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Cylinder Records: An Overview

Few people realize that sound recordings were made in the cylinder format for forty years (from 1889 to 1929) for entertainment use and even longer for business and educational purposes. While much of their history coincided with that of acoustic disc records, many cylinder recordings were never duplicated on disc. Also, a cylinder version of a recording often differed from the disc version, even by the same artist. Consequently, it is important that both a conscious and conscientious effort be made by private collectors and professional archivists to preserve our recorded heritage in this earliest of all recorded formats.

The purpose of this article is to provide keys to identify the different types of cylinders and to answer the questions most often asked by collectors and archivists when they first come across these aging artifacts. The primary focus is on the most common types of cylinders manufactured in the United States, with some mention of a few important European cylinder types and manufacturers. Most oddities and ultra-rare types of cylinders are beyond the scope of this article.

Why Cylinders?

When one first encounters records in the cylinder format, the likely question that comes to mind is "Why a cylinder?" Thomas Edison, Chichester Bell, Charles Sumner Tainter, and other early developers chose the cylindrical configuration because of inherent advantages the cylinder offered over the disc for sound recording technology.

Most importantly, the surface of a helically-grooved cylinder provides a constant stylus-to-groove motion throughout the recording, which affords a *constant linear speed*. Because the stylus-to-groove relationship remains uniform, so should the quality of the recording. With a disc record, the rotational or *angular* speed, which we know as "revolutions per minute" (RPM), remains constant, but the linear speed decreases as the stylus follows the groove toward the center of the disc. With reduced linear speed, there is likely to be some loss of audio fidelity. This has been a limitation of the disc format in all its constant-angular-speed varieties. Pathé Frères partially addressed this problem on their early discs by recording from the inside to the outside of the record, so the fidelity would improve as the record was being played. This practice was also used for many early radio transcription discs. But the problem was

never completely solved until the advent of Compact Discs, which are played at a constant linear speed (by varying their rotational speed from roughly 200 to 500 RPM).

The cylinder also became the format of choice because it made use of lathe technology, which was familiar to engineers and machinists of the 19th century. The lathe, (a machine designed to remove unwanted material from a cylindrical workpiece by rotating it against a cutting tool), can face, bore, and thread the workpiece, all important steps in making a cylinder and its corresponding mandrel.

Another advantage that cylinder phonographs held over their disc-playing counterparts was that a good number of cylinder phonographs could *make* recordings as well as play them back. Thus, blank cylinders served for business dictation in the office and also allowed recordings to be made in the home. (Today, the discovery of someone's old home recording of baby's first words or some amateur talent on a cylinder can be a moving and enjoyable experience.)

Cylinder Record Companies and Brand Names

To avoid the complicated corporate genealogies of the companies that manufactured cylinder records and phonographs, these companies and their products will be referred to generically in this article by the following terms:

1. The National Phonograph Company (from January 1896 through February 1911) and Thomas A. Edison, Inc. (from March 1, 1911) will be referred to as "Edison".
2. Products manufactured by the American Graphophone Company (1887-1906) and by the Columbia Graphophone Company (from 1906), and marketed by the Columbia Phonograph Company, General will be referred to by the brand name "Columbia".
3. Records manufactured by the Indestructible Phonographic Record Company (IPRCo) of Albany, New York were sold under multiple brand names. For simplicity, I will use the term "Albany Indestructible" to identify the common source of these records.
4. Entertainment records manufactured by the U-S Phonograph Company of Cleveland, Ohio were marketed under the U-S Everlasting and Lakeside brand names. These products will be referred to, in general, as "U-S".

Types of Cylinder Records

Characteristics Shared by all Cylinder Records

While there are many different types of cylinder records that need to be considered, they all share some common features.

First, cylinders consist of a hollow sleeve or tube with a modulated helical recording groove on the outer circumference. Virtually all cylinders track from left to right, as viewed from the front of the phonograph.

The various inner-surface features of cylinders were designed to grip the tapered mandrel of the phonograph and to assure that the recording would not be played backwards. Although the specific features to accomplish this varied from one manufacturer to another, most cylinder bores taper slightly from the left end to the right end, when

viewed from the front of the phonograph.

Another characteristic that all commercially-marketed cylinders share is vertical-cut recording. In this recording process, the stylus moves up and down with respect to the record surface, in response to the varying sound-wave pressures, rather than in a side-to-side motion (the lateral cut method, more commonly used to make disc records).

But this is about where the similarities of the various cylinder types end. We need to examine other characteristics that differentiate one type from another.

Standard-Size Cylinders and Groove Pitch

One of the most widely used cylinder configurations is commonly called the "standard-size cylinder". This broad type can be readily identified by its dimensions, which are approximately:

4-3/16 inches (10.6 cm) axial length,
2-11/64 inches (5.5 cm) average outside diameter, and
1-11/16 to 1-13/16 inches (4.3 to 4.6 cm) internal diameter.

Standard-size cylinders can be grouped into three generic classes according to groove pitch:

2-minute (100 TPI)
4-minute (200 TPI)
Business and School Cylinders (150 TPI)
(See the section: "Business [Dictation] and School Cylinders" for a description of this last type.)

While these three cylinder types all fit the same size phonograph mandrel, it is important to determine exactly which type you are dealing with before attempting to play a cylinder.

Two-Minute Cylinders

"Two-minute" cylinders were the earliest of the three types. They were produced from 1889 through at least 1918 (in the U.S.) and until 1923 (in England). They can be identified by the groove pitch (stated as "turns per inch" or "threads per inch" [TPI]) on the recorded surface. Two-minute cylinders have a rather coarse groove pitch of 100 TPI.

Groove pitch is important because most phonographs have feed screws to drive the reproducer mechanism, which tracks the cylinder groove pitch *exactly*, with little free play.

How long does a two-minute cylinder play? At first, that may seem like an odd question, but actually, it makes more sense than you might think. When we speak of a two-minute cylinder, we mean that the cylinder's duration is approximately two minutes *when played at a speed of 160 RPM*, provided that the recording covers most of the axial length of the record. However, this is just a convenient way to classify these cylinders, as not all "two-minute" cylinders play for two minutes. Sometimes, they play *longer* because they were recorded at a slower rotational speed. The term "two-minute" is retrospective - it came into use only after the four-minute cylinder was introduced and some distinctive term was needed to differentiate between the two types. Therefore, the terms "two-minute" and "2M" will not appear on records or

record containers manufactured before 1908, the year in which the four-minute cylinder came on the market.

Four-Minute Cylinders

Four-minute cylinders were introduced in 1908, in response to complaints that the two-minute duration was too brief, especially for classical and operatic pieces. Two-minute cylinders also faced competition from the longer-playing, 12-inch disc records of the period. Four-minute cylinders doubled the former maximum cylinder playing time by doubling the groove pitch. Thus, four-minute cylinders are grooved at 200 TPI.

The standard-size cylinders described above are the ones most commonly found among collections today. However, there are many other less-common types to consider; some are mentioned in the section "Other Cylinder Types".

Oversize Cylinders

Several oversize cylinder types are similar to the two-minute standard-size cylinders, with a 100-TPI groove pitch and about the same playing time. Yet, they differ from the "standard" cylinder in their larger diameters. Two types I will discuss briefly are the Concert cylinder and the Pathé Salon or Intermediate cylinder.

Concert Cylinders

The standard-size wax cylinders of the 1890s often did not play loudly enough to be heard in a large room, such as a dance hall or auditorium. One way to address this problem was to substitute a larger horn than the one originally provided with the phonograph. Another approach was to increase the surface speed of the cylinder. Several manufacturers did this by enlarging the diameter of the cylinder, which not only increased volume but also helped to improve the audio quality.

The first of the large-diameter types was the Concert cylinder. Concert cylinders are approximately 4-1/4 inches (10.8 cm) long with a 5-inch (12.7 cm) outside diameter. These records were first marketed in late 1898. The heyday of the Concert cylinder was roughly 1899 to 1902, but even at that time, their sale to the public was never large. By 1902, the advent of the moulded, mass-produced standard-size cylinder, which offered considerably improved volume, made the cumbersome Concert cylinder obsolete. Edison Concert Records could still be purchased by special order from 1902 until 1907. As can be imagined, Concert cylinders are rarely found today.

