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Preservation Assessment

Peggy Pixley

April 30, 1990

LIS 5233

Preservation of Library Materials

Preservation Assessment

Plan and Purpose

My plan was to choose an area of the library and study its environmental conditions which affect the life of the library materials. I studied temperature, humidity, and light, which have been called the "three silent but deadly enemies of old books." (Exchange, 1985) Proper control of these "enemies" can prolong the life of library materials by many years. I did not attempt to check air pollution as I had no means to check it, and there does not seem to be any obvious problems.

Area Chosen

I learned in talking with other librarians that the Holy Spirit Research Center, a branch of Oral Roberts University Library, would be a challenging area for study due to problems known in the past. A librarian who had worked in that area when it housed the law library told about frequent battles with humidity and how books with mold had to be treated during summers.

I chose this area to study, thinking how environmental controls are especially significant to the Holy Spirit Research Center as it seeks to acquire and preserve historical materials related to the pentecostal - charismatic movement and make them available to researchers world-wide. Many of these items are unique and might possibly be lost if not retrieved for this collection. This library serves in addition to ORU's theology collection and is a closed collection available for in-house research.

Methods of Study

My method of study was to measure temperature and relative humidity by means of a hygrothermograph borrowed from Roger ^R Tydin, ORU's archivist. I also spent time interviewing Karen Jermyn, the Center's librarian, and toured

and observed the area. I interviewed other people who had known about past problems. I did not know until I had started the project that a lady from the Oklahoma Historical Society, Cherie Cook, had come during 1989 and made recommendations. I have incorporated some of those suggestions along with mine. The problems still exist as there was no available budget for preservation matters (which seems to be the main hindrance with many libraries). However, understanding the problem and working toward goals are certainly two valuable steps to take.

Temperature and Humidity

We placed the hygrothermograph in the bound periodicals area. A four-day record was kept by the machine. I then transferred the record to a form found in Pamela Darling's Preservation Planning Program (Darling, 1982), recording the readings at every four hours. Results are attached. I found the temperature was fairly consistent, ranging from 66° to 70°F., a range of only 4°. This falls within the recommended range, which is usually mid to upper 60's. However, Karen explained to me that often there are very wide fluctuations in temperature. At times staff may come to work and are cold enough to wear coats. At other time the heat may seem almost unbearable. There is no thermostat in the area for reading or regulating temperature. The library is housed in a very large building which also houses the main library, many classrooms, administrative offices, etc. I would have liked to monitor such changes. However, the hygrothermograph was available to me only four days as someone else needed to use it. While the record was kept, the weather outside stayed constantly cool, which I wonder if it may have contributed to the even temperature.

The recorded relative humidity was not quite as consistent as the temperature readings, however. Relative humidity ranged from 49% to 78%, a range of 29%. This is of particular concern since high humidity, especially with

wide fluctuations, is a greater threat to deterioration of materials than high temperatures. The recommended relative humidity is said to be 45% to 55% and not more than 60%. The range should be within 6%. (Banks, 1974). If higher, conditions may contribute to mold growth which in turn causes rapid decay. When relative humidity drops, moisture is released. When it increases, the moisture is absorbed, which can cause materials to break apart.

There is a humidistat in the Holy Spirit Research Center. It stays set on 45 RH. The records of the four days indicate that it is not working properly, or perhaps it can only control the area nearest to it. The librarian explained to me that if it is lowered, it causes drastic temperature changes in other areas of the building.

Light

I had no tool available for measuring light, but much can be learned by observation. I noticed that there were no skylights or windows to cause concern (since sunlight produces the most ultraviolet rays, which are the most harmful in the decaying process). The lighting consists of fluorescent bulbs which are not presently filtered.

Recommendations -- Light

Ideally, light levels should be measured. Perhaps a preservation specialist could do this, or a tool could be borrowed for the purpose. Since fluorescent lighting produces harmful, ultraviolet rays, there is a need for filters. Special fluorescent lighting is available, but the least expensive route would be to buy plastic sleeves which cover the bulbs and filter UV rays. This was also recommended by Ms. Cook, who visited previously. These filters should not hinder patrons' ability to read. There are sleeves available that cost as little as \$2 - \$3 per four-foot tube. They can last a number of years.

Keeping lights turned off in areas that are not presently in use is a practical idea. Every step taken can help slow down deterioration.

