

**HOW DO YOU TURN A HOUSE INTO AN ARCHIVES?  
AIR CONDITIONING AND TAPE STORAGE IN A HOT AND HUMID  
ENVIRONMENT**

Shubha Chaudhuri

The title of this paper may seem strange. When I was about to become Director of the Archives and Research Centre of Ethnomusicology in India, after having worked there for a few years, I was told that being director of an archives is all about making sure the air conditioning is running, and that the dehumidifier is functioning. Nearly 20 years later, I have had frequent reason to remember these words which have helped me keep my focus and be resigned about paying attention to this aspect of running an archives which seems to require attention again, again and yet again.

After moving the archives three times in 18 years and visiting many small archives in other parts of India and the world, I have seen archives that have had their beginning not in custom-built facilities with vaults designed for tape storage but in spaces designed for homes or classrooms. This has something to do with the fact that few archives are planned as archives. They are often tape collections in research organizations, teaching institutions and so on. Even those who plan archives from the start have to find funds for all their activities—for research and documentation, for cataloguing and dissemination activities and so on—and creating appropriate archival facilities puts an enormous strain on budgets that are already stretched. Thus many institutions have their beginnings in rented premises and have to make do with an existing space.

Air conditioning specialists and consultants quote exorbitant rates and suggest systems that are often unaffordable, making fledgling archives give up on the concept of a preservation strategy.

What I intend to do is to offer a set of tips, most of them common sense, and to share my experience of running an audiovisual archives in a city which is hot and cold by turns, dry and humid by turns and dusty at all times.

*Attitude and Hysteria*

The major prerequisite is attitude and a firm belief that it is the priority of the institution to store and preserve its materials in the best possible conditions. You have to be convinced about this or it is not likely to work. It is often easy to overlook the critical nature of archival storage until tapes are covered in mould and often rendered totally useless. The most common reason or excuse is cost—of running an air conditioner for 24 hours and perhaps installing and running a dehumidifier. We tend to forget the cost of what goes into the creation of each tape—the cost of travel, fieldwork, artist's fees, cataloguing, laboratory time and so on. If one calculates the per unit cost of a tape in these terms, then the per unit cost of preservation seems minuscule in comparison! Since damage creeps in, affecting some tapes and not others, and does not destroy a whole collection overnight, it is not taken seriously enough. It is not a matter of choice but of conviction. If the person leading the institution believes that this is the highest priority, it will work. If not, it is best to consider storing your recordings at a facility that does.

Creating a facility is, however, only the first step. It needs constant attention at the highest priority on an ongoing basis to create the appropriate conditions. It has to be the one area where no compromises are tolerated even if it borders on hysteria! Hysteria also includes developing an interest in all kinds of stray information on media and storage that you never thought would interest you!

*Choosing a Space*

Choose a house that is on a quiet street if possible, with low traffic. It will pay off in terms of the dust and pollution that enters the

building. Air conditioners facing the street can also aggravate the situation by blowing in dust and soot. Plants and trees help in providing a screen which keeps out dust. Look out for signs of damp and leakage. As damp is to be avoided at all costs, make sure there is no possibility of rainwater coming in or of flooding due to low-lying land or inadequate drainage on a street that has a reputation for flooding. These will lead to humidity rising and the costs of locating and repairing a source of damp can be high. Seepage or leaks may be adequately repaired for domestic use but not for being able to maintain stringent preservation goals.

It is also necessary to keep in mind that you will have to make alterations and may have to remodel areas, put in extra wiring and so on; keep this in mind if you are renting so that there are no hurdles at a later stage. Try and make sure that the electrical line is not shared with other apartments so that it is possible to have clean power. Estimate the amount of power requirement at the beginning so that you can make arrangements to put in the extra power. This may not be possible in some cases and if so, look for another place. An archives is highly dependent on electricity and there is no way to avoid this, though attempts can and should be made to keep consumption low.

*Planning for Air Conditioning: A Sliding Scale*

The control and maintenance of stable temperature and humidity is the goal and not air conditioning per se. Thus it is important to consider the rationale for the installation and use of air conditioning. Stability is the singlemost important factor and it is essential to remember that cooling raises humidity. If humidity control cannot be installed, it is perhaps better not to install air conditioning. Few things are as harmful as air conditioning that is switched on and off according to factors ranging from human comfort to financial implications.