The large diameter of these records clearly required a special corresponding mandrel. Edison offered only a dedicated Concert Phonograph to play these records. Columbia and Pathé likewise made dedicated Concert phonographs but they each also sold models equipped with accessory mandrel sleeves which fit over a standard-size mandrel to adapt them to the larger cylinder.

Pathé Salon (Intermediate) Cylinders

During the early 1900s, Pathé and other firms offered the advantage of increased surface speed in a cylinder that was easier to handle than the unwieldy Concert cylinder. This was the Salon cylinder, also known as the Intermediate cylinder and as the Salon Intermediate.

This cylinder was 4-1/4 inches (10.8 cm) long, with an outside diameter of 3-3/4 inches (9.5 cm). This size was a nice compromise between the standard and Concert cylinders. Like Concert cylinders, Salon records also require a special mandrel. Pathé manufactured phonographs that could play only the Salon record and also made convertible machines with mandrel adapter sleeves.

Other Cylinder Types

While most odd cylinder record types fall outside the scope of this article, some unusual types occasionally appear on record auction lists and are found in some private collections and archives and therefore deserve mention.

Language Instruction Cylinders

One type of standard-size non-entertainment cylinder of note is the foreign language instruction cylinder. These came in sets of ten to twenty-five records with instruction booklets, listening tubes and, sometimes, a special phonograph. They were made as early as 1889 and as late as the 1920s. The purpose of these prerecorded cylinders was to let the language student hear the correct pronunciation of a foreign language. Repeating attachments on some machines allowed a phrase to be easily replayed, as often as the student wished. Early language records look like any other two-minute cylinder of the period and they will play on any phonograph designed for two-minute cylinders. Later series were grooved at 200 TPI to play on four-minute phonographs.

An interesting characteristic of these language cylinders is that they typically play at speeds close to 90 RPM. This slow speed was adequate for speech and allowed a longer lesson to fit on the record.

These records can be identified by their content and were manufactured by Columbia, Edison, or U-S Phonograph Company for the International Correspondence Schools, R. D. Cortina Co., or Dr. Richard S. Rosenthal's International College of Languages, at various times.

Busy Bee Cylinders

At first glance the Busy Bee Record, manufactured by Columbia for the O'Neill-James Company of Chicago, looks like any other standard-size cylinder. However, closer inspection reveals that the Busy Bee has a slightly larger *inside* diameter than the standard cylinder. Thus, if you owned a Busy Bee phonograph with its slightly-larger-diameter mandrel, you had to buy Busy Bee records from the O'Neill-James Co.; they were the only records that fit. In other words, capitalism was at work here rather than technological improvement.

Columbia Twentieth Century Talking Machine Records

Columbia achieved increased playing time for one series of records by simply increasing the axial length of the cylinder to 6 inches (15.2 cm). With the groove pitch still at 100 TPI and a speed of 160 RPM, Columbia offered a record that played approximately three minutes. These cylinders were made of black wax and were of the same outside diameter as the standard cylinder. Boxed as the Twentieth Century Talking Machine Record, these long wax cylinders were also known as "BC" Records or Premier Records.

The Twentieth Century Talking Machine Record had a short life span of only about three years, from 1905 into 1908. Consequently, they are seldom seen today. Their demise was hastened by the marketing of the four-minute cylinder.

While the Twentieth Century record can be played with the same reproducer used for the standard two-minute record, they require a longer mandrel which was fitted on some Columbia and U-S models. However, the first two-thirds of a Twentieth Century cylinder can be played on any two-minute phonograph having an open-end mandrel. The record will simply extend past the end of the mandrel.

Lioret Cylinders

While this article focuses on cylinders manufactured in the United States, some notable records from France should be included. The firm of Henri Lioret manufactured a unique cylinder-format product.

The Lioret cylinder, patented by Henri Jules Lioret in 1893, is a moulded celluloid record. Variants were made in four different lengths (see Chart No. 1), each with a 2-1/2 inch (6.4 cm) diameter. These rather small records, formed on a celluloid ring mounted on a brass support, played from thirty seconds to as long as four minutes. While the 3-1/8 inch. (8 cm)-long cylinder looks much like a standard-size cylinder, the other three Lioret sizes resemble small circular candy tins with colorful paper labels attached to one end. These records slide onto a rod-shaped spindle, rather than a tapered mandrel. Needless to say, these records fit only Lioret phonographs. Lioret cylinders and Lioret phonographs both are quite rare in the United States.

Business (Dictation) and School Cylinders

In addition to the entertainment records which form the bulk of most cylinder collections, cylinders were also manufactured for use in business and education.

Business (Dictation) Cylinders

Business cylinder blanks were designed to be used in offices for recording dictation, to be played back later by a typist or stenographer. Unlike entertainment records, these cylinders were meant to be shaved down and reused. As one might expect, the recordings most often found on these records are business letters, but business blanks were also sometimes used to make personal or documentary recordings and can occasionally reveal an interesting item. These cylinders are about 6 inches (15.2 cm) long and of "standard" diameter.

Business cylinders were to be recorded and played back on dictating machines at *either 150* TPI *(Edison) or 160* TPI *(Columbia)*. The rotational speed could vary, according to the whim of the person making the recording. Try playing business cylinders at 90 to 100 RPM, for a start. These records can be difficult to date, unless the recording itself reveals the information, because the blanks were produced from the 1890s on into the 1960s, when the machines were finally and rapidly replaced by newer dictation equipment, most often using magnetic tape or belts.

School Cylinders

Another type of standard-diameter cylinder fits neither the two- nor four-minute cate-

gories. This was the 150-TPI School Cylinder.

School Cylinders are prerecorded records intended for dictation practice in business classes. The contents include dictation exercises at various rates of oral delivery. Certain speech records were also used for elocution lessons. These records look similar to the Edison four-minute Blue Amberol Record, except that most were dyed black instead of blue. They are grooved at 150 TPI and play at 80 RPM. Consequently, if a standard-diameter record does not track properly at either the two- or four-minute feed rate, it may be a School Cylinder.

These records came in two sizes, the 4-inch "standard" length and a 6-inch length. The 4-inch plays for a maximum of six minutes and the 6-inch for a maximum of nine minutes.

Something unique to the School Record is that it had one of the longest production runs of any cylinder record. These records were made from 1910 until 1960, long after production of entertainment cylinders ceased.

Materials: Wax vs. Celluloid

The previous sections focused on dimensions and groove pitch as two attributes for classifying cylinder types. Another important factor to consider is the material of which the playing surface of the cylinder is made. This material is almost always either "wax" or celluloid. This distinction helps to identify and date cylinders. It is also crucial in making decisions about cleaning, preserving and playing back the audio information on a cylinder. Let's discuss the materials and how cylinder records were duplicated in production quantities.

Wax Cylinders

While wax and celluloid cylinders were produced concurrently for more than two decades, wax was introduced first and was used for entertainment records from 1889 into the 1920s. "Wax" cylinders may be divided into the following types, by the specific material.

White-Wax Cylinders

Of all the wax cylinder types, the earliest was the "white wax". These were the experimental precursors of commercial record products and are now extremely rare.

The white wax material was composed of various animal, vegetable and mineral waxes. Blanks were made of white wax in 1887 and into 1888. This material was used mostly in making standard-diameter cylinders, though some were shorter than the familiar 4-inch length. A small number of incunabular recordings survive on white wax records in a few archives and private collections.

Brown-Wax Cylinders

Standard-size brown-wax cylinder blanks were manufactured from 1889 into the 1910s.

Brown wax is actually a "metallic soap," combined with lesser percentages of natural waxes. This material was soft enough to make a good direct recording. The color can vary from a light cream color to a very dark, chocolate brown, but usually falls somewhere between the two extremes.

Because of their highly organic composition, brown-wax cylinders are unfortunately prone to mold (fungus attack). Often, they are found in an unplayable condition as a result of this mold damage. But sometimes, while they may look terrible, the stylus can pass over the mold with only a slight "swishing" noise.

All Concert cylinders manufactured by Edison and Columbia were made of brown wax, even those made after 1902 when standard-size records began to be moulded in black wax. Also, two-minute Recording Blanks are of brown wax. (Remember, when trying to date a cylinder record by the type of wax, if it seems to be a home recording, it could be from just about any period, not just prior to 1902.)

