

SYMPOSIUM RECORDS CD 1243

The FOUR-MINUTE CYLINDERS Part II

Biographical details for the artists in this volume are included in the notes for the companion volume, CD 1242.

Thomas Alva Edison (1847-1931) first thought of recording sound whilst he was working to improve his "Repeating Telegraph"; a machine he had developed to speed up the transmission of telegraphic messages. These were sent by Morse code, dots and dashes representing the letters, stored on paper discs or tape. In the course of one of his experiments, Edison ran a disc at high speed and heard what he described as "A light, musical, rhythmic sound resembling human talk heard indistinctly." His log for the 18th July 1877 reads: "Just tried experiment with a diaphragm having an embossing point and held against paraffin paper moving rapidly. The speaking vibrations are indented nicely and there is no doubt that I shall be able to store up and reproduce automatically, at any future time, the human voice perfectly."

The earliest reference to the Phonograph is on one of Edison's sketches, dated 29th November 1877. It shows a grooved metal drum on a shaft. Round the drum was wrapped a sheet of tinfoil. The drum could be rotated by a handle at one end of the shaft. The shaft also had a screw thread so that as the handle was turned, the drum would both rotate and move along. On each side was a diaphragm, with a stylus attached at its centre. The stylus on one diaphragm was shaped for recording sound; the other for reproducing it. Loud, clear speech would vibrate the recording diaphragm so that as the tinfoil on the drum moved past the stylus, a spiral line of indentations would be produced on the tinfoil.

Edison handed this sketch to his assistant, a Swiss clockmaker, John Kruesi, and, according to some, told the astonished Kruesi that the machine would talk.

On 6th December 1877, Kruesi delivered the completed machine to Edison who promptly recited into it what he later described as "a little piece of practical poetry", the nursery rhyme "Mary had a little lamb".

The machine worked, and if Edison's own account is to be believed, "I was never so taken aback in all my life... I was always afraid of things that worked the first time."

Despite the initial euphoria and Edison's claim that he could "reproduce... the human voice perfectly", the tin foil Phonograph of 1877 was far from perfect. Tin foil was an extremely sensitive recording medium, but unfortunately, after the recording was made it quickly wore. Few of the early tin foil experiments have survived, probably none in a playable state, and indeed it is doubtful if anything of real historical or artistic significance was recorded at all. Although such great artists as Franz Liszt (1811-1886) and Richard Wagner (1813-1883) were still alive, they were apparently never asked to record. Indeed, it is doubtful if either of these illustrious gentlemen were even aware of Edison's experiments.

Nevertheless, the Phonograph was hailed as "One of the wonders of the world" and Edison as "The greatest inventor of the age". Eager to capitalise on this success, Edison took the Phonograph to New York City and presented himself at the offices of *The Scientific American* at 67, Park Row. The issue for 22nd December 1877 reports that "Mr. Thomas A. Edison recently came into this office, placed a little machine on our desk,

turned a crank, and the machine inquired as to our health, asked how we liked the Phonograph, informed us that it was very well and bid us a cordial goodnight".

The following April, Edison took the machine to Washington D.C. and demonstrated it to members of the National Academy of Sciences, and to President Rutherford B. Hayes (1822-1893) at the Whitehouse. Hayes was evidently fascinated and is said to have stayed up all night recording his voice.

It appeared to many that the Phonograph had a rosy future, but Edison's interest waned as his attention was diverted to the development of the electric light. By mid-1878, he had forgotten all about the Phonograph and did not to return to it for a further ten years.

The possibility of recording sound was nothing new. It had fascinated scientists and philosophers for generations. In 1857, a Frenchman, Léon Scott de Martinville (1817-1879) devised a machine which he called the Phonautograph. A hog's bristle, attached to a diaphragm at the end of a horn, was placed against a carbon-coated revolving drum. Sound collected by the horn, vibrated the diaphragm and the bristle traced a pattern of the sound waves on the surface of the drum. The machine was used for a time as a kind of primeval oscilloscope, but Scott was unable to play back what he had recorded.

