

Photographs, Sound and Movies

Special collections pose unusual preservation issues. The major materials that libraries have are:

Photographs. Prints are on paper, negatives are on film.

Sound: Old recordings are vinyl records, then we had cassette tapes, now we have CDs.

Movies: Pre-1950 we had nitrate film, now we have acetate film.

Videotape: There were many tape formats, consumer VHS being the most common and the worst. Fortunately, DVDs are completely replacing all the tape formats.

Information sources

The Image Permanence Institute, in Rochester, publishes both scholarly and consumer-oriented materials on the care of photographic film and paper.

The National Media Laboratory in Minneapolis used to publish reports on tape longevity, but they've gone commercial.

[It's not a coincidence that Kodak is in Rochester and 3M in Minneapolis.]

Again the Library of Congress, the New England Document Conservation Center, and IMLS have useful reports.

There were older media

Only a museum or research library would have these, but

- photography before George Eastman (founder of Kodak) had media such as daguerrotypes, glass plates, ...
- sound recordings came on wax cylinders once, and we also have player piano rolls, wire recorders, dictabelts, ...
- some collectors have 16mm versions of many movies
- early TV was recorded by filming the screen with something called a kinescope
- before DVDs we had two kinds of 12-inch “laserdiscs”

If you have these, you need specialist care.

Always go to higher quality

When reformatting from one medium to another, try to use a higher quality medium so that you do not lose information in the transfer. If you can't, you must save the original.

Audio: CDs are higher quality than either vinyl or tape.

Film: To scan a 35mm slide and capture everything you need to be at or above 4000x6000. Rarely done. Larger film formats are even more demanding. Black and white film can in principle resolve 100 lines/mm; an Ansel Adams 8x10 viewcamera negative would have to be scanned at 50,000 pixels on each axis (yielding a 2 GB image).

TV: VHS is awful. DVDs are much better. But 16mm film has more resolution than even HD-DVD, in principle.

Care of photographs

Black and white photographic film is quite durable. (Remember the claim of 500 years for the life of microfilm, which is just a kind of 35mm film).

However, it can be easily scratched, and many kinds of chemicals will attack it. Film should be stored in sleeves, folders, or envelopes. *Not* airtight boxes, by the way.

Photographic film has both very high resolution and a very high range of density. You'll nearly always want to save the original, since almost no scanning project captures the full quality on the film. Some emulsions resolve over 500 line pairs/mm but only contact prints on a glass plate show this.

Photographic prints

Prints are made on paper. In general, photographic paper is thicker and better than ordinary paper. And because George Eastman did not market photography until 1890, some of the worst years of acid paper were missed. But old photographs often suffer from brittleness and distortion.

And, of course, you can not just try to filter out the fuzzy staining. Once photographs are damaged by mold, it's permanent.

Again, the message is low temperature and low to moderate humidity, and avoiding cycles of warm/cold or wet/dry.

Vinyl records

As materials, these are pretty durable. They will melt in high temperatures, however. Unfortunately they scratch easily and often when played. They also break easily.

They should be kept in sleeves at cold temperature.

However, it is best to transfer them to CD.

A few audiophiles claim they can hear the difference and that they prefer the old sound. As a result, a typical library would like to transfer the originals to CD and always use the CD copies, but not discard the originals.

Tape recording

Magnetic tape is either linear-scan or helical-scan. Linear scan packs less information onto the tape but is more durable. The history of tape recording is ever more information at higher densities, and thinner and thinner tapes, but at some cost in fragility.

Tapes are either analog or digital. Computer tapes are digital; sound tapes are analog *except* for DAT (digital audio tape).

Tapes are either reel-to-reel or in cartridges or cassettes.

Handling

Try to avoid handling any storage medium by the actual medium itself. For example

- CDs and records should be held by the edges (and, for vinyl, the center).
- Photographs and negatives, as much as possible, should also be handled by the edges.
- Store materials on steel shelves, grounded.
- Keep tape away from magnetic fields and heat.
- Write on the envelopes holding the material, not on the material.

Consider wearing gloves.

