From Basement Storage to Online Access: Processing and Digitizing the Mathematical Association of America General Mathematics Film Production Elements
Transcript, Part 1 of 2

Introduction
 Hi, there! I'm Justin Kovar, the Audio and Moving Image Archivist at the Dolph Briscoe Center for American History at the University of Texas at Austin. For this video I wanted to present a case study of an audiovisual project processed and digitized by an archive, from the planning stages all the way through online access Not to show "the way" to do it, but to show a way that it has been done.
 In my first year working in archives, it was hard to find where A/V and digitization fit in. Even basic questions like "How do you get from this? To this? To this." were hard to find answers for.
 This video is scoped to a small collection of six 16mm film titles which are all in relatively good condition, and really zeroes in on one film, "The Kakeya Problem." But I hope it details some of the considerations you need to make when processing and digitizing film, and gives you a sense of A/V in archives more broadly.
 The first half of the video is focused on shipping and processing film collections, and everything in the processing section can be done with less than $500 in equipment, so don't let cost keep you from getting to know your A/V collections. The second half delves into digitization and online access for films, and I hope it brings some light to all the decisions that are being made in the digitization process, so at the very least you can create a policy for files created from your collections, rather than yielding those archival choices to outside vendors.
 Please keep in mind that I'm scoping this video for the beginner, and everything I touch on could be explored in a lot more detail.
For digitization and A/V standards, SMPTE, AMIA, FADGI, AES, ARSC and the the IASA are the sources I check and trust most for information.
For Arranging and Describing A/V Collections, we now have the guidelines created by Megan McShea from the Smithsonian's Archives of American Art. I could not overstate how much of a contribution to the field her document is, but I should clarify that this project was completed before her guidelines were published, so this video may also serve as a document of what was happening in A/V archives before the guidelines. Let's get into it.

Project Context
 This project came about after two successful in-house film digitization projects for the Briscoe Center's Archives of American Mathematics: The Max Beberman Film Collection and the School Mathematics Study Group, two collections of release prints that were digitized with amazing precision and speed by Cassandra Gallegos, who I was lucky to work with. The Mathematical Association of America, or MAA, Lecture Films were different in that they are production elements rather than release prints, so there are more moving parts, which we'll get into later.
 These films had been created in the 1960s, and stored in the basement of the MAA headquarters since. They show prominent mathematicians giving lectures and

demonstrations on their discoveries, but also capture informal moments, and even veer toward documentary at times. The prints from these films were lent to educational institutions, which lead to the prints being in poor condition or missing completely, which is why we worked from the production elements. To estimate the cost, we used a test title, "The Kakeya Problem," and I timed my work digitizing, assembling and describing the films. We were able to digitize in-house at 20 cents per foot, at about $1,300 per film title, which was about one-tenth of the lowest outside vendor estimates the MAA had received.

In retrospect, we should have raised the cost to about $1,500 per title, as the test film ended up being a little less complex than the other films in the collection, and we made a switch from standard to high definition for the project, which was the right thing to do for quality, but added a lot of extra time for file transfers.

The project was funded by the Simons Foundation in May 2014, and we posted it online in December of the same year, with the films incorporated into an MAA centennial video the following year.

I should say, this project was a good candidate for digitization because the MAA held copyright for the films, and they were enthusiastic about the collection being published online.

As you'll see, digitizing these films was a time and work intensive process, and any rights issues would have made the project a lot less feasible. This, to me, is where copyright law impinges the digitization of A/V. Because A/V digitization is expensive compared to traditional processing (even though it's not *that* expensive), online publication is an expected outcome of projects, so collections with murky copyright are not even considered as candidates.

Shipping Film

You might get a question from your donor asking what they should send. In my opinion, you want everything. A/V boxes are full of surprises, and appraisal is best done in person. At the very least you want every production element of a film, any papers that seem to be related, and the original film cans, even if empty. Encourage your shipper not to remove film cans from their original boxes if possible, especially if they have writing on them. Films didn't fit into folders, so a box is sometimes the closest thing you have to that. If you're getting the boxes from the creator's storage, it's also great to have the shipper number the boxes and take a picture so you can get an idea of the original order.