Recommendation -- Temperature and Humidity

In order to maintain a constant level of temperature and humidity, it seems a separate thermostat is needed in the HSRC. Ideally, it needs to have a separate heating and cooling system from the rest of the building. A few years ago the administration studied this problem and had an air-conditioning engineer to check the system. The only total solution that could be seen was a separately controlled system. A humidistat was installed which it appears is unable to control the entire area. A separate system was not feasible at the time of the study due to the obvious expense that would be involved.

I would still suggest that temperature and relative humidity be monitored and some steps should be taken to provide as much control as possible. Even a change of a few degrees or small percentage can add years to the life of the materials. Maintaining a level which is too high is better than having wide fluctuations. The humidistat should be checked to see if it is functioning properly. A dehumidifier should be purchased, if possible. One machine I saw listed can draw 14.2 litres per day from an area of 35,000 cubic feet. Cost is \$285.00 (Sears Kenmore). This recommendation was also made by Ms. Cook. More than one may be needed as funds allow.

If dehumidifiers are used, they must be monitored carefully. Portable units need to be emptied of condensate daily. (MacLeish, 1985).

Machinery is needed to monitor temperature and humidity. The best system would be one that provides a continuous record on paper (such as the hygrothermograph). This method enables nights and weekends to be monitored as well, which may be the time fluctuations occur. Since a hygrothermograph costs at

least 400.00, a less expensive method would do. A sling psychrometer (\$80.00) is a portable instrument for measuring both relative humidity and temperature at intervals. It is considered to be very accurate and could be used in other areas of the library as well.

Some of the less expensive hygrometers range in price from \$7.00 to \$50.00. Paper-testing kits are also inexpensive. (See attached pages from University Products, Inc.) Also attached are lists of other companies as sources (Darling, 1982). One source suggested that if funds are too low, a Taylor gauge, available at hardware stores for a few dollars, will suffice to measure both temperature and relative humidity (Exchange, 1985).

One simple suggested worth noting is keeping the doors closed to retain stability. Keeping the air circulating is helpful. Stacks should not be so close that air circulation is cut off.

Educating the staff in preservation matters so they will understand the reasons behind the monitoring will help enlist their cooperation in maintaining standards. Videos and slide-tape programs are available for instructional purposes.

Preservation should be everyone's responsibility. Even a limited effort can make a difference in the length of life for a library collection.

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APPENDIX A

Relative Humidity and Temperature Report

INSTITUTION: Oral Roberts University HSRC

Week: April 16, 1990

Instrument(s) Used: Hygrothermograph

Date of Last Calibration: April 20, 1990

Calibration Procedure: Paper record kept by hygrothermograph, recorded here at 4-hour intervals.

Day	Time	Room	RH%	Temp. °C	Remarks
Mon.	10 a.m.	Holy Spirit Research Center	74	72	This was temperature when first set in room. (Not counted)
"	12 Noon	" "	69	69	
"	6 p.m.	" "	78	70	
"	10 p.m.	" "	78	70	
Tues.	2 a.m.	" "	70	67	
"	6 a.m.	" "	64	67	
"	10 a.m.	" "	60	69	
"	2 p.m.	" "	57	68	
"	6 p.m.	" "	53	68	
"	10 p.m.	" "	50	67	
Wed.	2 a.m.	" "	49	66	
"	10 a.m.	" "	49	69	

Continuous Records Included

Yes ☒ No ☐

Comments on Records:

Note that humidity increased during day, dropped significantly at night.

Relative Humidity and Temperature Report

INSTITUTION: ORU HSRC (Continued)

Week:

Instrument(s) Used:

Date of Last Calibration:

Calibration Procedure:

Day	Time	Room	RH%	Temp. °C	Remarks
Wed.	2 p.m.	Holy Spirit Research Cent.	50	69	
"	6 p.m.	"	52	69	
"	10 p.m.	"	53	68	
Thurs.	2 a.m.	"	55	68	
"	6 a.m.	"	57	68	
"	10 a.m.	"	56	69	
"	2 p.m.	"	61	68	
"	6 p.m.	"	64	68	
"	10 p.m.	"	65	69	
Fri.	2 a.m.	"	67	67	
"	6 a.m.	"	67	67	
"	10 a.m.	"	67	68	

Continuous Records Included

Yes ☒ No ☐

Comments on Records:

Temperature ranged from 66 to 70°F, a range of 4°.

Relative humidity ranged from 49% to 78%, a range of 29%.