First, consider a perfect scenario and then plan according to your means. Ideally, the vault is run with 24-hour temperature and humidity control with power backup such as a generator. Temperature control is also advisable in areas where recordings are made. This may not be as low as the vault but is important all the same. This is especially so if magnetic tapes are being used. Finally, it is ideal to also air

condition the area where tapes will be played for users. One realizes that this may not be possible in immediate terms. However, it may be possible to build up to this level gradually with some foresight and careful planning.

From the very beginning, plan on creating a storage space or a vault for archival materials, no matter how small it is. Intensive shelving in a walk-in closet is also an option. It is best to store all that may need archival conditions in a small space that you can control, rather than storing it in multiple locations for professional or administrative convenience. When resources for air conditioning are inadequate, comfort air conditioning for personnel should be the last priority. Do not seat personnel in the archives storage area. The desired temperature is not always comfortable for people and tends to get switched off or altered, and each person emits heat that puts an additional load on the air conditioning hence affecting the stability of the area as well as adding to the consumption of electricity.

The next space that could be air conditioned is the recording area. This need not be run all the time but the area should be cooled to a reasonable extent before recordings are handled. Working copies should also ideally be stored in a separate place, providing a backup and reducing the traffic in the archives vault. An option would be to store working copies in a non-air conditioned space if the user space is also not air conditioned. That way the recordings are not subject to a varying environment. As working copies have an archival master, they can be regenerated when they deteriorate.

There are many ways to make air conditioning more effective so that the costs of running it are kept low. Designing workflow and processes that do not require repeated entries into the space also helps to a remarkable extent. Resist the temptation to show people the vault when power is fluctuating and at all times, if not really essential.

It is important to remember that of the two, humidity is the more dangerous and thus when faced with a choice, opt for keeping the humidity low at the cost of raising temperature. Archival storage areas or the vault should be kept between 16°C and 18°C and a relative humidity of 45% ± 5%. If this is not possible to maintain through the

day and through the year, then opt for slightly higher figures such as 18°C–20°C but attempt for stability through the day and through the year. This may mean constant tinkering and you will need to get very familiar with the thermostat settings.

While choosing an air conditioner, try and make sure it has settings that are lower. However, even if you cannot set it to lower than 18°C, if the space is well insulated and the air conditioning runs uninterrupted, the temperature will fall to the desired levels. Investing in a branded make with a good service reputation is worthwhile.

Coming to the all important subject of humidity, it is my experience that the old-fashioned window units are more effective at controlling humidity than split units and they thus put less pressure on the dehumidifier. An additional problem with the split units is that pipes run through the space and often suffer from condensation and leakage if they are insufficiently insulated. Dehumidifiers are now available in a range of models and even those made for domestic consumption can be used as long as they retain the desired levels. We find that as a cost effective measure, one can use a heater to burn away the humidity. It means that air conditioning has to be run at cooler temperatures to compensate. Oil heaters with no moving parts are a workable solution and less dangerous to leave on in an unmanned building overnight. (We have been doing this with great success at ARCE in our server and working copies storage area.)

A generator or some form of backup power is a must. At the very minimum, a small unit that merely runs the air conditioner for tape storage can be installed. However, if the space is well insulated, a room can maintain the temperature and humidity for at least an hour.

Running air conditioning for 24 hours has its hazards. If funds permit, have two units which are cycled so that each unit is not taxed too heavily and there is a backup within the system. Security personnel or whoever is on the premises outside working hours should be trained to run generators, report faults and be alert for short circuits.

### *Planning Archival Spaces*

Each institution has its needs according to its structure and what it needs to highlight of its operations, but a few considerations will

help. Plan on separation of public and user areas and work areas for technical facilities, processing of materials and storage.

In choosing areas that will need air conditioning, such as the vault, recording rooms and even user areas where recordings are to be played, try to choose rooms that have little or no direct sunlight so that the air conditioning is more effective and the costs of running it are lower.

Try and ensure that areas where recordings have to be used are adjacent to each other so that they are not carried through areas where there is a great temperature and humidity difference. This will cause condensation and hence moisture will get trapped inside the container of the recording. There is considerable literature on the problems of hydrolysis, binder breakdown and other malaise that afflict tape and which are not being discussed here.

All media can be affected by mould and fungi; condensation also affects the insides of computers so digitization does not do away with the need for archival control.

#### *Building a Vault or Archival Storage Space*

Once a room has been selected in a naturally cool location, it is important to block all avenues of light, heat and dust. Sealing windows and extra doors is a good idea for many reasons. A bright and sunny space may look attractive but direct sunlight is to be avoided at all costs as it contains damaging ultraviolet rays.