Twenty years later, Charles Cros (1842-1888) evolved a system of recording which, for all practical purposes, was identical to Edison's.

Cros proposed a diaphragm and stylus which would cut an undulating spiral on a smoke-blackened disc. The disc would then be photo-engraved to form a disc of hard material such as tempered steel. Cros' idea (which in many details anticipated Berliner's system) might have worked, but, lacking the financial backing to construct a working machine, he settled for the next best thing, he deposited a sealed packet containing details of his invention with the Academy of Sciences in Paris on the 10th April 1877.

At his request, presumably on hearing of Edison's success, his packet was opened and read on the 3rd December 1877, thus proving, to the satisfaction at any rate of some, that Cros, not Edison, was the true inventor of the Phonograph. Scott also tried to take some credit. In fairness to Edison, it must be remembered that whilst he probably knew something of Scott's work, no evidence has ever been found that he was aware of Cros. However, it has been suggested that the date on Edison's log was added subsequently. What is certain is that Edison was the first to produce a machine which actually worked.

Far more significant, were the experiments, starting in 1880, conducted by Alexander Graham Bell (1847-1922), his cousin Chichester Bell (1848-1924) and Charles Sumner Tainter (1854-1940). Alexander Graham Bell already had the invention of the telephone to his credit, and it was therefore perhaps natural for him to have a keen interest in the problems of recording sound.

In 1880, he had been awarded the Prix Volta by the French Government and with the financial proceeds he established the Volta Laboratory Association in Washington D.C.

Various experiments in Electro-Acoustics followed, and in 1885 the Laboratory produced an instrument of its own, called the Graphophone. This was similar to Edison's Phonograph, but for one crucial refinement. Edison's tin foil was replaced by a cardboard cylinder coated with wax. Wax was to be of the utmost importance to the talking machine industry until well after the second world war.

Curiously, Edison seems to have been completely unaware of what the Messrs. Bell and their associates were doing, for not until 1887 did Edison take any further interest in the Phonograph. However, there can be little doubt that when his interest was re-

awakened, it was as a result of hearing of the Volta Laboratory's experiments, though Edison maintained that the timing was purely coincidental. In October 1887, he informed the New York Evening Post, "I finished the first phonograph more than ten years ago (sic) (and) it remained more or less a toy... Nevertheless, the phonograph has been more or less constantly in my mind ever since. When resting from prolonged work upon the (electric) light, my brain would almost automatically revert to the old idea."

Clearly Edison was announcing the imminent arrival of his improved machine, but the problems to be overcome were evidently more complex than he had anticipated, and it was only in June 1888 that his Improved Phonograph made its *début*. A famous photograph, said to have been taken in the early morning of the 16th June 1888, shows a dishevelled but triumphant Edison listening to his new machine, having worked on it continuously for three days and three nights..

In designing this machine, Edison adopted some of Bell and Tainter's improvements and introduced other refinements of his own. Probably the most significant of these was to replace the cardboard with wax coating by a cylinder entirely of wax. Wax cylinders were extremely fragile, but the impression on them was much better retained than by tinfoil, and the playing time was increased from a few seconds to two minutes. Moreover, unlike Volta's coated-cardboard cylinder, Edison's solid wax could be re-used many times over by shaving off the original recording. In this design Edison had devised a product which would remain substantially unchanged for almost a quarter of a century.