Tape problems

The information on tapes is in a layer of magnetic particles. These will lose their magnetism over time, much faster at warm temperatures. Also, the magnetic layer can separate from the underlying acetate, turning the information into a small amount of scattered rust particles. Tapes wear out if played a lot and tear easily.

Again, transferring the sound to CD is the best solution.

Fortunately, the consumer tape formats (stereo cassette, 8-track cartridge) are poor quality sound and were disliked by the audiophiles, so saving the original may not be important.

Tape cartridges

Often the tape cartridge will fall apart or the tape will get tangled, so that the tape is still good even though the device that normally reads it won't.

Sometimes you can fix this. With luck the tape cartridge is held together with screws and can be taken apart, or it may be necessary to pry or cut it open and extract the tape. The tape can then be wound onto a new device.

This is rarely worth doing. Always check first that you can't buy another copy of whatever it is.

Videotape

Consumer videotape is helical scan. It's also thin. It is a terrible medium for permanence, since it will neither last many years nor will it last many playings. Typically a few hundred playings (250-350) will ruin a videocassette.

Transfer to DVD is the only reasonable answer. Again, there is fortunately no community of VHS-lovers who will complain about the loss of their favorite format.

If you do want to save videotape, again it will want low temperature and humidity.

Copyright

Virtually all commercial sound recordings and movies are in copyright. The exemption that libraries have for preservation depends on an inability to buy a new copy. It is unlikely that you have many VHS videotapes, for example, for which you can not buy the same movie on DVD. So you shouldn't do your own transfer. [However, "Slow Fires" is an exception!]

Personally made recordings and photographs, of course, will not pose a problem.

If possible, acquire the copyright along with the object (e.g. should a local photographer donate works to a local library on retirement, ask if you can have the copyright).

Handling

Your fingers have oil on them, and may also have dirt. Your fingernails will scratch both film and tape. When handling film, wear gloves. (Tape is usually in cartridges).

Vinyl records are very heavy. They must be stored carefully both to minimize the risk of falling on the floor and the risk that the records will distort if stored leaning on each other.

Dust should be prevented with air filters and removed, if present, with soft brushes or cloths.

Store film in the dark. Displays should use copies.

Dangers

Nitrate film is extremely flammable. It must be stored very cold and in fireproof buildings with detectors and sprinklers. Any photographic film from before 1950 may well be nitrate. If you have nitrate film you should consult your local fire department.

Photographic paper will also burn but will not ignite spontaneously.

Acetate film develops "vinegar syndrome" and also emits gases that are believed to be health hazards. Since they also attack film, don't store negatives in sealed boxes.

Stages of film loss

Film tends to deteriorate in this sequence

- fading
- becoming brittle
- becoming still more brittle and giving off gases
- starting to soften (nitrate) or bubble (acetate)
- becoming a powder

Prevention means *low temperature storage*. Color film should be stored in a freezer. If this is not possible at least keep the humidity low, ventilation good, and temperatures reasonable.

Reformatting is the best solution. Until recently this has meant copying to modern film; now digitization may be better. Doing this well is expensive.

Tape loss

Recording tape, whether audio or video, is subject to the magnetic layer flaking off. VHS tape is particularly unstable and should not be relied on to last more than 5-10 years or more than 200 playings.

If tape must be kept it should be played through regularly partly to check on it and partly to just rewind it on the spool. Also buy higher quality tapes, not the cheapest.

NPR has lost many of its recordings from the 1970s as a result of using poor quality tape.

Sometimes, heating a tape briefly will let it be played once.

Survey your collection

If you don't check your collection every so often with at least random sampling, you don't know what state it is in.

Collection status is more than physical condition. How important is the material to your organization's purpose? How many other copies exist? How many users are there?

Under some conditions you may have to resort to triage (deciding what stuff is so badly off that you should give up on it). And you should think before acquiring fragile material whether you are prepared for the long-term commitment.

Conclusions

Cold, dry storage is best.

If you don't survey your collection, you don't know what problems you have.

Reformatting to digital for

- images: most common, helps access; avoid loss of quality
- sound: also common, access usually prohibited by copyright
- video is becoming easier and salvages the least durable stuff

There is a lot of specialist knowledge about these formats: be prepared to outsource some of the jobs.