During the white- and brown-wax periods, duplicate records were made by one of three methods: direct, acoustic, or pantographic duplication.

The direct recording method was the first means of producing multiple records. This method was used in the very early 1890s and amounted to making recordings "by the round". Several phonographs, each loaded with fresh blanks, were arranged in front of the artist(s). The phonographs would be started simultaneously and several (perhaps four to twenty) records could be made from each performance. If more records were needed, the artists simply repeated the performance over and over again. With this method, each record was virtually unique. Needless to say, direct recording was not a very efficient way to produce records in quantity.

Next to be developed was the acoustic dubbing method. This process involved the use of rubber tubes to connect a phonograph playing the master record to a bank of phonographs loaded with blanks. As the stylus tracked the original (master) record, the resulting pressure variations, conveyed via the tubes, actuated the recording diaphragms on the phonographs holding the blanks. As the master record played, multiple duplicates were made. One problem with this method is that, unwanted noises in the room could be picked up and spoil the duplicates. This method was soon supplanted by the pantographic method.

The pantographic method traced the groove of the master record with a reproducer stylus which was mechanically linked to a cutting stylus bearing upon an adjacent blank cylinder or several blanks. This method cut down on intrusive ambient noise.

Both the acoustic and pantographic methods gave variable results. For instance, if you have the first copy made from the master, it would likely reproduce with good volume and clarity. But you could also end up with one made near the end of the master record's useful life, resulting in a weak and noisy recording. Also, there was no real guarantee that your record was not made from a copy of a copy of the master. Nor could you know that the copy was made by the legitimate record company and not by some early bootlegger.

Black-Wax (Moulded, Gold-Moulded) Cylinders

By the late 1890s the cylinder record's popularity was increasing and a better method for mass production was needed. This led to the commercial development of "Gold Moulding" - a metal deposition process which created a master metal mould from the original (master) record. This mould was then used to make further copies and moulds for mass production. The final duplicate records were made by flowing or forcing molten wax into the working mould (which had the recorded grooving in negative on its inner surface). Upon cooling, the wax would shrink and the cylinder could then be removed from the mould. The master cylinder was very slightly tapered along the length of its outer surface to facilitate easy removal of the duplicate from the mould.

Edison and Columbia both placed moulded records on the market in the first few months of 1902, though Columbia's cylinders were not yet black until 1903.

Gold-Moulding allowed the harder and more durable black wax composition to be used successfully. While black wax is more durable than brown wax, it is also more brittle, and becomes more so with age. It can be damaged by mold, but is not as susceptible as brown wax. Black-wax records play at a one-third higher speed than most brown-wax records and thus, are louder and capable of better sound quality. Another major advantage of these cylinders over their predecessors is that they soon had title and record number information molded into one end rim, making identification much easier.

No matter what type of wax material was used, all wax cylinders are quite fragile and prone to breakage and groove damage. A better material was needed and it came in the form of celluloid.

Celluloid Cylinders

Early Edison phonograph patents mention celluloid as a possible record material. However, the first company to commercially manufacture a cylinder made of this durable material in the United States was The Lambert Company, beginning in 1900. Lambert was not however, the first. Credit for this innovation goes to Henri Lioret of France, who, as mentioned earlier, obtained his first patent for a celluloid cylinder in 1893.

Lioret's process first softened a blank celluloid ring by immersion in hot water. It was then removed and inserted into a mould. A tapered mandrel, forced inside the celluloid ring, pressed the softened material into the recorded grooving to make an impression. The mould, cylinder, and mandrel were then plunged into cold water to shrink the celluloid so the cylinder could be removed.

Later celluloid records were made by more advanced moulding methods. A plain tubular celluloid blank was first inserted into a mould. The mould would then be sealed with airtight fittings and steam would be introduced into the mould. The applied pressure and heat would make the celluloid blank soften and expand into the negative grooving and end-rim markings, so that an impression would be left in the celluloid. After cooling and shrinking, the cylinder could be removed. The process took six to seven minutes per record.

All common celluloid cylinders have some sort of core to which the celluloid was tightly fitted for support. (Lambert cylinders are a notable, but less-common exception.) This critical fitting process was done after the celluloid had been impressed (or "printed").

The core of a celluloid cylinder varies from one brand to another:

Lambert - No core at all on most; late-production Lamberts have plaster linings.

Edison - Plaster of Paris, with a ribbed bore. Early examples have the plaster dyed dark blue or black. Later examples are cored with white plaster, though many cores have darkened with age, handling and soiling.

Albany Indestructible - Spiral-formed cardboard tube with metal rings at each end.

U-S - Resin-impregnated wood-pulp composition, with a smooth, tapered bore. (Mice loved the taste, judging by some examples!)

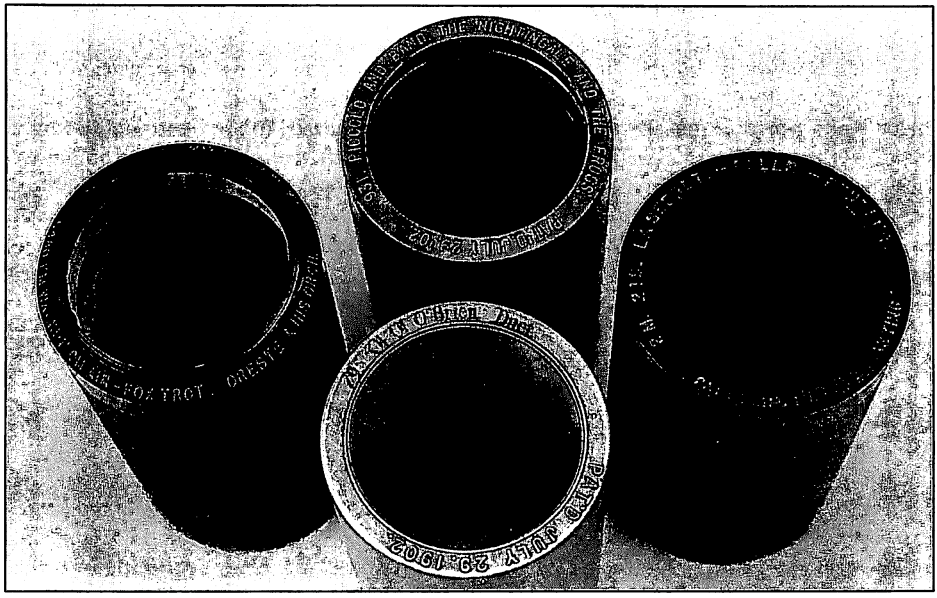

Fig. 1. Celluloid cylinders with cores: Indestructible, U-S, Everlasting, Lambert, Edison. (Photograph: James McPherson)

Fig. 1 shows four basic types of celluloid cylinder cores.

Celluloid records were made in both the two-minute and four-minute standard-size formats. Lambert also made celluloid Concert cylinders. Edison used celluloid for the very large Kinetophone cylinders for synchronous use with motion pictures, 1913 to 1924.

Celluloid records have several advantages over wax records. They are rarely broken by mishandling and can be played repeatedly with less wear than wax records. In addition, they rarely get moldy. Yet, celluloid records are not free from problems, despite what turn-of-the-century hyperbole would have us believe.

First, if a cylinder was made (or eventually became) slightly "out-of-round", a significant pitch waver would result on playback. This is especially noticeable with cylinders, as compared to discs, because of the higher rotational speed.

Secondly, camphor, which was used as a plasticizer in the celluloid, evaporates over time. As the camphor is lost, the celluloid tube tends to shrink in length and diameter. If the celluloid is constrained by a core, the increasing stresses can cause tears in the celluloid called "end splits." Such splits are seen most often on Edison Blue Amberol Records because they have flanges or turned-in celluloid at *both* ends of the cylinder. This prevents the celluloid from shrinking much lengthwise and thus, the stresses build up until the material splits. Other celluloid cylinders, such as those manufactured by the U-S Phonograph Co., have no end flanges, so the celluloid is free to shrink in length, pulling back from the ends of the core. This can cause the stylus to "jump the groove" if extreme shrinkage has reduced the groove pitch from the 100- or 200-TPI standards, but U-S records seldom develop end splits.