In the shipping process there are some things you can do that will help you (05:00) later in the project. What we're trying to do is minimize the chances of loss, or damage during transit. Every shipping line loses packages, so with one-of-a-kind items, if it is possible to pick it up in person, that's always the best solution. Depending on rarity and the size of a collection, I consider 6 hours to be a reasonable limit for item pick-up.
 If you are using a shipping service, pay the extra money for tracking.

Also, upgrading the shipping times seems to make your package more of a priority for the shipping companies and certainly cuts down the time that your film spends in a warehouse with no climate control.

To that same end, try to plan your shipping to coincide with the months that have the best temperatures for film. Where I live, in Austin, Texas, that's October to April.

Packing the film for shipping may be the most important step in avoiding damage to the films. The main concept is to avoid the film unspooling on the reel, shifting inside the reel can or the cans knocking around in the shipping box. While film can be referred to as a MOVING image. You want to make sure YOUR shipping box is packed more like a STILL life.

The first step, is to attach the film to itself using hold-down tape, to make sure that it's not loose on the reel. Another problem that comes up here is that you find two 16mm films stacked on top of each other in a 35mm container, this is very bad for shipping. Especially if the films are on cores, they become intertwined during the shipment, scratching their surfaces and requiring painstaking work to separate the reels without damage. The best solution would be to rehouse them before shipping, but depending on the donor, the best solution I could ask for is just to have them put a barrier between the two reels. More than anything it's about educating the donor that just because a film is in a can doesn't mean it's safe for shipping.

The next step is to make sure the can stays closed during shipping. Keep in mind that film has a lot of mass: air packs are going to pop, Styrofoam peanuts will compress, and paper is going to flatten. To help this, use a packing material that has some density to it. I'm using a fairly solid Styrofoam peanut, and I'm packing it tight, trying to give the film as little wiggle room as possible for the next leg of its journey.

So now we've received, then unpacked, our boxes, and this...is everything. "But wait!" I can hear you saying, "I thought this project only had six movies?" Well, six titles to be exact, but this is what six titles look like with all their production elements.

Release Prints versus Production Elements

When you think of a film, you might think of a release print, or the finalized version of a film, with the picture and sound all on the same reel. Something like what was used in most movie theaters until about five years ago But did you know that even then the average motion picture took about 4 reels to be played? This is because the diameter of a full film would be too large to ship. A larger reel like this is only about twenty minutes long at sound speed, so films were sent in multiple containers, and a skilled projectionist would either transfer between the reels live, or at most chain theaters splice together all the reels onto a single horizontal platter

That's not too hard for anyone with a library pedigree to understand: One title can span multiple volumes. And that's release prints, as easy as it gets with film. Production elements, or the films that make up a print, get a little more complex. Before the print, the sound and picture tend to be on separate reels.

For the film we'll be working with, "The Kakeya Problem," the final print was made by combining an internegative, or dupe negative picture reel, with an optical audio reel. The optical audio reels were printed from full-coat magnetic stock and the magnetic stock was probably recorded from 1/4" audio tape (not film!) that was used for the original recording. So on that same day of recording, while the audio tape was recording sound, the film cameras were rolling, capturing images of the professor's lecture on negative film stock. There seems to have been minimal editing, with the camera negative, transferred to an interpositive. Then the interpositive, processed, to the

internegative, which was composited with the optical audio reel to make the release print.

　　And that's an example of production elements, don't let it scare you off. We'll dig a little deeper in the next section, and it will make more sense out of the abstract. Film formats can seem never-ending, but if you know what to look for there is consistency, and definitely some common themes.

Identifying Film
　　So with that, let's start identifying our films. Here's the equipment I'll be using:
- a clean table, meaning cleaned with your normal cleaning products, then cleaning off those with water;
- a ruler;
- a pair of rewinders;
- a take-up reel;
- a split reel for cored film;
- a splicer;
- splicing tape;
- a Moviscop viewer or loupe for taking a closer look at the film images and noting edge codes;
- and perhaps, gloves.