Events moved rapidly. Edison dispatched a representative, Colonel George Gouraud (18??-1912) to London with a prototype machine and a quantity of wax blanks. Gouraud, with a distinguished record in the American Civil War, had become a well known figure in London society, and into this society he brought Edison's machine. The possibility of recording the human voice was nothing if not novel to 1888 Londoners (the original tin foil machine having received virtually no publicity here) and Gouraud seems to have encountered no difficulty in persuading influential figures of the day to have their voices recorded. The poets Robert Browning (1812-1889) and Alfred Lord Tennyson (1809-1892), actor Sir Henry Irving (1838-1905), composer Sir Arthur Sullivan (1842-1900) and even former Prime Minister William Ewart Gladstone (1809-1898) were all recorded in October 1888 or shortly after. Edison's German representative was no less enterprising. In 1889 he captured Johannes Brahms (1833-1897) playing part of his Hungarian Dance No.1 in G Minor and providing his own spoken announcement. This recording, although it survives only in very poor sound, may be heard in a new transfer on Symposium 1222.

Meanwhile, the talking machine industry in the United States was expanding rapidly. Edison had long insisted that the phonograph was not a toy for entertainment, but a piece of office equipment for dictation. A distribution system was established and some machines were indeed used for this purpose. Many of the distribution companies however, quickly realised there was greater potential in providing entertainment cylinders for saloons and drug stores. Edison soon swallowed his pride and launched a commercial recording programme. The first cylinder offered, made of brown wax, was a rendition by the Edison Concert Band of 'All Coons look alike to me'. Already, however, competition was beginning. At much the same time that Edison was improving his phonograph and Gouraud was courting the rich and famous in London, a young German émigré, Emile Berliner (1851-1929), living in Washington D.C., was experimenting with a flat disc record to be played on a machine he called the Gramophone. To judge from the quality

of the earliest surviving discs, Berliner's first attempts were no more successful than Edison's, but if Fred Gaisberg (1873-1951), who would later play such an important role in the development of the Gramophone Company, is to be believed, Berliner was firmly of the opinion that his machine was already superior to Edison's. "Berliner proudly explained that in his process the recording stylus was vibrated laterally on a flat surface, thus always encountering an even resistance, which accounted for the more natural tone. Acquainted, as I was, with the tinny unnatural reproduction of the old cylinder playing phonographs, I was spell-bound by the beautiful round tone of the flat Gramophone disc." Moreover, copies of discs could be produced in unlimited quantities in a press. Cylinders, however, had to be produced individually, though fairly soon it was found that a strong voice could be recorded successfully by a bank of a dozen or so machines at a time. Nevertheless, no artist of consequence could be expected to perform the same piece over and over again just to produce a few dozen recordings, so there was little of musical worth available. Probably more than anything else it was the ease of mass-production which ensured the eventual supremacy of the disc in the subsequent battle between the two systems. In 1896 Edison did offer seven solos by one Carlos Francisco, a pseudonym of the Spanish-American baritone Emilio de Gogorza (1874-1949) but the Edison customer who wished to listen to Grand Opera, was unlikely to find anything in the catalogue with which to satisfy himself.

In 1897 the Gramophone Company was established in London to represent Berliner's interests in Europe, and in Paris, the French Pathé company was offering competition. By 1900, Berliner's American concern, now named Victor, and Columbia were both expanding rapidly and their catalogues were beginning to include operatic fare performed by major artists.

Meanwhile, in West Orange the Edison company carried on much as before. However, in 1901 a method of mass-production by moulding was at last perfected. The cylinders were described as "Gold Moulded" and the new process allowed a more durable wax to be used. In theory, at least, this allowed an unlimited number of copies to be made from one master cylinder mould. The cylinders were henceforth black, presumably to distinguish them from their predecessors. However, moulding cylinders must have been slower and more difficult than pressing discs.