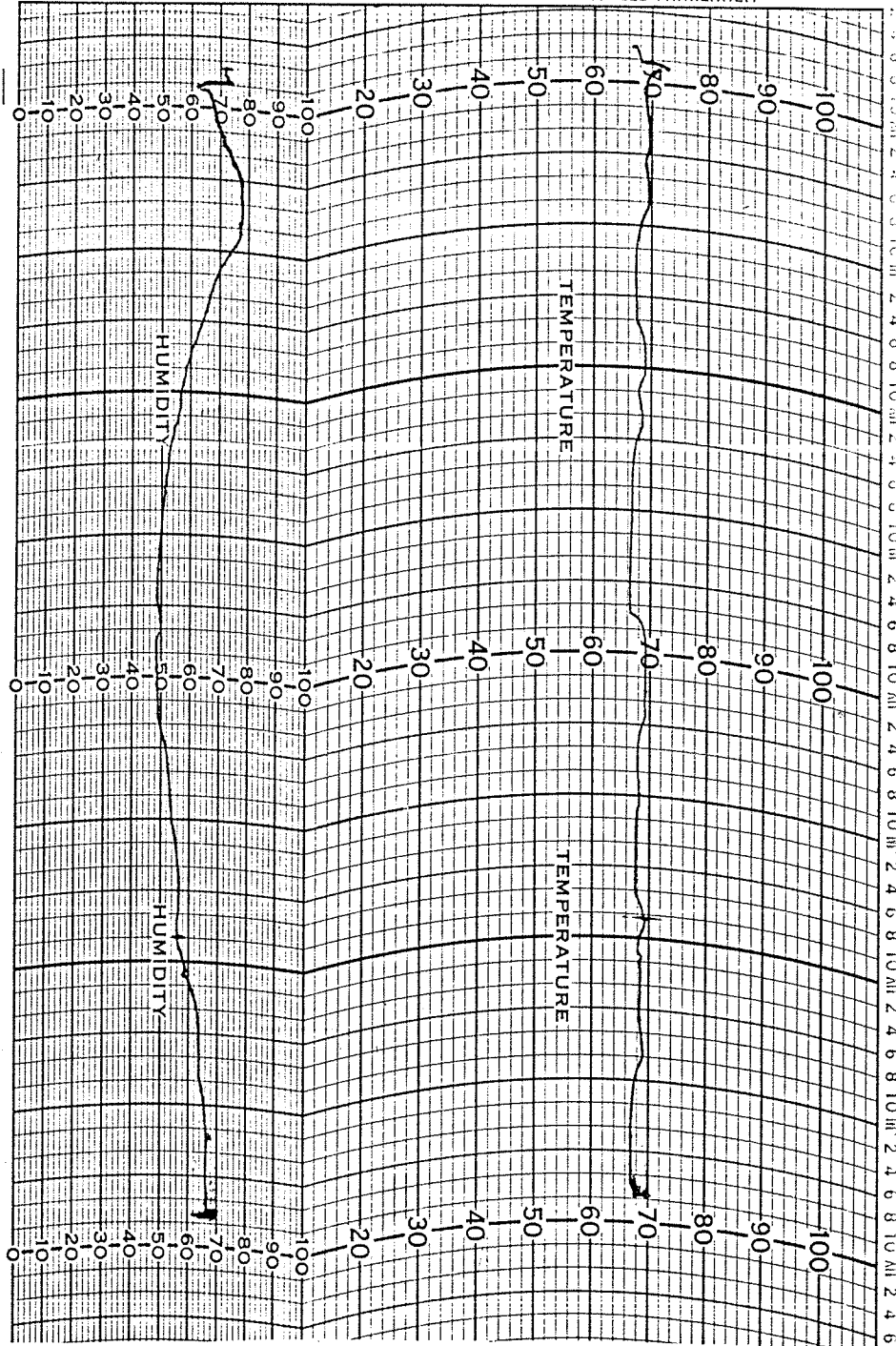
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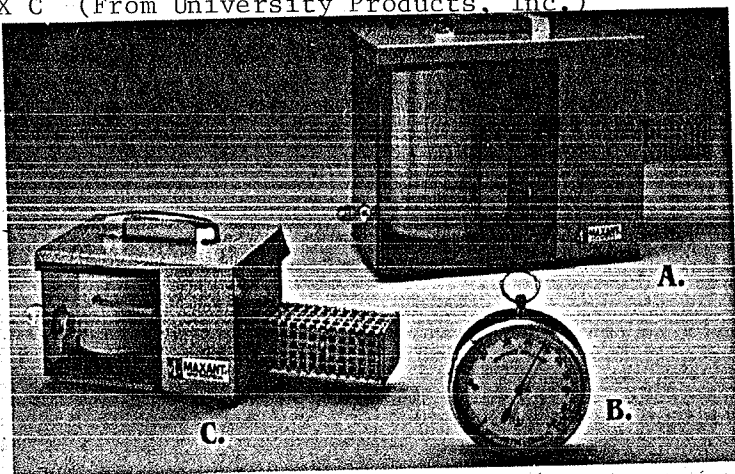
APPENDIX B