　　For cleaning the film, as we were requested to for this collection, you can use FilmRenew or a comparable product, and KimWipes lint free cleaning cloth. And for rehousing the films we'll need:
- hold-down tape; (10:00)
- film canisters;
- labels;
- and silica gel.

　　For taking notes, I use a spreadsheet program—the plainer the text, the better. And it's very important that you make sure it does not correct your spelling or layout of dates. Here are the fields I'll be filling in while looking at the film:
- identifier (the digital filename we'll be using for our digitized film);
- title.

Then some of the film properties:
- base (either Nitrate, Polyester or Acetate);
- A-D Level (Vinegar Syndrome);
- gauge (or width);
- picture type (black and white, color, or none; positive or negative);
- and sound track.

Then we'll combine these properties into the controlled vocabulary we use for A/V in the PBCore Instantiation Physical field.
While I'm winding through the film I'll be noting the following metadata:

- leader;
- countdown leader;
- synchronization marks;
- film brand;
- edge codes;
- correlating year for the edge codes;
- writing on the tail.

Then from the container I'll be noting any labelling or writing on the:
- reel;
- can top;
- can bottom;
- can side;
- and also any notes inside the can.

Identifying Film[1]

For this next segment, we're going to process the materials from the film titled, "The Kakeya Problem." This is a good example of a simpler set of production elements. We will be covering a lot of ground—format identification, repairs, cleaning, and getting as much metadata as we can from the film into the spreadsheet. I've found the idea of going back later to be magical thinking. The backlog is neverending, so I try to do as much as possible with the analog item the first time I have it out.

So with no further ado, Let's crack open these cans and see what we've got! OK, this can has some legacy numbers on it, along with a recent label declaring it to be "The Kakeya Problem, Reel 1, Interneg and Sound neg, or negative." Let's see if we can trust that note.

When I'm opening film cans, I tend to wear rubber gloves, mostly to protect my fingers from rusty cuts and avoid tetanus shots. I also specifically don't wear white gloves because the dirt and the rust leaves them permanently dirty.

Alright, now here's something we see fairly often. These films were kept in a plastic bag, probably straight from the lab. It's common for people to think this is a good idea, even archival, but archivists know better. Bags don't allow materials to off-gas, quickening the onset of vinegar syndrome for film. There are no issues with removing film, or any media, from plastic bags. If the bag has creator notes on it, you can keep it under the reel for now, but otherwise, toss it.

When you're first opening a can, the smell is also a chance to get a general sense of the film's condition. There's no need to stick your nose into the can and breathe deep, I assure you, the smell of vinegar syndrome will find you. And this is...not bad at all.

Next we'll go ahead and measure the gauge of the film. Looking closely, we can see that what we have here are actually two films in one container, also fairly common.

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[1] Film identification resources include:
http://www.brianpritchard.com/16mm%20Identification%20Version%201.02.pdf
https://www.filmcare.org/filmbaseid
https://www.filmcare.org/visual_decay

As I touched on earlier, films being transported this way leads to intertwined films. I've already fixed that for this set, but I'll show you how to deal with loose or unwound film in a later section. So we'll measure these one at a time. What I'm looking for is not the diameter of the reel, but the gauge, or width of the film. If the film is lying horizontally, we want to know how tall it is. This is the most important measurement to note in your finding aid, as it determines what equipment you need to play back your film.

And the same holds true for all audiovisual items. It's a little helpful to have the diameter of media, as it tells us how long it will play for, but it is crucial to have the width, as it is the limiter for the equipment we need to play it back. Helping us track what we can access in-house, what we need to send to vendors, and so much more, and it looks pretty clear that what we have here are two 16mm films in a 35mm container.

Let's focus on the internegative film for now. I'm going to add 16mm to the gauge field in the spreadsheet, And also fill in a temporary title. Since this is a modern guess I'll add [Reel 1 Interneg] in brackets. We'll be refining this title as we get more information from the film.