Only in 1906, after being in business for some 18 years, did Edison begin to offer operatic recordings. To be sure, cylinders of Military Bands and "Coon Songs" continued to pour forth as fast as the company could record them; the "pop"-market was and is the main source of income for any company in the entertainment business. However, Edison decreed that no expense should be spared on the new series; to this end he even opened a new recording studio. This was in New York City, on the 17th floor of the Knickerbocker Building at Fifth Avenue and Sixteenth Street, and it wasn't long before such artists as: Bessie Abbot, Mario Ancona, Robert Blass, Giuseppe Campanari, Florencio Constantino, Andreas Dippel, Heinrich Knote, Marie Rappold, Anton van Rooy and Antonio Scotti could be seen in the vicinity. Edison himself had little understanding of opera, but this did not prevent his publicity department plugging the new records for all they were worth, and often more. "Hitherto, Mr. Edison has refused to permit Edison records to be made by Grand Opera singers, preferring to wait until he could so improve his methods of recording that the voices of great artists could be reproduced with all their characteristic sweetness, power and purity of tone. These improvements having been effected, the artists co-operated with enthusiasm with the result that the Edison Grand Opera Records ... are a distinct advance over anything of the

kind heretofore attempted."

The implication was that all previous attempts by rival companies had in some way or other been flawed and there is indeed some truth in this assertion. The cylinders themselves are seldom seen today but when playable copies do turn up and are reproduced electrically, they bear eloquent testimony to the success of Edison's recording techniques. As a contemporary advertisement put it and with considerable justification: "The... Grand Opera Records will go out... with the prestige of the greatest single success in the history of the Edison phonograph. Until the first ... of the records were fairly on the market, it was uncertain how the trade and the public would receive them. The approval of the public was prompt and emphatic. For clearness, naturalness and artistic reproduction, they were pronounced superb (and) they were hailed as marking an epoch in the art of reproduced sound."

Their rarity today is hard to explain. Technically they were excellent, and many of the singers had important careers. However, they were expensive and their playing time, limited to just over two minutes, necessitated some drastic cuts. Constantino's "Che gelida manina", for example, commences at "Sono un poeta", almost half way through the piece. Thus, they stood little chance against the durability of Victor's 12-inch shellac discs with their playing time of over four minutes. These accommodated the aria complete. The Edison company had, in short, presented its jobbers with something of a white elephant and, to add insult to injury, it admonished them when the anticipated sales figures did not materialise: "In the past, much has been said in criticism of the (Edison) Phonograph because no high class records by Grand Opera singers, could be had for it. Now that the want has been supplied, dealers should lose no time in going after this high class trade."

Despite the failure of Edison's operatic venture, the company's other sales, of both cylinders and machines, were holding up well. Nevertheless, as 1906 drew to a close, some of the more perceptive members of Edison's board could have been forgiven for feeling a little uneasy. Victor and Columbia were both prospering in the disc business while cylinders were beginning to lose their market share as more and more people turned to the disc for their home entertainment. Part of the problem, as we have seen, was the restricted playing time, so as 1907 dawned, Edison began experiments to double the available time. Short of increasing the diameter of their cylinders, as Pathé had done, thus making them incompatible with existing equipment, there were only two ways in which this objective could be accomplished: either by reducing the running speed, or by cutting a finer groove. Edison opted for the latter. The new cylinders had 200 turns to the inch instead of the previous 100, and like the best discs, had a maximum playing time of something over four minutes. It is evident, however, that the company encountered severe difficulties developing the new cylinder for the new 4-minute "Amberol" cylinder did not go on sale until November 1908, by which time Edison's already precarious market position had been further undermined. One of the difficulties was that as the groove was smaller, so the area of contact with the stylus was also smaller. The resulting increase in pressure on the groove walls resulted in more rapid wear. The obvious solution was to use celluloid, a material with excellent wearing properties. However, by a court decision of 1901, the Lambert company owned the rights in the manufacture of cylinders from celluloid. Consequently, the Amberol was still made of wax and looked very like its old two-minute counterpart. It has been suggested that they were made of a more durable wax and it is certainly true that they were less susceptible to fungus. The company itself tried to play this card. Readers of Edison's house publications were told how, during the manufacture of the Amberols, Edison would emerge from his office