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE MARYLAND, U.S.A.

INSTRUMENT NO. DATE STATION
PERCENT RELATIVE HUMIDITY TEMPERATURE DEGREES FAHRENHEIT





A. Hygrothermograph

Two functions in one instrument: a humidity recorder (0-100% R.H. scale) and temperature recorder (+14°F to 114°F) simultaneously track the two most critical factors of any indoor environment. Human hair humidity sensor. Bimetallic temperature sensor, 7-day clock is Swiss made. Sensitive, rugged, and dependable, the Maxant Hygrothermograph has a hammertone finished metal case. Lockable hinged top has a carrying handle and tall, 3-sided smoked PLEXIGLAS® window. Overall dimensions: 5 1/4" x 9 1/2" x 15 1/2". Weight 8 lbs. Runs on AA battery.

Cat. No.	Description	Price
438-0003	Hygrothermograph with 2-yr. chart	\$663.40
438-0004	2-yr. Replacement Chart	36.50

B. Hygrometer

A compact but very accurate humidity indicator. The 3 1/2" diam. scale is graduated every 1% from 0-100% R.H. The human hair sensor is the same as found in far more expensive hygrometers. Chrome bezel ring, black wrinkle finished metal case. Legs for shelf location, ring for wall hanging. Case 4" diam.; depth 1 1/2". Weight 10 oz.

Cat. No.	Price
438-4583	\$49.10

C. Hygrograph

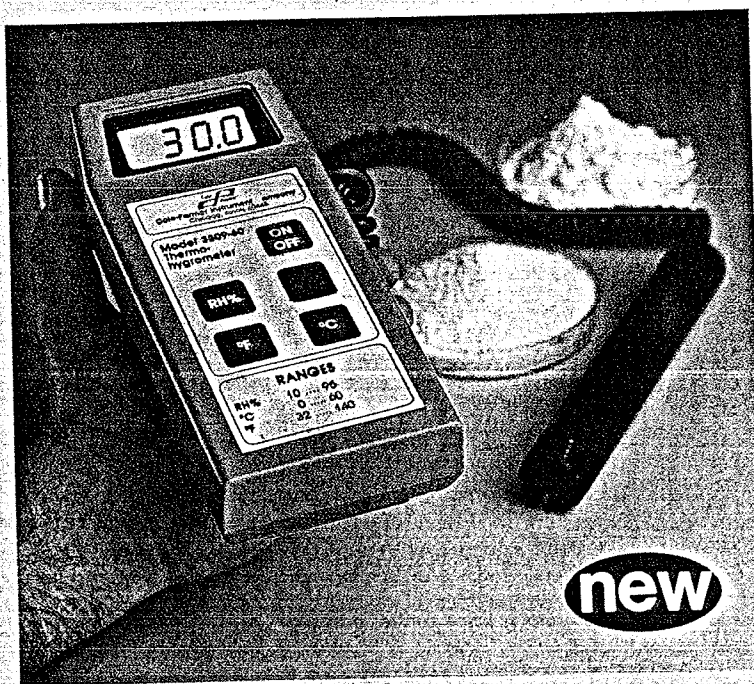
A compact humidity recorder with rugged metal case of hammertone finish. The perfect monitor of relative humidity for indoor gardeners, owners of fine art or wooden musical instruments, and others. Sensitive human hair element, 0-100% R.H. scale, and a year's supply of 7-day charts. The hinged top has a lock, carrying handle, and 3-sided smoke PLEXIGLAS® window. Swiss 7-day clock mechanism. Overall dimensions: 4" x 4 1/2" x 11". Weight 3 1/4 lbs.