Now let's check the base material. Motion picture film comes in three types: nitrate, acetate, and polyester. We can eliminate nitrate for this set, since nitrate wasn't really used for 16mm film in the US, and nitrate was out of production by 1951, many years before these films were made. So that narrows it down to acetate or polyester. I distinguish between these two by holding the film up to the light and seeing if my hand shows through the film. If the base is polyester it will be translucent, so I'll be able to see my hand. If the base is acetate it will be opaque, and my hand won't show. And this reel appears to be...

I'm moving to a light table so you can get a better look at this. Here's the film we've been looking at, (15:00) and you can clearly see my hand passing through the back of the film, which means the base is polyester.

This explains why the film is in such good condition. Polyester is extremely stable compared to the other film stocks. Unfortunately, this means we can't test for acetate deterioration levels, because it's not acetate. But here's the IPI's website to help you get a better sense of the test. And in our spreadsheet we'll mark polyester as the base, and leave the A-D ranking blank.

Now we're going to switch to white gloves and put this film onto the winder. And first thing on the leader we have creator notes designating it as Part 1, naming Wards Natural Science Est or Ent., then Interneg, followed by "head," which just means the beginning of the reel, with the end being the tail. All good news in being able to rely on the modern label.

I'm going to write this verbatim on the spreadsheet under "Notes on Leader," even if there are numbers, misspellings and shortenings I don't understand. Someone else might, or a pattern might emerge from the rest of the collection.

Let's wind a little further...Oh, and what's this? Head Sync, with an X in a box in the middle. This is actually one of the most important things to note for the digitization of a film, and to make sure you capture in digitization. It can also come in the form of a punch hole. With production elements, this is what was used to keep multiple films synchronized together. The films would all be lined up on a ganger, or synchronizer, so that they could all be played back at the same time. For this reason, if you run into any

damage on production elements, you want to be really cautious about not losing frames when you're performing repairs, because you'll lose sync.

Now we're moving past the leader to the actual film, but since this isn't yet program material, I'm still listing the metadata under "leader." And right at the beginning you can see a date, "9-10-79." This doesn't match the dates I have for production, but I'll note it regardless. And right after we have a credit for the processing lab: a byron color-correct print

The first thing you might notice is how orange the film is, that's a good sign that you're dealing with color negative film. Notice that the orange extends to the edges of the film, including the sprocket holes. If it was just a faded color film, the area surrounding the image would be black or clear. Notice too that there are sprocket holes on both sides, so we do not have sound on this reel.

As we go further we've got a very clear label of the producer being the "Mathematical Association of America," the title being the "Kakeya Problem," and then "A.S. Besicovich," the professor giving the lecture. Notice the number "3481" in there, too. I wonder what that means?

The next section of the reel for picture film is usually a countdown or focus leader. The most recognizable is the SMPTE universal leader, and I see this Pathe' a lot, but there are plenty of variants from local labs that were used to help the projectionist focus.

I note in the spreadsheet the company that made the leader if I can find it, but it's important not to look to the countdown for identifying the film stock. Labs often printed these up in bulk and spliced them onto prints, so it does not necessarily match the rest of the stock on the reel.

If we wind a little further, we get to the beginning of the program, with MAA titles, which are clearly negative.

With everything we've found so far, I feel pretty comfortable identifying this as an internegative, and it does in fact appear to be reel 1 of the Kakeya Project. Let me add this info to the spreadsheet. The picture type is color, negative, there's no soundtrack...and looking up these attributes on the PBCore list, we can add "Film: 16mm negative."

While we're past the leader, I'm also looking for edge codes, but I don't see any on this reel. So that date will remain...a mystery. I'm guessing a reprint? But I don't know, and don't have time to investigate outside of the reel. I won't be using the mystery date for the film in the finding aid, because it's not the creation date for the title, which is confirmed with the edge codes I'll find on other elements, but I am going to highlight this reel's date anomaly in its description., And hopefully leave enough breadcrumbs for a future researcher to notice the issue and investigate further.