Albany Indestructible records have a celluloid flange at the title end only, which leaves the celluloid free to shrink back from the non-title end, so they don't suffer end

splits. Indestructibles can, however, get out-of-round when the cardboard-tube core deforms due to moisture, permitting the celluloid to shrink to the now-distorted contours of the core.

Another annoying problem is that core materials can swell with moisture and age, preventing the cylinder from fitting all the way on the phonograph mandrel. Plaster of Paris cores, especially those on later Edison Blue Amberols, are notorious for swelling. Tight-fitting cores can be reamed out to fit the mandrel, but this should be done carefully with a reamer designed expressly for cylinders, to keep the bore concentric with the celluloid. Never just rub the inside with sandpaper.

Playback Considerations

I have classified cylinder types by three attributes: dimensions, groove pitch, and materials. These attributes are all you need to identify the type of cylinder and to determine the proper equipment for safe playback. In this section, some basic considerations for cylinder record playback will be discussed.

Handling Cylinders

Always handle wax cylinders by inserting two fingers into the bore, to avoid touching the delicate recorded surface. The mere residue of a fingerprint can promote mold growth on some "waxes".

As mentioned before, most cylinder bores are tapered. While this taper is not particularly obvious on casual inspection, if one tries to slip a record onto the mandrel backwards, it simply won't fit on very far. For cylinder records bearing end markings, the end with the record number and title will be the smaller inside-diameter end to be slipped on the mandrel last.

I should emphasize that, if you have never before placed a cylinder on a mandrel, you should be careful to slide the record *very* gently until it first feels snug; don't force it past the point of initial resistance. Due to the taper, additional force could abruptly split or crack the record, especially wax ones. A tight fit can also cause trouble, should any drastic changes in temperature occur near the cylinder. For example, if an air conditioning vent blows cool air toward the phonograph, the cylinder may shrink onto the mandrel and crack.

Identifying Groove Pitch

It is important to keep in mind that groove pitch is what really separates two-minute from four-minute cylinders. If you play a cylinder and the stylus skips or repeats, then the reproducer is probably being advanced at the wrong feed rate. While this is one way to identify which kind of cylinder you have, it could also cause damage to the record.

There are safer ways to identify the type of record *before* playing it. Upon making a visual comparison of two- and four-minute cylinders, side-by-side, you will see that the grooving of the four-minute cylinder is noticeably narrower or finer than that of the two-minute cylinder. With a low-power magnifying glass, it is possible to clearly see the vertical groove modulation on a two-minute cylinder, whereas the four-minute groove pitch is too fine for the details to be so easily discerned.

Several brands of four-minute records can be readily identified because the title-end rim is marked with a "4M" designation. This is discussed further in the section

"Identifying Major Brands of Cylinders Manufactured in the United States".

Materials and Playback Equipment

The type of material used to form the recording surface of a cylinder *must* be considered when choosing appropriate vintage playback equipment. Wax records must *always* be played with a sapphire-stylus reproducer. *Never* use a diamond-stylus reproducer on any wax record as it will do irreparable damage. (This is not a question of the stylus material; rather, the floating weights on diamond-stylus reproducers were meant for celluloid cylinders and are too heavy for wax records.) Edison Diamond Reproducers can be identified by their large floating weight and by their styli, which are always mounted on a small metal bar in the shape of a cross. I strongly recommend using a sapphire-stylus reproducer, even on four-minute celluloid cylinders, as the reduced weight will cause less wear.

While the relatively soft brown-wax composition could take a recording well, it wears rapidly with repeated playback. It is very important to remember that, to play these soft wax records on a vintage acoustic phonograph, you should use a sapphire-ball reproducer without any overhanging weights. Early Columbia two-minute reproducers are fairly lightweight, but if an Edison reproducer is used, it should be Model A (sometimes known as the Automatic), Model B, or the early Gem. Any model designated C or higher is too heavy for safe playback of brown-wax records.

Black wax can tolerate a heavier reproducer than brown wax (such as the Edison Model C with its overhanging tail weight, or the Columbia Lyric Reproducer). Two-minute Gold-Moulded cylinders have a shallow, wide groove that requires an elliptical-contact-area "button" stylus (such as the Edison Model C) to track properly, with minimal wear. The four-minute Edison [Wax] Amberols, with their narrower 200-TPI groove, require a smaller stylus. The Edison Model H is the most common four-minute sapphire-stylus reproducer.

Never use a two-minute reproducer on a four-minute record or *vice versa*. A two-minute reproducer could scrape a four-minute groove and a four-minute reproducer would carve a damaging trough in the bottom of a two-minute groove. While they look similar, close inspection of the stylus mounts will reveal different configurations. The markings on the tail weights clearly indicate the reproducer model designation.

Some reproducers can be used for either two- or four-minute records. These (mostly of Edison design), utilize two separate styli, one two-minute and one four-minute. Some, like the Model K, have the two styli on a swivel mount. A half-turn brings the proper stylus into place. This model has a "2/4" indicator that is fairly easy to use.

Another series of favored Edison combination reproducers are the Models M, O, and Q. These have a horizontal, protruding rod bearing a knob at the end with a number 2 or 4 stamped on it, indicating the stylus in position to play the record. The number facing upward corresponds to the stylus facing down toward the mandrel. These reproducers are the forerunners of the later 78/LP "flip" styli and work in a similar fashion. The M, O and Q reproducers are generally preferred by collectors over the earlier rotating-swivel kind because the reproducer does not have to be removed from the carrier arm to change the setting.

All these purely-mechanical reproducers were developed for the original phonographs of the cylinder period. There are various types of electrical pickups that will play cylinders quite well, with less wear, but these are outside the scope of this article and really deserve a study of their own.

Playing Speed

Is there a "Standard" cylinder speed? The speed at which cylinders were recorded changed over the years, as technology evolved. The most common speed for prerecorded cylinders made after 1901 was 160 RPM, which became a near-universal standard for moulded records. Exceptions include the various series of records based on speech (for teaching foreign languages or stenography practice), which continued to be recorded at speeds between 80 and 100 RPM.

Some early-issue Edison Gold-Moulded Records play at the formerly-used speed of 144 RPM, because they were moulded from masters that had been made during the late brown-wax period. Another exception includes some Edison Blue Amberol Records dubbed from disc records, around 1915. Occasionally, these were transferred from Diamond Discs played at the wrong speed.

Other Speeds to Consider

White wax and brown wax cylinders, made by direct recording, acoustic dubbing, or by pantographic duplication, were recorded over a wider range of speeds than the records which followed. It sometimes seems as if the recording supervisor adjusted speeds during the recording session perhaps to better suit the duration and nature of each selection.

The speeds most often used for these early records were approximately 100 RPM, then 120 RPM, and finally 144 RPM (used for Edison and Columbia brown wax records made during 1900 and 1901).

However, exceptions are many. For instance, I have discovered some early wax cylinders recorded at 130 and 90 RPM. Generally - and only generally - the slower the speed, the older the recording, but one cannot dependably date a recording by its speed alone.

If you are familiar with the work of a given artist, especially if he or she is a singer, you may be able to determine the proper speed by the pitch of the voice. For instrumental records, especially solos, if you are acquainted with the music and instrument being played, you might try different speeds to determine which sounds "right" for that particular instrument. An important clue could be whether or not the instrument could be easily played in the key heard on the record.

Speed Adjustment

Most spring-motor phonographs have some means of speed adjustment. This is usually a knurled knob protruding through the bedplate of the machine or located underneath this plate, near the motor. Turning this knob sets the speed of the motor. A classic method for determining speed is to put a piece of tape on the mandrel and then to count how many times it goes around in a measured period of time. For example, 80 times in 30 seconds means that the speed is 160 RPM. This method is obviously not the most accurate, but will do in a pinch. Stroboscope discs are available for cylinder mandrels and can be quite accurate, when used with the proper illumination.

Some Edison phonographs of the early 1900s have two marks cut into the back guide rod, 1.6 inches apart. If the reproducer carrier arm moves from one mark to the next in one minute, then the speed is set correctly for 160-RPM records. Speed adjustment mostly requires some patience.

Storage Considerations

Proper playback minimizes record damage and enhances audio fidelity, but storage conditions must also be considered in order to preserve cylinder records. While few archives and private collectors have the money or facilities to provide ideal storage conditions for all types of cylinders, the following are general points to consider.