clutching a paper bag and deposit the contents into the mix. The chemical elements of this particular brew were said to be known only to Mr. Edison himself and: "Every effort to discover the identity of that mysterious and potent chemical by analysis, has met with dismal failure.". For all that, the wax Amberol was a very fragile beast which, like its two-minute cousin, would shatter if subjected to anything more than the slightest knock. Judging from the numbers which still turn up after more than eighty years, the series as a whole sold well enough, though many of the more desirable titles are seldom seen. The first Amberol list, dated the 15th November 1908, offered 50 titles, but there were no operatic selections. The first Grand Opera Amberols, came in December 1909, nearly seven years after other companies had offered four-minute, twelve-inch discs. The Amberol cylinders were too late to be any serious competition, they were, however, considerably better recorded than anything the disc companies could do, and were more cosmopolitan than Edison's earlier attempts. Most of the two-minute Grand Opera records had been recorded in the United States, but by 1909 Edison had established studios in Milan, Berlin and Paris, as well as West Orange and London. The new cylinders offered titles by: Agostinelli, Carlo Albani, Arral, Bori, Caronna, Cilla, Constantino, Delna, Dubois, Duclous, Farrabini, Galeffi, Galvany, Giorgini, Hensel, Huberdeau, Jörn, Kurz, Labia, Longstone-White, Lucenti, Martin, Melis, Nucelly, Parola, Polese, Rappold, Slezak and Soomer.

As previously noted, the cylinders were extremely fragile, but the same criticism could certainly not be made of the machines. These were beautifully made and thousands remain in good working order to this day. At the time of the launch of the wax Amberols, the range comprised of the "Triumph", "Home", "Standard", "Idealia" and "Gem" Phonographs, which had all reached their model-C versions. With the launch of the four-minute cylinder, the engineering department went into overdrive to produce a conversion kit to make existing machines compatible with the new records. This took the form of an extraordinarily ingenious miniature epicyclic gear unit, which halved the speed at which the reproducer was fed along the cylinder. It could also be disconnected, by means of a small lever, to allow older cylinders to be played.

In July 1909, the first "combination" model, the "Fireside", went on sale; then the model-C phonographs were discontinued, to be replaced by new "combination" model-D versions. Apart from the ability to play 2 and 4-minute cylinders, and other minor cosmetic changes, there was little about the new machines to distinguish them from earlier models and a new gimmick was required. The Edison company found one by looking to its competitors. In 1906, the Victor company had introduced a magnificent console model with enclosed horn. It was called the Victrola and sold for \$200. Columbia followed suit with a similar instrument, the Grafonola and in Europe HMV got in on the act with British built Victrolas called Gramolas. Edison's answer, in December 1909, was the Amberola I. Like the Victrola, this was a console model with enclosed horn, also at \$200. However, unlike anything else available, it played only cylinders. Other Amberola machines followed over the next twenty years, including a number of table top models, and Edison was the only company to offer a cylinder instrument with enclosed horn. The Amberola I, appeared at the same time as the first operatic wax Amberols, and Edison decided the time was right to push both the Amberola and Grand Opera. In February 1910 the company informed the trade: "Now that you've got Slezak and the Amberola to take care of one class of your customers, and all the other styles... to take care of the other classes, you're equipped to take out all the profit there is in the business... because while the Amberola class is resting and the Grand Opera lovers are saving up to buy more records, the good

old ragtime - coon songs - Sousa - Herbert - monologues - sentimental-ballads crowd will still be on the job buying phonographs... and... records until there is frost on the sun."