I'm going to use the magic of video to pause for a second so we can identify the other elements of this film, along with some other common production elements. Keep in mind that everything I'm working with here is 16mm film, all in relatively good shape. So If your film is stinky, sticky, brittle, or nitrate, don't unspool your film. Consult an expert. And keep in mind that film comes in a lot more sizes and types.

First, let's look at the other reel in this can, labeled a sound negative. On the leader we have the title again, followed by Modern Learning Aid. And as we wind past the leader, which is quite short compared to the other reel, notice that the film only has

sprockets on one side and two small lines on the other side. Those lines are actually stereo sound waves that can be translated to sound by an optical sound head. So it definitely looks like we have an optical sound reel. And this does appear to be negative, as the lines are solid and their negative space is clear. With a positive print, I would expect to see a thick, black stripe on the side of the film and white sound waves running between. We can tell just by looking at the lines (20:00) that there's not much sound happening at this point. Keep an eye on them as we wind through the film.

And we've got some writing past the leader. That "PS" with a boxed X in the middle is a synchronization point, so that should line up with our internegative reel. I believe the PS stands for print start. Then we we have "head," "R-1," or reel one written.

And that looks like all the writing in the leader area, but it's not the end of the metadata on the film. If we look closely, we can see that the film has edge codes. Edge codes are manufacturer metadata denoting the year of production.[2] While it's not necessarily the year the film was used, it can be useful for getting a circa date for undated films. So we've got written on here "Kodak, 24," and really small: line, circle square, followed by "Safety film" with a dot between the S and the A, then some numbers I can't make out, followed by "93071." That line, circle, square is the edge code that I'm referring to. I can cross reference that to the Film Preservation Guide's Appendix and find that correlates to...well, I don't see lines in that chart. But circle square correlates to 1962, which seems to match the known production date of the films. And we can also see that the dot placement on the Safety means this was manufactured in the U.S.

Here's the info I'm adding to the spreadsheet:
- brand: Kodak S.AFETY;
- edge code: "Line, circle, square", and
- correlating year: 1962.

Now let's look at the rest of the films for this title. Here are the questions I'm asking myself when I'm identifying film.
- Does the film have a picture?
- Is it color or black and white?
- Positive or negative?
- Are there sprockets on both sides?

If there are sprockets on both sides, and the film has images, your reel does not have sound. If sprockets are only on one side, there is usually a soundtrack on the other side. In most cases I see optical soundtracks, which are literally an optical representation of a sound wave. But there are also magnetic stripe variants. If you have an optical soundtrack and a picture, your film is most likely a release or test print. If no picture and a soundtrack, then it's a soundtrack. If there are sprockets on both sides and a positive picture, then your film is most likely an interpositive, with multiple scenes

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[2] Edge code resources include: http://www.filmpreservation.org/userfiles/image/PDFs/fpg_10.pdf, http://www.centerforhomemovies.org/filmforever/Edgecodes.pdf, https://erikpiil.files.wordpress.com/2014/06/dupontedgecode.pdf, http://www.brianpritchard.com/Date%20Codes.htm.

combined onto one reel. Or if it has sections of black in-between the picture, it's A or B roll.

A and B roll, sometimes called checkerboarding, is a film editing technique that switches between two reels, and when one reel has picture, the other has black. We don't have it for the "Kakeya Problem," but here's an example from another title in the collection, "Predicting at Random."

If you have sprockets on both sides and the picture is negative, you most likely have an internegative.

You'll notice that the entire stock of color negative has an orangish-red cast, not just the image area. Less commonly I'll see camera negatives, but you can usually distinguish between the two by looking for edits and sudden camera switches, which are a sign of internegative, since the camera negative would be from a single camera. If your film has sprockets on both sides, no picture, and is an opaque reddish orange, you have full-coat mag stock. This isn't really film in the traditional sense, it's magnetic audio tape on film backing made to run at film speed. As opposed to optical audio this was a cheap and flexible way to work with audio on film, because you could record and re-record onto it, but the backing and magnetic particles seem to react badly to each other, and I have yet to find this without advanced vinegar syndrome. This also requires a whole different machine to play back, (25:00) and it does not synchronize well, so when I'm choosing what to digitize, I try to avoid full-coat mag stock.

