
1926 Edison console phonograph equipped for both standard and long playing Edison discs.



Edison diamond point reproducers and attachment. Extreme left-used for blue amberol cylinders; the other two for Edison disc records. All use the same system of floating weight, non-metal diaphragm and diamond stylus. At top is attachment for playing conventional needle type discs on an Edison disc phonograph.



1914 advertisements showing elegant cabinet work on the newly introduced Edison disc phonographs.



Monthly supplements of the late 1920's showing "No Distortion" quotation, introduction of long playing records, and the "Edisonic".

As early as 1911 with the cylinder records, Edison emphasized keeping abreast of broadway shows and the opera. The company's monthly magazine, "Along Broadway," continued this into the 1920's.

"Tone-Test" booklet issued by the Edison Company, confirming claims that reproduction of Edison disc records with the "Living Artist Reveals No Difference".

Edison disc records are one-quarter inch thick and weigh a pound each. Early "Embossed Black Label" at right; later "White Label" at left.

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For more than forty years, L. Brevoort Odell, a private collector, has pursued his interest in acoustic records, chiefly cylinders, with particular emphasis for Blue Amerols.