Temperature

Extremes in temperature are a threat to cylinder records. Heat can soften and deform wax cylinders, especially the soft brown-wax type. Black-wax Gold-Moulded cylinders are less affected by heat, but still not immune to elevated temperatures.

Drastic temperature changes create the worst thermal stresses for all cylinders. If a wax cylinder is taken from one temperature extreme to another, severe cracks may form. This is important to remember if cylinders must be shipped during extreme weather conditions. The shipping carton containing the cylinders should be allowed to slowly return to room temperature before it is opened. The wax Amberols and late-issue 2M Edison Standard Records made of hard wax are especially vulnerable to even small temperature changes, if not gradual and uniform over the entire record - simply *holding* some wax Amberols can cause a severe crack to form from the heat of the hand. When cleaning wax cylinders, it is important to match the temperature of any pressurized gas or cleaning liquids to that of the cylinder.

Celluloid cylinders are more susceptible to cold, especially those which have developed internal stresses from shrinkage of the celluloid material. Freezing temperatures, particularly below $0^{o F}$ ($-18^{o C}$) can cause the celluloid to further contract and possibly split.

Moisture

As previously mentioned, wax cylinders are prone to fungus growth which can eventually destroy the recording. The best way to avoid this growth is to store cylinder records in a dry environment. It is also important that humidity does not build up with changes in the weather or moisture-producing activities occurring in or near the storage area.

Containers

Clean storage containers are also an important consideration. Many old cylinder boxes are contaminated with dust, dirt, fungus, and insects. Unfortunately, it is difficult to completely clean old boxes of this unwanted debris. Archival-grade storage containers may be purchased as replacements but, generally, they are expensive.

Another related problem concerns brown-wax and early black-wax cylinders. These records were originally wrapped in cotton batting. This wrapping material is often found to have adhered to the record's surface. It can be virtually impossible to separate the cotton from the record. Consequently, it is strongly advised to avoid using this original packaging material.

Some early cylinder storage cartons and cabinets hold the records on pegs, eliminating the use of individual cylinder boxes. While some people fear that peg storage exposes the records to possible damage from organisms in the air, others think that it is good to prevent all unnecessary contact with the fragile recorded surface. If peg

cabinets are used, be sure that there is plenty of clearance between the records so they will not strike or scrape against each other upon removal.

Identifying Major Brands of Cylinders Manufactured in the United States

Unlike disc records, cylinders have precious little space for a label. Important identifying information was often printed on the cylinder box lid or on paper record slips packaged in the box with the record. But over the years, these lids and slips have often become separated from the cylinder and lost. Collectors of disc records are keenly aware of printed label details, minor label design variations, printed label details, record and matrix numbers, and other information marked in the run-off area - all of which help to identify the recording. Cylinder collectors also seek this sort of information, but often have to work harder to get it. One should not despair, for brands and recorded selections can often be identified, especially for the moulded records.

The history and numbering schemes of the many cylinder record companies are too complex and involved for this article, but there is one point to keep in mind when trying to identify and date cylinder records. Before 1900, most record catalog numbers were assigned in categorized blocks, rather than chronologically. For example, numbers 1-499 might be Band Records, while numbers 500-550 were Baritone Solos, etc. This means that a record of this period cannot be precisely dated by the catalog number alone. After 1900, most companies began to assign catalog numbers consecutively and chronologically, as the new records were released. Blocks were then generally reserved for large *series* classifications, such as popular, grand opera, ethnic, and so on.

It is also important to remember that many titles were "remade" at a later date, retaining the original catalog number. Thus, a selection first released in 1900 on brown wax may have been remade as a new recording in 1903 and issued in black wax, with the same catalog number. On the other hand, some recordings were actually made much earlier than the catalog number on the record would ordinarily indicate. This is true with some Edison Blue Amberol Records, because many wax Amberols were reissued in Blue Amberol form with a new (higher) catalog number. Sometimes, the old wax-record number is visible on the circumference of the celluloid cylinder. At other times, you may have to consult sources such as *The Edison Phonograph Monthly; Edison Cylinder Records, 1889-1912* by Allen Koenigsberg; or *Edison Blue Amberol Recordings* by Ron Dethlefson, to learn the original issue date and number. To use these references effectively, you must be able to identify the brand or manufacturer of the record.

Brown Wax Identification

The majority of brown-wax cylinders can be readily distinguished from other wax cylinders by the total absence of any identifying markings on the records themselves, leaving the person holding the cylinder to wonder "What exactly do I have here?" This lack of information is one of the most exasperating aspects of dealing with brown-wax cylinders. You really need to play them to verify their content and, even then, their origin isn't always revealed. Some very early ones were originally labeled with a paper band or ring on one end, bearing some information, but they are quite rare. Most brown-wax records were originally identified solely by the paper record slip packed with them. These small slips of paper were either printed, rubber-stamped, or

handwritten (or all three!) with the record title and artist name, and often with the record number, selection category and brand or company name. When cylinders are found together with matching record slips, identification is more immediate and complete. (Fig. 2 shows three examples of these slips.)

Fortunately, most brown-wax cylinders have a spoken announcement at the beginning of the recording. This announcement often includes the title of the selection, the artist name, and the record company name. Some introductions include even more. An

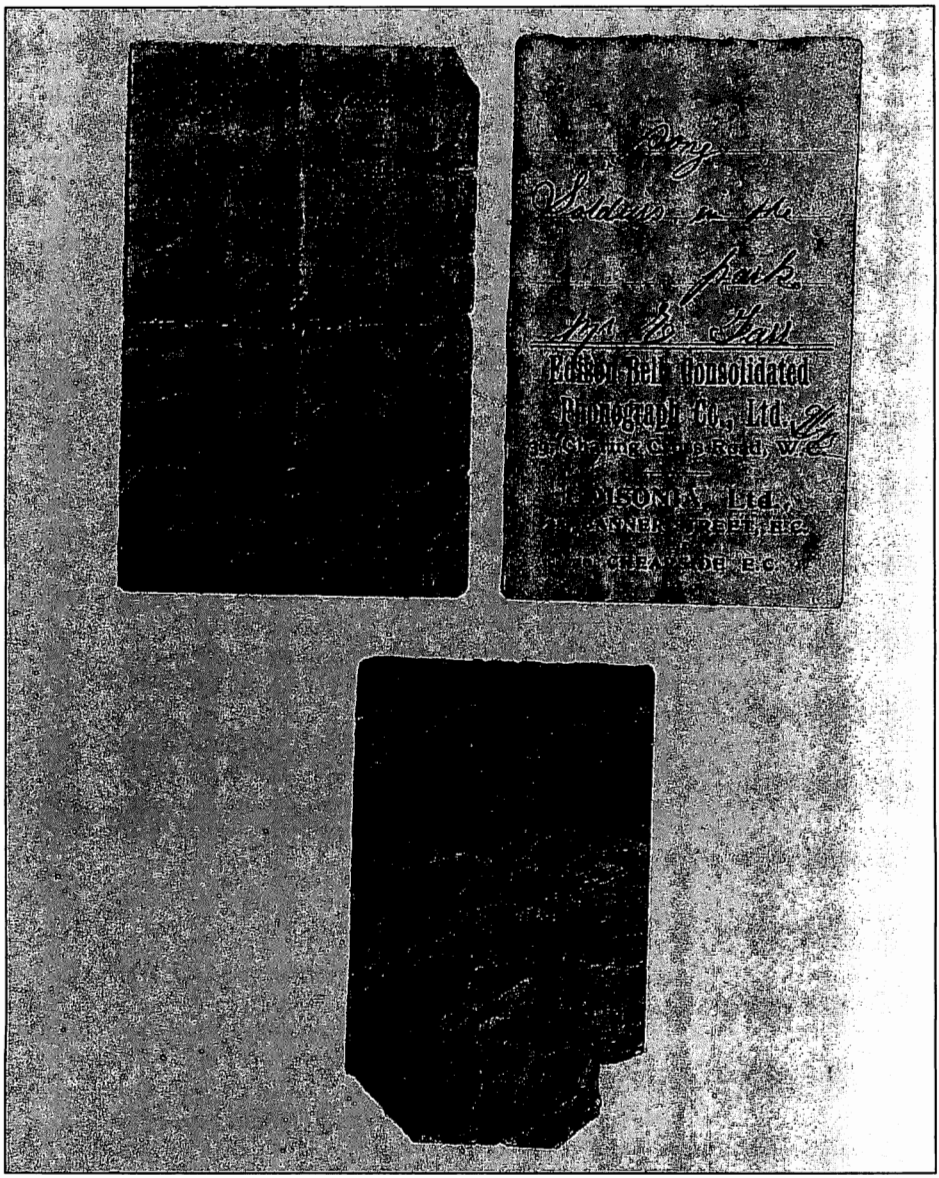

Fig. 2. Paper record slips. (Photograph: James McPherson)

example announcement might be: "'Soldiers in the Park,' from the comic opera, *The Runaway Girl*" or "'Columbian Exposition March', which was introduced to great acclaim at the fair in Chicago". On rare occasions, a record number may even be given.