Let's get back to the first reel we were looking at, the internegative. Now I'm going to go ahead and wind through the film while feeling the sides for broken sprockets. I'm not squeezing the film, just letting it glide past my fingers, and if there was damage, I would feel a little snag, then stop the wind and repair that section of film. This film, though, is in pretty good shape. Like many production elements, unused since the composite was made.

This might be a good time to talk about gloves for film. I use gloves, but I don't love gloves. They're nice for giving a look of respectability, keeping hands cut-free, and helping to avoid fingerprints on film. But on that last point, they can give a false sense of confidence about doing no harm to the film. If you touch the image surface of a film, whether with gloves or not, you will leave a greasy thumbprint on the film. Working without gloves also keeps the hands more agile and is better for film with sprocket damage, which tends to snag on film. That's all to say, gloves are not a sure sign of doing things right, and not using gloves is not a sign of doing things wrong. The important thing is just to make sure that you only handle the film by its edges, and keep your filthy fingerprints off the film.

And here we are at the end of the film. This section is called the tail, and usually has some leader tape, which is another chance for metadata. So we've got some repeated info from the head, and then a tail sync punch hole, which could be useful, and the repeated info one more time. So I'll add that to my spreadsheet

Winding and Cleaning

Then I'll splice some leader tape onto the tail, to protect the film from the core. This means we just need a few inches of leader tape, so I'll pull that out, loosely measure it around the core, and cut it on the splicer. Then you might cut the tail to make

a nice edge for the leader tape, but I'm pretty conservative about that, especially if there's writing.

So now, to attach the leader to the tail we're going to put the tail on the right hand side of the splicing block, lining up the sprocket holes with the matching pins on the block. If your film is too shrunken to fit, don't force it. That's a clear sign that your film needs conservation treatment. Then we put the new leader tape on the left side, and have that meet the tail in the middle, and then to get these to hold onto each other we're going to use Kodak Pressman tape, which I order from Urbanski.com. This uses a butterfly paper detachment system, kind of like a band-aid. So you get it lined up on the sprockets of the splicer, then you hold the tail side tight and pull out the paper on the leader side, smoothing down the tape afterwards, then do the same for the other side. Hold onto the leader side, and pull the tape onto the tail side—and smooth it down— then we turn the film around and do the same on the back. Hold one side, pull the tape, smooth it down, then hold the other side, pull the tape, smooth it down, and that looks like it will hold up.

Now that the tail is attached, we need to wind the film back onto a core, so I'm going to transfer the yellow reel that we've been using as the take-up reel to my left side, where it now becomes the supply reel. And then on my right I'm going to use a split reel that holds a core, which will be what the film is held on for long-term storage. This film came already cored, but if it hadn't, we would be replacing whatever reel it came on with a core. The usual rules apply. If there is creator information on the reel, find a way to keep it or transfer that information, then let it go. So to wind the film back to it's start, I'm going to thread it straight across, from the top of the supply reel, to the top of the take-up reel. If I were to wind from the supply top to take-up bottom, things get more complicated.

And while I wind, I'm going to clean the film at the same time. This might be controversial, so check how the profession is feeling about cleaning before you start incorporating it into your workflow. Cleaning does improve the picture, removing dust and minimizing scratches, which is helpful for digitization, but the chemical composition of the cleaner is not completely known. I'm not winging it, this is the cleaning method I learned while interning at the Texas Archive of Moving Image, but check. Safety first.