Try and locate the air conditioning units and dehumidifier outside the room with the cool dry air being ducted in if possible. If not, these can be installed as window units with sufficient precautions being taken for fire hazards. Wiring should be external and ideally run through PVC pipes or ducts so that sparks or short circuits do not cause fires.

Intensive shelving and crowded places like vaults need to be well lit. Lights need be turned on only when personnel enter the vault. It is useful to have the switches positioned outside the room, near the entrance, so that it is easier to turn them off and on. Not positioning switchboards inside the vault reduces the fire hazard.

As fluorescent lights emit ultraviolet rays, they should have acrylic covers, which cut out the harmful rays.

### *Insulation*

Insulating the vault or tape storage helps to a great extent in keeping the environment stable and protects against variation of external temperature and humidity.

Fibre boards attached to a wooden frame is the simplest kind of insulation that can be done, leaving an air gap between the board and the wall. It would, however, be much more effective if fibre glass insulation can be used to fill this gap which could be about three-four inches. If the ceiling is higher than required by your shelving needs, reduce the height when you insulate so as to create a smaller and hence more efficient area for air conditioning. Seek advice for thermal insulation materials as new products enter the market every few years.

At the end of the insulation process no chinks of light should be seen. It would be advisable to use sealants on the windows even if they are boarded. Various kinds of sealants are available but even ordinary rubber strips can be attached to the bottom of the door to keep the cool dry air in and heat and dust out.

### *Shelving and Storage*

Archives shelving is a topic of enduring interest to archivists, much to the exasperation of those who have to listen to them. The major question is wooden or metal? 'Wood looks so nice and warm' is often heard as we are not keen to have our archives look surgical and forbidding! It is not impossible to use wood, just more difficult. Wood tends to sag under the weight of tapes or phonodiscs packed end to end. It is also more prone to pests and insects. Varnishes and paint used on wooden shelves have to be tested for acidity as long-term contact with acidic paint will affect the materials shelved on them. This kind of testing is hard in many developing countries. If necessary, use polyurethane paint or varnish.

Metal shelving has certain advantages. It takes weight better and is easier to buy in varying sizes with adjustable heights in most countries. In the case of metal shelving, make sure that they are not painted but 'enamelled' or baked so that the surface is chemically inert.

Closed shelving is practically a necessity in hot and dusty places.

Closed shelves not only keep dust out to a great extent but retain the lower temperature and humidity and provide fire protection to an extent. Glass looks nice but is not particularly effective. Compact shelving is increasingly available. These run on rails that are fixed on the floor and are available with a choice of manual or electronic controls. This has the advantage of providing closed storage in less space as it does away with the need for aisles.

#### *Fire Protection*

There are various forms of fire protection and systems for extinguishing flames. Some of them rely on gas and chemicals that may be harmful and many sophisticated systems may be unaffordable. However, some sort of fire extinguisher must be made available.

Thus a lot of care must be taken to prevent fire and remove possible causes. Smoke alarms are affordable and should be installed. Like all other measures, installing them is just the beginning; they need to be tested regularly and batteries maintained so that they function when they are needed.

#### *Monitoring*

Monitoring temperature and humidity continuously helps in ensuring stability; appropriate measures can be taken on a day-to-day basis which helps in developing a long-term strategy that works for the space and the institution.

Temperature and humidity should be measured at least three times a day, including the time when the day is hottest. Thermometers now also include a maximum and minimum setting so that the peaks and drops can be measured overnight or for the gaps in between. This is essential as the goal of archival environment is minimum fluctuation and regular monitoring can ensure immediate remedial measures.

Accumulating this information will be very useful in figuring out what works best for your situation.

#### *Training Staff*

People who come to work at an archives, come from a variety of backgrounds—be they recordists or engineers, researchers, performers

or programmers. Few may have any reason to be exposed to the importance of maintaining strict standards of archival control. It is therefore important that all the staff in the archives understand all the elements that are involved in maintaining the necessary standards, regardless of specialization or the nature of their routine activities. Ultimately, it is the human element that makes or breaks an archives. Physical preservation must retain the highest priority. Involving all members of the staff in monitoring the temperature and humidity and in discussions and policy making in this regard helps in creating an awareness without which an archives cannot succeed. This is difficult to do on a daily basis where words like posterity lose their sting!

All the research that we do, the documentation that we put together and the databases that we create will be of little use if the materials that we store are damaged or inaccessible. We owe it not only to ourselves but to those who have entrusted their materials to us, to the performers and communities who may use these in the future.

In the end, it is only the conviction and will of an archivist that can turn a house into an archives!