Columbia cylinder records can often be roughly dated by their announcements. Rick Wilkins, who has made a study of the announcements on Columbia brown-wax cylinders, cited the following examples[1] which help to date these records by time periods:

1. The earliest were probably made during 1891, on channelled-rim "North American" (NAPCo) style blanks. Example announcement: "The Columbia Phonograph Company of Washington, DC presents 'The Washington Post March,' as played by the U.S. Marine Band".
2. By 1892 the format changed to: "The U.S. Marine Band presents 'The Washington Post March,' recorded for the Columbia Phonograph Company of Washington, DC".
3. After August, 1894: "'The Washington Post March,' played by the U.S. Marine Band for the Columbia Phonograph Company of Washington, DC". The NAPCo blanks were gradually supplanted by the bevel-rim Edison style.
4. On January 1, 1897, the executive offices of the Columbia Phonograph Company were moved from Washington to New York. The announcement format changed to "...for the Columbia Phonograph Company of New York City".
5. In 1898, the Columbia Phonograph Company, General opened their European headquarters in Paris, France. Now the format became: "...for the [famous] Columbia Phonograph Company of New York and Paris".
6. In 1900, when the European headquarters was moved to London, England, the format became: "...of New York and London".
7. From late 1900 into 1901, the announcement was simplified to "...Columbia Phonograph Company".
8. From April 1902, during the moulded-wax era, the announcement became: "...Columbia Record".
9. Columbia dropped announcements altogether around 1905.

Opening announcements can be difficult to understand, sometimes because of damage from the stylus having been set down roughly at the start of the recording. And, as stated before, it is almost impossible to tell whether the record you are holding is a company original or a bootleg copy.

Black Wax and Celluloid Identification

The first black-wax cylinders were moulded with a bit more identifying information than their earlier brown-wax relations. They also were originally supplied with record slips, but as with brown-wax cylinders, these slips have often been lost over the years. By 1902, good, clear, spoken announcements routinely preceded the recorded selection, and these announcements were often easier to understand than those on brown-wax cylinders.

While many companies manufactured two-minute black-wax cylinders in Europe, Edison and Columbia were practically the only firms to produce black-wax records on a large scale in the United States.

Chart No. 2 (beginning on page 160) summarizes the cylinder record types produced by the major U.S. manufacturers and their periods of production. This should help to identify and roughly date most cylinders. More details for identifying each major brand of moulded cylinder record follow below.

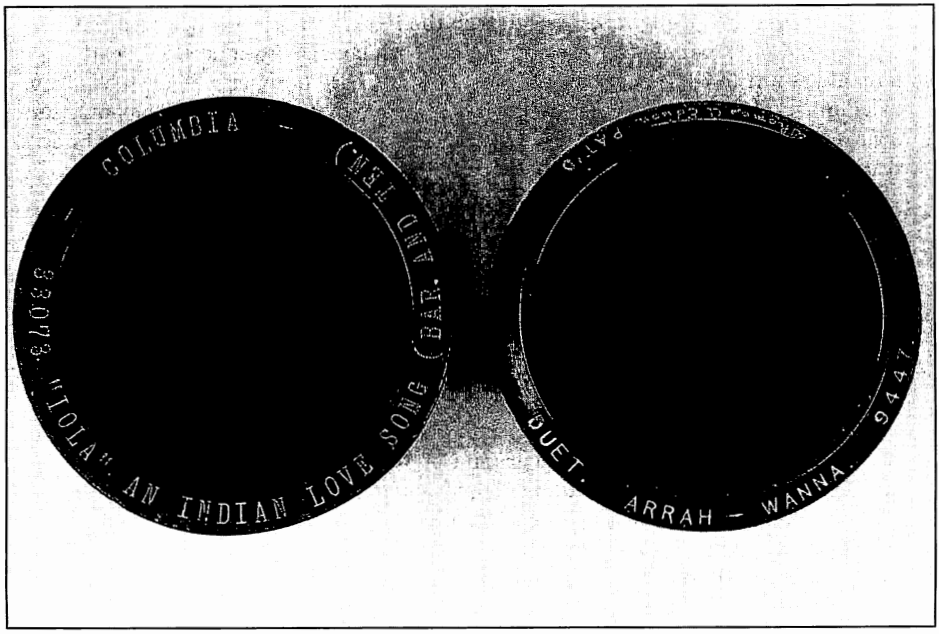

Fig. 3. Columbia and Edison 2 min. cylinders with printed ends.
(Photograph: James McPherson)

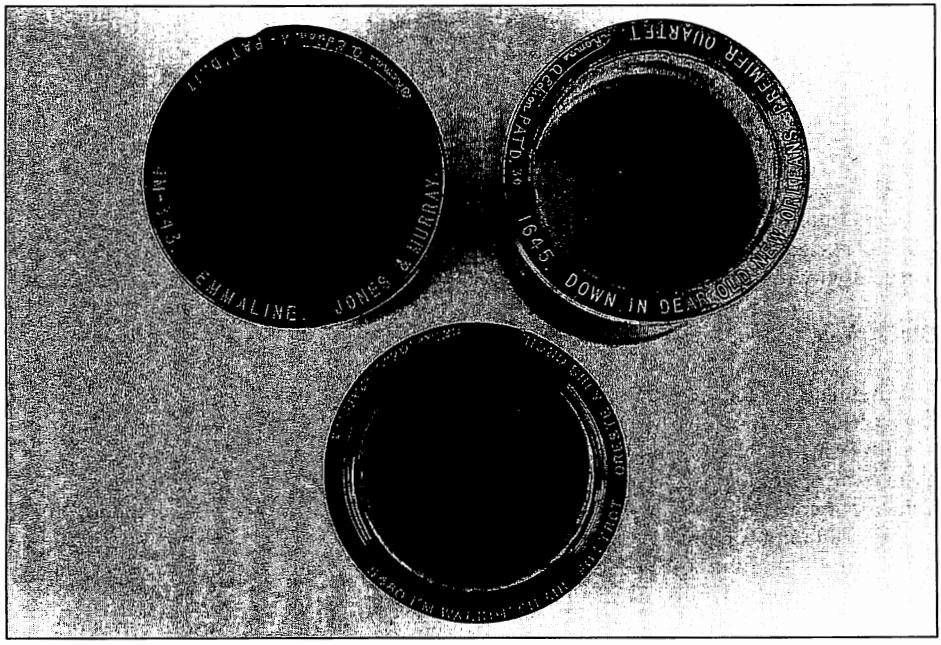

Fig. 4. 4 min. cylinder ends: Wax Amberol, flat-end Blue Amberol, beveled-end Blue Amberol
(Photograph: James McPherson)

Edison

From 1902 through July 1904, Edison moulded wax records had only the brand name and record number moulded at the right-hand end of the record circumference. Tiny numbers or dots (indicating take or matrix numbers) can also sometimes be seen. The selection title was not included during this period.

From August 1904-on, the brand name, record number, title, and selection category (i.e., Baritone, Tenor, Banjo Solo, Band, etc.) were moulded on the right-hand end rim (Fig. 3). Edison Gold-Moulded Records have beveled end rims from this time to the end of their production.

The thick-walled end of the cylinder was soon termed "the title end" or "the label end". Recessed characters moulded into that end rim were filled with white pigment, for improved legibility. While the artists' names were seldom marked, their identity could be ascertained from the spoken announcement. By 1909, Edison began to credit the "talent" on the title end of the cylinder. At that point, the need for announcements diminished, because all of the essential information was now clearly marked on the title end, and announcements were soon dispensed with. Take and matrix markings can usually be found in the title-end circumference, just below the record number on the bevel.

