

## **THE EDISON DISC**

### **Its Origin**

Edison made the first machine to repeat words spoken to it in December 1877. His first patents date from 1878 and include descriptions of both the famous tinfoil cylinder phonograph and its lesser-known sibling, a tinfoil disc phonograph. A few of these disc phonographs were made and demonstrated during 1878, but unfortunately none seems to have survived. Towards the end of 1878, Edison turned his attention to electric lighting systems. Meanwhile in 1886, Bell and Tainter adopted the cylinder format and produced a machine with exchangeable wax covered tubes. This "Graphophone" spurred a peeved Edison into perfecting his cylinder phonograph, which was demonstrated in 1888, and thus was set the format for office dictation machines for many decades, and a popular format for domestic entertainment, ceasing only in June 1929.

### **Its Adoption**

The high tide of cylinder popularity was about 1906-7, and although the cylinder remained a viable medium for many more years, the writing was nevertheless on the wall. Discs had a playing time of anything up to 4 minutes compared to just over half that from cylinders, and a greater variety of music was being offered as a result, by more imaginative record companies. Other factors were involved as well. In January 1907, Edison applied for a patent for a record of "hard, tough material" with a pitch of about 200 grooves to the inch, vertical cut, and work began on a cylinder to rival the discs. Edison had an excellent chemist named Jonas W. Aylsworth who had joined the company in 1890, and since his retirement in 1903, worked as a consultant in the Edison laboratories. A legend has it that Aylsworth and Walter H. Miller, Edison's manager, saw the need for a disc and began working on it secretly. Edison found out and decided to take charge, to everyone's dismay. That may or may not be partly true. What is verifiable, is that the creative trio set about devising a disc, from 1907, which would be as smooth and clear as the cylinder, natural in tone, indestructible, played with a polished diamond stylus ground to fit the U-shaped groove accurately, and in every way a superior record to all others on the market.

### **Materials and Manufacture**

At that time, new thermoplastics called phenolic resins were being much discussed in the chemical world. Aylsworth used these with wood flour to make a flat, unwarpable disc blank. At first the record grooves were moulded in celluloid, which was then bonded to the wood flour core. Early examples soon showed a tendency to split or curl up at the edges and peel off. Gradually these problems were overcome to the point of having a marketable product. Well preserved examples of these early discs are astonishingly good. From 1916, it was decided to apply the phenolic resin directly to the powder blank. This may have been all right at the time, but surviving examples have much greater hiss than the earlier ones. The main source of chemicals needed for these discs was Germany, and with the dislocation of trade occasioned by the Great War, Edison was forced to produce his own. The quality was variable, for this was cutting edge chemistry for the time. The problem was compounded in the boom years between 1917 and 1920 when demand was at its highest and materials were in their shortest supply. The blanks were supposed to receive four coats of resin to seal the blank and take the impression, but the drying time was longer for each successive coat and the time in the press was something like 20 minutes. The temptation to rush things is suggested by the imperfect pressings and noisy surfaces of this period. In 1921, china clay was adopted as the principal filler for the blanks,

then in about 1926, a water resistant petroleum derivative called BS was used which gave very good results, just as the market for these records was disappearing.

### **Gestation**

The Edison disc was conceived as a complete system with the record and every part of the reproducing mechanism conceived as a whole. From development of the record material, to the viscously damped recorder which allowed increased sensitivity yet freedom from blasting, to motor design to selection of cabinets to reproducer design and materials, not to mention many features introduced to avoid confrontation with Victor's patent lawyers, every element was developed with regard to producing the most accurate, and for the most part, practical reproduction of recorded sound then obtainable.

Progress was slow. Until 1910, Edison vigorously denied having any plans for a disc record, but nevertheless went ahead with plans for building up a repertoire of disc masters for future use. Standard disc motors of the time were not powerful enough to deal with the mass of 4 to 5 ounces of reproducer and the swivelling horn, even if the stylus pressure was only 1  $\frac{3}{4}$  ounces, and a suitable tracking mechanism had to be devised. That an Edison disc machine was pending was only announced in July 1911 at the 5<sup>th</sup> annual convention of the National Association of Talking Machine Jobbers in Milwaukee, Wisconsin. To discourage any assaults by Victor's patent lawyers against the new machine, it was reported that the machine was based on Edison's 1878 British patent. The disc phonograph was reported at the same time in a speech from President Dyer of the Edison Company at this convention in the Edison Phonograph Monthly of August 1911. However, no records would be ready for sale until late 1912 and in the meantime, Victor's agents lost no time in rubbishing the project, trying to persuade Edison's trade to drop his line in favour of theirs. The Edison disc was to be aimed at the quality end of the market, and finally in 1913, there was a fine range of machines and enough records for the public to begin buying. The range of machines was revised in 1915, following the factory fire of December 1914.