For this project, the decision was made for me, as cleaning was requested by the donor. So here's how I clean films, as safely as possible. First I grab a KimWipe, which is a lint-free cleaning cloth. Then I'm going to fold my Kimwipe multiple times, and hold it against the open lid of the FilmRenew while quickly tipping it upside down then right side up. Then I dab my cloth against itself to spread the cleaner, and unfold it, waving it a little to let it dry a bit. I don't want it wet, I just want it to be slightly damp all around. Then I'm going to fold it back up, and wrap it around the film while holding it between my thumb and forefinger. I'm not gripping it at all, I'm just giving it the gentlest bit of resistance as I wind the film through. As I'm winding the film I'll periodically stop...and check the cloth for dirtiness. If it's more than off-white I'll refold the cloth to a new section and continue winding and cleaning until the reel is done.

And let's talk for a minute about winding. I'm using Moviscop winders here, and this set has geared ends on both sides, which means that either side can be engaged to do the pulling. You always want to start slow, to keep from pulling (30:00) and

stretching the film. You'll notice that I'm guiding the film with my left hand, and keeping my hand on the reel for a slight amount of friction, which also helps stabilize the wind and film pack. This also helps me stop the wind at any time. To check on my cleaning cloth, or any of the other things that can come up. So there's a few things I'm doing to stop the wind: first I slow down the wind with my right hand, as I increase friction on the reel, then I bring it to a full stop. Check my cloth and keep going. I'm also winding slower than normal. This is to give the cleaner time to evaporate.

Now when I get to the other end I'm going to add some new leader on to the original leader. This is both to protect the reel from the elements, but also to make sure we have enough blank leader to run through the film scanner to capture all of the original leader. We want to digitize all that writing, and especially the synchronization marks. So we'll splice and tape the new leader on, just like we did with the tail. Then we're going to use hold-down tape to keep the film from unwinding. I use an acid-free artists low-tack tape, but you might want to check what else is out there.

Housing

And now that we've done all this work winding and prepping this film, we don't want to put it back in a rusty can. A big problem with metal cans in general is that they don't allow film to vent properly, which leads to, you guessed it, vinegar syndrome. So to keep the film safe for the long-term, we're going to use these nice vented plastic cans sold by any of your favorite preservation suppliers.

First we're going to unscrew the split reel. Please be super careful when you're doing this! You want the side with the steel post on the bottom, and the side you unscrew to be on the top, otherwise terrible things can happen. In the same way, when I'm moving film on a core, I treat it like a bomb that could go off at anytime. Think about what your life will be like if that core drops out! I can tell you from experience that the core will not go back in, and you will spend your day wrestling with unruly film. If I'm moving a cored reel by hand, I have my middle finger through the center, and my thumb holding the outside, and I am holding SO firmly. There is a better way: If the film still has the split reel on the bottom, bring the bottom of the new plastic can on top of that, then hold them together firmly, [FLIP] And there you go.

Now the final step, very much like the cherry on top of a Sunday, is to drop a pack or four of silica gel into the can to absorb moisture and slow the onset and spread of vinegar syndrome. This film has no vinegar odor so I'm just going to put in one. Then we close up the lid, and your film is rehoused!

Metadata

Now we need to transfer the metadata from the original film can. Metadata for A/V is so scant that I try to keep as much as possible for the end user, and the film can is one of the best sources. We don't have the space in our stacks to keep empty cans for their informational value, but we do photocopy the labels. In the future I would like to move toward taking digital photos, and hope there is a place for photos in modern finding aids. Because for A/V containers, it's incredibly useful for researchers, especially with some of the common problems that come up, like crossed-out titles on re-used items. So very palimpsest-esque. While it's not possible to take pictures of all

the items in a box filled with folders and paper, it's really feasible to do that for A/V, because the amount of items per box is so much lower.

Still, some info, like the sides of cans do not photograph well, so here's all the info I transfer to my spreadsheet:

- writing on the reel;
- can top;
- can bottom;
- can side;
- and notes inside can.

Of these items, the notes inside the can are often absolute gold for researchers. These tend to be from the creators and contributors, and often contain hand-written shot lists or indexes of the films. There are also lab notes on timing, color adjustment, or data tape on the same, and truthfully, I don't know what most of it means, but just because I don't know, does not mean someone else won't. Again, metadata is so scarce with A/V that I recommend you error on the side of keeping things.