Four-minute Edison [Wax] Amberols can be distinguished by their flat title-end rim bearing a "4M" designation before the record number. Early-issue Blue Amberols also have a flat title-end rim, but no longer have the "4M" designation (because Edison had ceased two-minute production). From late 1913-on, Blue Amberols have a beveled title-end. (Fig. 4). The vast majority of Edison celluloid records were dyed various shades of blue, thus their name: "*Blue* Amberol". Actual colors vary from a light powder blue to a dark, almost black, navy blue. Usually, the color fell between these two shades. Between 1913 and 1921, Edison issued a series of light classical and operatic works recorded by celebrity artists, with the celluloid dyed a rich purple color: the Edison Royal Purple Amberol Records.

Columbia

Like Edison, from 1902 through 1904, Columbia's moulded wax records had the brand name and record number moulded at the right-hand end of the record circumference. From mid-1903-on, Columbia added the selection title and began to use black-wax material instead of brown. From 1904-on, Columbia cylinders have flat-end rims with the moulded brand name, record number, title, and selection category on the right-hand end rim (Fig. 3).

Lambert

Lambert cylinders are marked with the Grant Date of a key William F. Messer moulding patent: July 29, 1902, in raised letters on the title-end rim, with the record number and title rubber-stamped on the same rim. (Remember not to confuse this date with the date of recording or issue.) The color of Lambert celluloid records varies widely. The earliest ones were white, followed by pink, and finally by black.

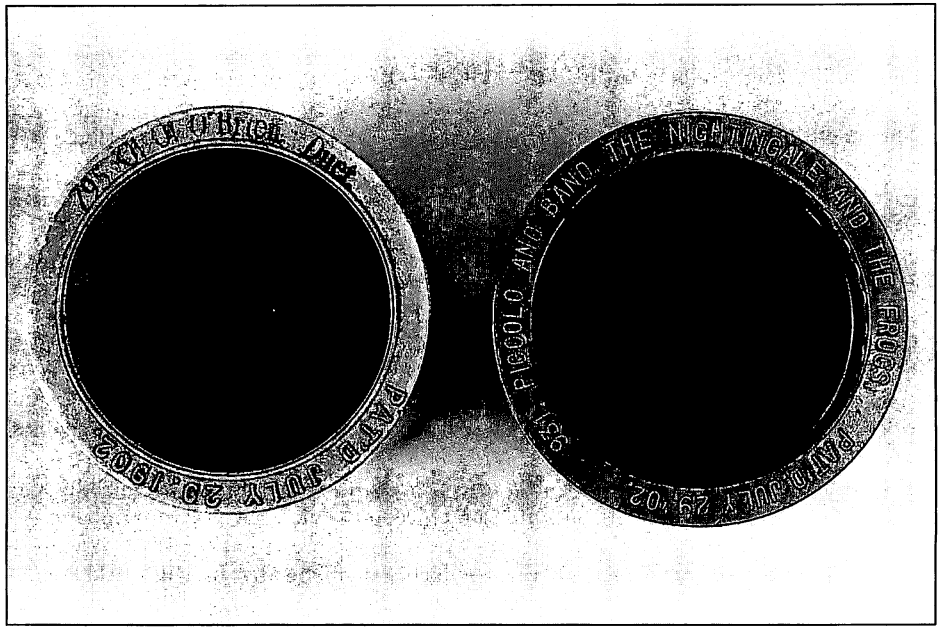

Fig. 5. Lambert and Albany Indestructible cylinders. (Photograph: James McPherson)

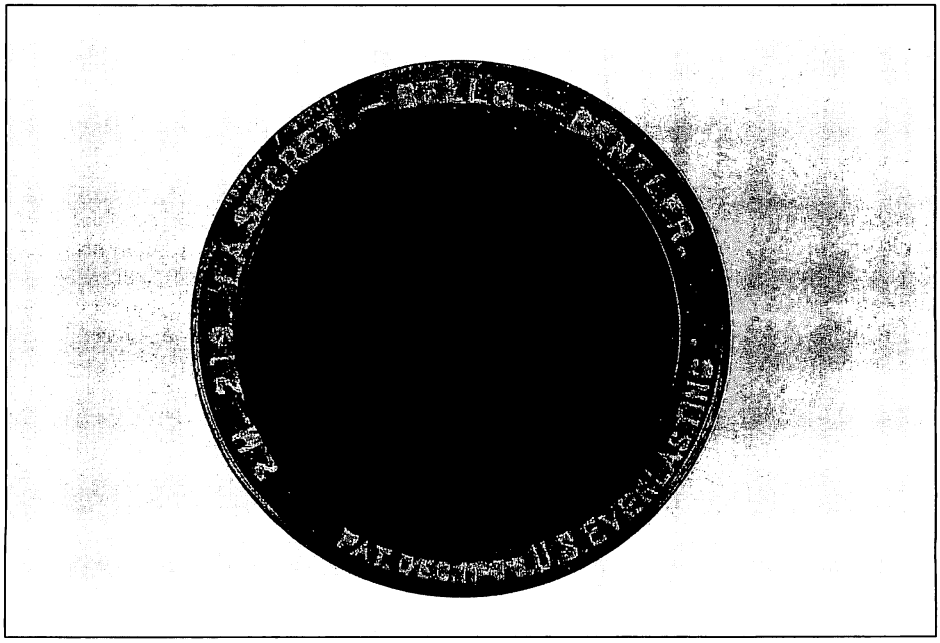

Fig. 6. U-S Everlasting cylinder, manufactured by U-S Phonograph Co. (Photograph: James McPherson)

"Albany" Indestructible

The Indestructible Phonographic Record Company (IPRCo) of Albany, New York later acquired the rights to the Messer patent and moulded the same date on their cylinder rims. Early two-minute "Albany" Indestructible Records have the "July 29, 02" date embossed in raised letters, along with the title and record number. This information was soon pressed into the celluloid rim. Later Indestructibles include the artist's name, but they never state a brand name because they were boxed and marketed under a variety of names. The color of the celluloid was usually black, although a small percentage of light blue examples turn up. All Indestructible end rims are flat. (Fig. 5 shows examples of a Lambert at left and an Indestructible at right.) Indestructible cylinders were sold as Oxford Indestructible Cylinder Records by Sears, Roebuck & Company, and, after 1913, as Lakeside Indestructible Cylinder Records by Montgomery Ward & Company. All of these records look the same and use the same record numbers.

U-S

The U-S Phonograph Company of Cleveland, Ohio manufactured celluloid records with a distinctive smooth bore and no end flanges. These records are marked on the core at the title end with the U-S Everlasting brand name, along with the record number and title, plus a "2M" or "4M" designation. U-S core markings often include the patent date of Dec. 11, 1906. The color of the celluloid was always black and their end rims were flat (Fig. 6). U-S Phonograph Company also manufactured Lakeside Indestructible Cylinder Records for Montgomery Ward & Company from 1910 to 1913. These bear the Lakeside brand name.

Most other moulded entertainment cylinders display their brand name on the end rim and this is the easiest way to identify them.

Discussion

It is not possible to cover all aspects of cylinder identification in a short article because the variations are so numerous. This article is intended as a basic introduction. Projects such as Bill Klinger's *Cylinder Industry Survey* are compiling much more detailed and comprehensive information about this fascinating sector of the record industry. Hopefully, this overview has helped to clear some of the confusion surrounding cylinder records.

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Endnote

1. Rick Wilkins, personal communication to Bill Klinger, January 9, 1985.

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I would like to especially thank Bill Klinger, who painstakingly proofread my draft and offered many detailed suggestions. Because of Bill's years of research on the cylinder record industry, he could offer a great deal of new information not readily available from other sources. His hours of help were greatly appreciated.