### **The Disc Phonograph in Britain**

Britain was the one foreign outlet, along with Australia, which was thought a viable market for the rather expensive Edison disc. Machines and records for the British market had been promised for October 1911, but were only beginning to trickle through by 1913. The simple fact was that the Edison had his hands full trying to keep up with the demand from his home market. The Northants Talking Machine Society appears to have been the first to demonstrate the new records in March 1913 and others followed suit. Not much was to be expected from the factory until the 1915 season. The records were received favourably, being thought sweet in tone, though not very loud. The use of machinery and reproducers other than Edison's would have affected these judgements. Some suspicion amongst cylinder enthusiasts that the latest blue amberols were dubbings from the new discs circulated, but with the banning of all non-essential imports from March 27<sup>th</sup> 1916, further comparison was impossible. The ban was lifted in 1919 but supplies of discs and machines did not arrive in any quantity until the summer of 1920. When they did arrive, the 33-1/3% war tax and general price rise since the beginning of the war made a disc which had been 4/2 now cost 8/6, more than three times the price of a popular needle cut record. There were few takers, neither for machines nor records. Reviews in the "Gramophone" magazines and other journals were less than encouraging, both concerning surface noise and content, with the exception of the dance records which won excellent reviews. The issue of dubbing of cylinders could be verified. Letters of protest flew in great numbers to Edison, but there was no

response and the company lost much custom and goodwill. A few of the long playing attachments sold, but the 1929 needle cut discs and their players never reached our shores. Jake Graham of Liverpool had been the staunchest of Edison dealers, but in February 1928, he sold up, leaving only the London and Provincial Phonograph Co. of Union Road, Clapham to soldier on until about 1936.

### **The Tone Tests**

With hindsight, these staged comparisons between the original singers and their records on a public stage were an astonishing achievement. To their original audiences they must have seemed miraculous. From the first, the Edison disc was subjected to critical audition. Victor and HMV had long been inviting the public to hear how similar their records were to the original singers. HMV hired the Albert Hall in 1907 to demonstrate the "Auxetophone" compressed air model with discs alongside the original singers. The audience was impressed at the lack of surface noise, the natural volume and the similarity with the original. Edison set up similar comparisons, called recitals, in 1913. But from October 1915, the real tone tests began, first at the Panama-Pacific Exposition in San Francisco, then all over the country. The company ran in collusion with dealers a series of staged comparisons where the audience was challenged to guess which was singing, or in the case of instruments, playing. Reports in the press, collected by Edison, reveal that there was genuine confusion. The machine played all the way through and the singer sang or did not, but moved the lips if the lights were on. A standard Laboratory "Chippendale" 250 model was used with discs no doubt given extra care in the pressing.

But other wise, the only trick admitted by the artists when interviewed by Jim Walsh for "Hobbies" magazine in the 1930s was that they sang at rehearsal volume rather than full concert volume and imparted a slight nasal quality to the singing. It is too facile to suggest that people were naïve and expected less than we would now. The correspondence columns of the Edwardian "Talking Machine News" reveal that record enthusiasts gave the machines and records no quarter and were as critical as we are now about the reproduction of their records. Edison records were good. They were recorded in a deadened studio allowing no ambient noise. Most acoustic recordings and machines have a carrying power which surprises. Carefully pressed Edison discs had sufficient sensitivity to hear sibilants and a singer drawing breath. Even now after more than 90 years, the tonal quality of some discs heard from an adjoining room is like a real voice. Combine the mechanical merits with the expectations of the moment on a darkened stage; no wonder people could declare the voice to be that of the live singer, when in fact she had already left the theatre! The impact of these tests was considerable and resulted in huge sales.

### **Curtain and Turntable Tests**

Curtain tests involve playing two machines behind a curtain and the listeners can decide which has the better sound. The humble Amberola 50 won many of these competitions. The turntable test was a device, which allowed three cabinet machines to be played each from exactly the same spot to give a fair test of the sound reproduction. The rival machines had to be well maintained and operated, regularly inspected by their respective dealerships. Although Edison disc machines were thought to have only slightly less surface noise than shellac discs, they routinely won in comparison with Victor, Brunswick and Columbia machines and records. Turntables were set up in the larger stores to allow each machine to give of its best, and a curtain concealed which instrument was playing. Human nature being what it is, accusations of trickery brought them into disrepute.