Unfortunately the sun turned cold surprisingly quickly. Despite the sonic superiority of the cylinder, and the undoubted quality of Edison products, cylinder sales were falling off alarmingly. Edison's chief recording engineer, Walter Miller, was certainly a worried man and urged Edison to produce a disc machine without delay. Edison, despite his years of advocacy of the cylinder's many advantages, agreed. Disc recording equipment was operating in Edison's European studios by the early months of 1910, but only in October 1913 did the Edison Disc Phonograph become available. Even then, a European launch was delayed in order to meet the home demand. (As it happens, Edison Disc Phonographs never reached Europe in any quantity due to the First World War.) While the engineering department was working to develop a disc instrument, Edison himself was determined to continue with the cylinder. His former chief chemist, Dr. Jonas Walter Aylsworth, had devised a celluloid material which was hard wearing, relatively cheap to produce and, most important, did not infringe anyone else's patents. Armed with this, Edison made one last desperate bid to save the ailing cylinder trade. At the end of 1912, wax cylinders were abandoned and in January 1913, cylinders made of blue celluloid, called Blue Amberols, were introduced. They consisted of a celluloid tube on a plaster-of-Paris core, and they were played with a new reproducer having a diamond stylus. According to Edison's ever enthusiastic advertising department: "The Blue Amberol record has been played three thousand times without any deterioration in the volume of sound or musical tone, and without showing signs of wear. That is to say, a Blue Amberol record is twenty to thirty times as durable as any other record made and to all practical intents and purposes unbreakable." In April 1913, the first operatic titles appeared. More followed over the next few months, but all were reissues, on celluloid, of titles originally issued as wax Amberols. Very few new recordings indeed were made for the series. A notable exception came in December 1913 with five solos by the great tenor Alessandro Bonci. However, any prestige these generated proved short lived for they were the last cylinder recordings made by any operatic celebrity.

When the Disc Phonograph appeared, the original intention, as with Pathé some seven years earlier, was for the disc to supplement rather than to replace the cylinder. Pathé's normal procedure was to record on special cylinder masters and then to make production parts by mechanical transfer in order to issue a given recording in various sizes and formats of both cylinder and disc. In the Edison factory, however, sometimes cylinder-moulds emanated from discs; sometimes altogether separate recordings were made.

In December 1914 there was a major fire at Edison's West Orange plant. It could not have come at a worse time. The Disc Phonograph had been available for barely a year, and in order to keep the machines selling it was essential that supplies should not be interrupted. Realising this, there was a major re-organization. It was decided that there would be no new cylinder recording; future supplies would be either re-issues from wax Amberol masters or transfers from diamond discs. Edison's cylinder recordings were generally somewhat superior to the discs, and the mechanical transfer process inevitably introduced a little deterioration of its own, thus the later cylinder issues tend to be less good than the earlier ones.

The company continued to produce recordings, including cylinders, until 1929. However, Edison set his face against any improvement which was not his own. Thus, when, electrical recording was introduced in 1925, the company issued a rather terse

statement which, after claiming that Edison records had "no distortion" continued: "There is much talk these days about electrical recording" as though it had just been discovered. "Let us stop and reflect. Hasn't it been pretty generally acknowledged that Mr. Thomas A. Edison knows something about electricity. He knows its advantages - he knows its limitations. Isn't it reasonable to suppose that this 'Master of Electricity' knows how to employ it in every possible way?... We are not 'telling the world' how Edison records are recorded ... except that the method employed is radically different from that in use by any other company." The implication was that Edison records were already electrically recorded, but even if they weren't this didn't much matter because they were already superior to all other makes anyway. Edison was eventually forced to embrace the new technology, and the last two hundred or so blue Amberols were electrically recorded. However they came too late to save the cylinder; for the other companies had established their lead, and the slump was arriving.

Edison continued to work almost to the end. He died on the 18th October 1931. In tribute, the entire electrical system of the United States was shut down for two minutes. He is best remembered not as an obstinate, deaf, octogenarian, but as a thirty year old engineer and entrepreneur demonstrating his little tinfoil phonograph to President Hayes. Whatever criticisms can be made, Edison's phonograph gave pleasure, and continues to give pleasure, to millions of people, and electrical replay of his Blue Amberol cylinders, as heard on this Compact Disc, ably demonstrates the genius that was Thomas Alva Edison.

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