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CHART 1: CYLINDER RECORD TYPES

STANDARD-SIZE CYLINDERS					
DIMENSIONS: 4-3/16 inches (10.6 cm) long, 2-11/64 inches (5.5 cm) outside diameter					
TYPE	**PERIOD OF MANUFACTURE**	**MATERIALS and MANUFACTURING PROCESS**	**GROOVE PITCH (TPI)**	**SPEED (RPM)**	**COMMENTS**
2-Minute	**1887-c1918 [-1920s in U.K.]**	**Wax or celluloid.**	**100**	**Various (See below)**	
	1887-c1888	White wax, solid or reinforced core. Direct live recording.	100	Various: 60 RPM for speech, 100 RPM for music.	Early wax records rarely bear any title or number markings. Generally, they may be identified only by playing them.
	c1889-c1902	Brown wax, solid. Direct live recording; acoustic or pantographic dubbing.	100	Varies, often 90-120 RPM. 144 RPM more common in 1900-01 but not universal.	
	1902-1912 [-1923 in U.K.]	Black wax, solid. Dulpicated by moulding.	100	160 Few exceptions have been found.	Usually marked with some title and number information on end rim.
	1900-c1918	Celluloid, often black. Some are light blue or pink or white. Usually have a core. Moulded.	100	160 (Except 1900-1902: 120 RPM)	Cores include cardboard, resin composites and plaster.

STANDARD-SIZE CYLINDERS (CONT.)					
2-Minute (Cont.)					
TYPE	**PERIOD OF MANUFACTURE**	**MATERIALS and MANUFACTURING PROCESS**	**GROOVE PITCH (TPI)**	**SPEED (RPM)**	**COMMENTS**
Busy Bee	c1904-1909	Black wax, solid. Slightly larger *inside* diameter than most 2-min. Moulded.	100	160	Made by Columbia for O'Neill-James Co. Designed to play only on a Busy Bee Phonograph.
Language Instruction (2-Minute)	c1889-1920s	Brown or black wax or celluloid.	100	Often 90	Wax/celluloid coincides w. entertainment records.
4-Minute	**1908-1929**	**Wax or celluloid.**	**200**	**160 (Some exceptions. See below)**	
	1908-1912	Black wax, hard composition, solid. Moulded.	200	160	Edison [Wax] Amberol. "4M" on the end rim.
	1910-1929	Celluloid, often blue or black. Some are purple. Moulded. Plaster, cardboard, or resin-composite cores.	200	160	Some marked "4M" on the end rim. After Jan. 1915, most Edison Blue Amberols were dubbed form Diamond Discs.

STANDARD-SIZE CYLINDERS (CONT.)					
4-Minute (Cont.)					
TYPE	**PERIOD OF MANUFACTURE**	**MATERIALS and MANUFACTURING PROCESS**	**GROOVE PITCH (TPI)**	**SPEED (RPM)**	**COMMENTS**
Language Instruction (4-Minute)	1910s-1920s	Celluloid. Moulded.	200	Often 90-100	
STANDARD-DIAMETER CYLINDERS, EXTENDED LENGTH					
DIMENSIONS: 6 inches (15.2 cm) long, 2-11/64 inches (5.5 cm) outside diameter					
Columbia Twenteith Century Cylinders	1905-1908	Black wax, solid. Moulded.	100	160	Designed to increase playing time to approx. 3 minutes
OVERSIZE ENTERTAINMENT CYLINDERS (Dimensions in Comments)					
Salon or Intermediate Cylinders	c1903-c1910	Brown or black wax. Moulded, though some pantographing was also used.	100	120 or 160	Dimensions: 4-1/4 inches (10.8 cm) long, 3-3/4 inches (9.5 cm) outside diameter.
Concert Cylinders	1898-c1907 (Made to order, 1902-1907).	Most are brown wax, solid. Some are black wax or celluloid. Pantographic or moulded duplication.	100	Varies, usually 120	Dimensions: 4-1/4 inches (10.8 cm) long, 5 inches (12.7 cm) outside diameter.

LIORET CYLINDERS (Manufactured c1894-cMid-1900s)				
TYPE	**PLAYING TIME**	**DIMENSIONS [LENGTH]**	**MATERIALS and MANUFACTURING PROCESS**	**COMMENTS**
No. 1	30 seconds	11/16 in. (1.7 cm)	Celluloid. Moulded.	Entertainment, talking doll, clock, and advertising records were made.
No. 2	1 minute	15/16 in. (2.4 cm)		
No. 3	2 minutes	1-9/16 in. (4 cm)		
No. 4	4 minutes	3-1/8 in. (8 cm)		

BUSINESS (DICTATION)/SCHOOL CYLINDERS					
TYPE	**PERIOD OF MANUFACTURE**	**MATERIALS and MANUFACTURING PROCESS**	**GROOVE PITCH (TPI)**	**SPEED (RPM)**	**COMMENTS**
Business (Dictation) Cylinders [Blanks]	1890-1960s	Brown or soft black wax, solid.	150- (Edison) 160- (Colunbia)	Various	Used mostly in offices for dictation. Indivisually recorded.
School Cylinders	1910s-1960s	Celluloid. Plaster of Paris core. Moulded.	150	80-100	Used for instruction in typing and stenography. 4"- and 6"- long versions.

CHART No. 2: MAJOR U.S. CYLINDER RECORD BRANDS and MANUFACTURERS

Only the major companies that made cylinders in the United States are included in this chart. Numerous small concerns served local markets, especially during the era of the brown-wax cylinder. The North American Phonograph Company (NAPCo) supplied records for distribution by regional companies, from 1889 into 1894. (The Columbia Phonograph Company began as one of these local companies and grew from that beginning.) Some small but important brown-wax record manufacturers include: Bettini Phonograph Laboratory, Hawthorne and Sheble Manufacturing Co., Leeds and Catlin Co., New England Phonograph Co., Norcross Phonograph Co., New Jersey Phonograph Co., Ohio Phonograph Co., The Talking Machine Co. (of Chicago), and the U.S. Phonograph Co. [of New Jersey].

BRAND/COMPANY and PERIOD OF MANUFACTURE	RECORD TYPES	PERIOD OF PRODUCTION
EDISON (1896-1929)* Mfd. by National Phonograph Co. (1896-1911), and Thomas A. Edison, Inc. (from 1911).	Brown Wax, 2-Minute	1896-1902
	Black Wax, 2-Minute	1902-1912
	Black Wax, 4-Minute ([Wax] Amberol)	1908-1912
	Celluloid, 4-Minute** (Blue Ambersol)	1912-1929
	Concert	1899-c1907
	School Records	1910-1960s
	Business Dictation Blanks	1889-1906
	NOTES *Edison manufactured records before 1896 for distribution through NAPCo. Edison quit manufacturing entertainment records in 1929 but continued in the business and educational markets into the 1960s. **Some 2-Minute Blue Amberols were made for a Mexican series.	

BRAND/COMPANY and PERIOD OF MANUFACTURE	RECORD TYPES	PERIOD OF PRODUCTION
COLUMBIA (1887-1909)* Mfd. by the American Graphophone Co. (to 1906), and Columbia Graphophone Co. (from 1906). Marketed by the Columbia Phonograph Co., General.	Wax-coated cardboard cylinders ("Bell-Tainter")	1885-1893
	Brown Wax, 2-Minute	1890-1903
	Black Wax, 2-Minute	1903-1909
	20th Century, 3-Minute	1905-1908
	Concert	1898-c190-?
	Business Dictation Blanks	1890-c1950s
	NOTES *Though the "Columbia" name lives on today with CDs, Columbia quit manufacturing cylinders in 1909. They merely *distributed* [Albany] Indestructible cylinders. until 1912. Columbia also manufactured wax cylinders for Sears, Roebuck & Co. (under the Oxford name) and Busy Bee records for the O'Neill-Janes Company.	
[ALBANY] INDESTRUCTIBLE (1907-1922) Mfd. by the Indestructible Phonographic Record Co. (IPRCo)	Celluloid, 2-Minute	1907-1918
	Celluloid, 4-Minute	1910-1922
	NOTES IPRCo also manufactured celluloid Oxford records for Sears, Roebuck & Co. and Lakeside records for Montgomery Ward (after 1913).	
U-S (1910-1913) Mfd. by the U-S Phonograph Co.	Celluloid, 2-Minute	1910-1913
	Celluloid, 4-Minute	1910-1913
	NOTES U-S Phonograph Co. also manufactured Lakeside records for Montgomery Ward & Co.	
LAMBERT (1900-1905) Mfd. by the Lambert Co.	Celluloid, 2-Minute	1900-1905
	Celluloid Concert	1903-1905