## **Boom and Bust**

The years following the Great War were full of relief and optimism. For all the misery and carnage, many had earned well doing war work, and soldiers came home with demob pay. The sun was shining again and people spent large amounts of money on records. In spite of a slump in 1921, the boom in records continued until 1923 when the impact of commercial radio in the States and public service broadcasting in Europe made itself felt. Record sales plummeted in the States and the Edison Company started to lose money in making records from then on. The BBC was so dull and worthy, we here continued to buy records! Edison reduced cylinder prices to 35 cents from 50 or 60 cents and lost many dealers, which resulted in selling cylinders by mail order direct from the factory. Some say Edison discs were of poor content and all hopelessly dated. It is not entirely true. Charles Edison and the younger elements at the Edison works saw to it that great variety of up-to-date goodies was available, maybe not as much as Columbia Victor or Genet in some fields, but certainly a representative selection of all that was happening. A notable exception was the lack of response to the album sets of chamber music, classical orchestral music and complete operas that some companies were starting to issue from the teens onwards. Perhaps there was also the practical consideration of the weight of an album set of eight to twenty diamond discs!

## **Innovation**

The most dedicated Edison enthusiast could not claim Edison to have been at the forefront on innovation and development in the 1920s. He was finally forced to abandon acoustic recording in 1927, two years after most rivals. He maintained that electric recording could not be achieved without distortion. In a sense, he was right, because of the ambient quality of microphone recordings, and it must be added that the last tone tests fizzled out with the introduction of the new technology. Read into that what you will. But a remarkable achievement launched in 1926 was his long-playing records. Only about 14 were released, and, recorded and played acoustically, they lacked volume from their gossamer-fine grooves, 450 to the inch. Compare a vinyl LP's 250 grooves. Consider the technical advances in cutting, electroplating and pressing such discs.

They spun at 80 rpm. A 12 inch disc gave 20 minutes per side, a 10 inch disc, 15 minutes. These were genuine Long Players, which were promoted as being able to provide "dinner music, from soup to nuts!" They were not a great success, however. The grooves are extremely susceptible to damage from the relatively heavy reproducer, the volume is modest, the recordings are acoustic at a time when the electric recordings of other companies were flooding the market, and worst of all, instead of taking advantage of the playing time to record long pieces of music, they had mere collections of dubbings of 4 minute tracks of standard Edison discs. This was in part due to the difficulty of sustained cutting and disposal of the swarf.

## **Electric Recording**

In spite of Edison's reactionary views on the merits of electric recording, his son Charles and Walter Miller managed to introduce the new method in the summer of 1927 to great effect, albeit more than two years late. A point to bear in mind, however, is that the great advance, which is electric recording, is more apparent to us with good electric reproduction available, than it was to people still using Victrolas with No. 2 sound boxes or early Diamond Reproducers which sometimes buzzed even with medium volume acoustic recordings. In the event, electric Edison discs were usually a very good product released at a time when the market no longer cared. Victor had its new "Orthophonic" gramophones to deal with the new records

and the first electric gramophones, some of them with radio and even auto-change systems, which rendered Edison's LPs unnecessary for the while. Edison's response to the needs of his electric records was to bring out a new reproducer with a heavier weight and spring loaded stylus bar which could handle the greater amplitude very well. It was marketed separately to bring new life to old phonographs, or on two new machines, the Schubert and Beethoven "Edisonics". These machines had fashionable new cabinets and longer, larger horns. Used with the new electric diamond discs, astonishingly fine results can be obtained with a real sense of presence of the singer. The sound is similar to the good Columbia machines of the time and less crackly than our HMV Re-Entrant gramophones.

### **The Last Gasp**

By 1928, it was becoming essential to link the phonograph business with radio. This was achieved by teaming up with the Splitdorf-Bethlehem Electrical Company of Newark. On January 14<sup>th</sup>, 1929, Edison took over this company and thereby had access to licenses for electrical recording and construction of quality radio equipment.

Three fine new radio-phonographs, the C1, C2 and C4 (needle-cut only) were introduced, having an ingenious pick-up designed by Charles Edison that could play both needle-cut and phono-cut with no more complication than inserting a steel needle when a standard 78 was to be played. With no steel needle, the usual diamond stylus on an L-shaped stylus bar would by default, be ready for use.

If Edison had to have a swansong of his phonograph, these radio-phonographs would honour his genius. Having heard a couple of C2s in action, I can say the radio reproduction would humble many modern receivers, and the reproduction of discs, both acoustic and electric, is astonishingly powerful and clean, somehow bringing all that is best from a 1920s recording without any noticeable rumble and only minimal hiss.

In the summer of 1929, the last blue amberols were released, (the list for May was released, that for June, prepared but released only in the clearance sales of the autumn of that year, and the list for July was proposed but not produced) and at about the same time, heresy of all heresies, an Edison needle-cut disc was introduced, together with two rather ordinary portable gramophones manufactured for Edison by the Prime Manufacturing Company of Milwaukee.

The Edison company's phonographic division had been manufacturing at a loss for some years by 1929. All manufacturing ceased on October 28<sup>th</sup> 1929 and the company turned its attention to manufacturing radios and electrical components.