In a perfect world I would scan all the notes, transcribe and rehouse them, but I currently just acknowledge their existence and transfer them to the new cans of film. One thing I won't be transferring to the new can is the post-it note, because it's a modern guess, not from the creator. This is equal to the metadata and label that I'm creating, so I will incorporate whatever is correct about it, but not keep it, to avoid misleading future researchers and archivists.

In the can we've been working on: Reel 1, internegative and sound neg, we have two numbers on top, "5018332" and "65" so I'll write that for can top, and for notes inside can, we have a paper data tape. Tthere's nothing on the side or bottom, so I'll leave those fields blank

Titling

Now I'll use all the metadata I've gathered to create a title, so we can get these cans labelled and on a shelf. The nice thing about adding all the info we have to our spreadsheet is it provides more transparency to our titling process. In cases where it's not clear, I add a note to the description field on how I ascertained the title and date, and in our new metadata scheme we added a certainty attribute for titles. The formal title, obviously, trumps all. But for A/V which one? Here's my hierarchy for release prints. The title card on the print (35:00)

- trumps the title printed on the film stock
- trumps the writing on leader
- trumps the film can's label
- trumps the writing on the film can
- trumps the notes inside the film can
- trumps an educated guess by an archivist.

For production elements, I tend to follow the same hierarchy, but skip the title card, as it could be misleading for picture elements. Because, for instance, a title card on an interpositive reel is the title for the whole film, not necessarily the element itself.

Production elements are parts of a whole, so I do think an argument could be made for them inheriting titles from the prints that they are a part of. So here's my final title for this reel, "The Kakeya Problem" in quotes as it's on a title card, Part I, Internegative. You'll notice that I spelled out internegative rather than keeping the shortening the creator used. I feel okay about that because it's a technical term, and that data is saved in context in our spreadsheet, which will eventually be a part of the digital object's description. You'll also notice that I didn't include things written on the leader like "Head," or "Wards Natural Science," because those aren't titles, they are locations and contributors.

Here are my titles for the other production elements [slideshow of titles].

Storage

Now I'm going to pack the films into boxes, to see how much shelf space we need. For storing your A/V items, let me pass on a great mnemonic I learned from Cassandra Gallegos: "film flat, tape tall." Film does best in the long-term when stored horizontally, and magnetic media does better vertically. Medium reels like these fit into standard boxes. For larger reels that don't, we assign each reel it's own box.

Next I'll confer with our Registrar superstar Evan Hocker on shelf locations, and we can make our labels for the boxes and films with our films ready for the shelf.

Description and Arrangement Part 1: Pre-Digitization

Since I know I'll be digitizing, I'm going to leave the description of the program material for that process. Keep in mind that if you are trying to do a comprehensive description of the film on the winders, or especially by hand, you may be wasting your time, and at the very least are deeply out of context. If a film was made to be played at sound speed, or 24 frames per second, describing it as you slowly unwind by hand is likely to give greater weight to minor things.

The MAA Records is a sizeable collection, with the majority of it processed before my time, making my arrangement decisions here somewhat pre-ordained. Because of the size, the collection's been split into seven distinct units, with the last of these being the Projects unit, which has a series for Films and Videos. I'm going to add a sub-series to this named "MAA General Mathematics" Film Production Elements, which is a creator-derived name for this set. And then, since this finding aid is so large, I'll just condense the items to a single content list entry per film title.

You can go a lot further with this reading Megan McShea's A/V processing guidelines. Where among other things she makes a great case for not segregating A/V in your intellectual arrangements. But you don't have to take my word for it!

And that's it! A completely processed film title with its production elements. And even if you go no further, you have done a great thing for your collection, without expensive equipment. You've exercised your films, which helps keep them pliable, you've put them into safer storage, which prevents and slows vinegar syndrome, and you've identified what you have and made it discoverable. Even if you're never planning to digitize in-house, you're now in a great position for working with a vendor who does, applying for grants, or making selections for archival prints.