Cat. No.	Description	Price
438-0001	Hygrograph	\$401.00
438-0002	2-yr. replacement chart	28.95

Digital Thermo-Hygrometer

Check relative humidity (RH), Fahrenheit and Celsius temperatures almost instantly with just a touch of the membrane keypad on this electronic thermo-hygrometer. Half-inch numbers read out clearly on display. Accurate to 2% in the range of 10-95% RH, 32° to 140° F and 0° to 60° C. Perforated plastic cap allows good air circulation, while protecting the humidity sensor (for use in dusty environments, a porous paper filter is suggested). When battery is low, a "BAT" signal appears on display (one 9-volt battery is included). Optional calibration kit containing 2 saturated salt solutions lets you recalibrate the instrument yourself. Weight: 1 1/4 lb. 7"L x 3 1/4"W x 1 3/4"D.

Cat. No.	Description	Price
884-0960	LCD Thermo-Hygrometer	\$460.10
884-0961	Calibration Kit	36.10

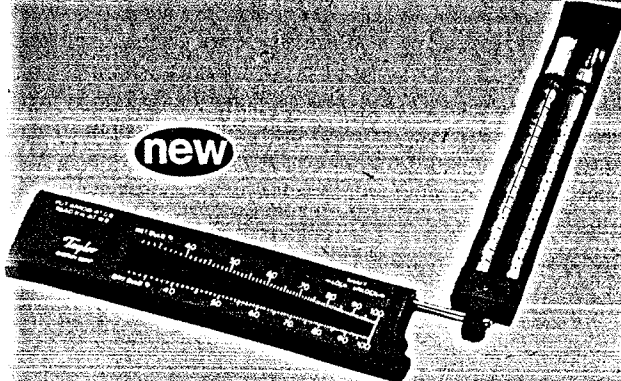


Tri-Test Paper Testing Kit

"TRI-TEST" is a spot testing kit for papers which does not require special training to use. The kit will test for acidity, alum and ground wood and contains all the necessary chemicals along with a complete detailed instruction booklet. Please note that care must be taken when handling the chemicals and interpreting the results. Store away from high temperatures.

Cat. No.	Price
455-0001	\$30.35





Sling Psychrometer

This economical, handheld, compact sling psychrometer measures relative humidity (RH). To use, pull thermometer slide out of its case and attach to case; next, moisten wick and, holding case, swing psychrometer around. Read wick and dry bulb temperatures and calculate. Works in the range of 20° to 120°F. Rule is calibrated from 32° to 100°F, and in relative humidity from 10% to 100%. Black case of high-impact plastic with white scale markings. Comes complete with 6 replacement wicks and instructions. Wt: 1 lb.

Cat. No.	Description	Price
649-1330	Sling Psychrometer	\$75.90
649-231	Extra Wicks, package of 12	9.90/pkg.

Hydron Humidicator Paper

This highly sensitive paper and accompanying color chart is used to measure the relative humidity of air. Just place Humidicator Paper strip in any room or exhibit case and leave in place. For protracted monitoring of humidity, just compare paper color to chart. For best results, change paper every 10-14 days of exposure. Includes enough paper for 200 test strips (foil wrapped for protection), a clear plastic dispenser and 5 color charts.

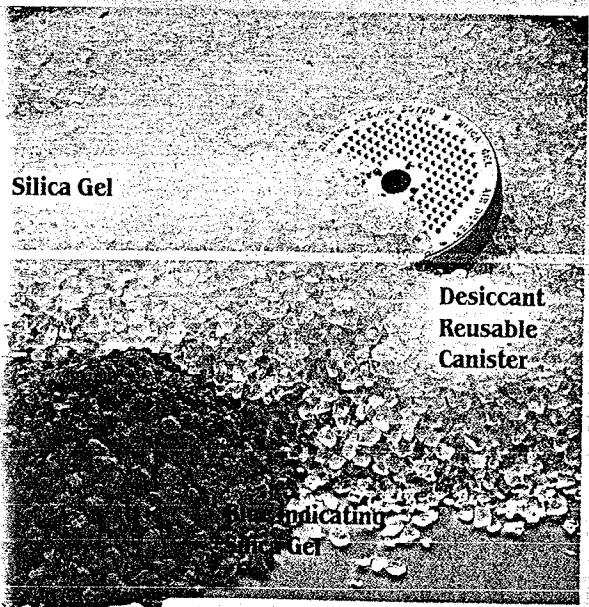
Cat. No.	Description	Price
472-H650	Hydron Humidicator Paper	\$13.85/pkg.



Blue Indicating Silica Gel

Color changes from blue to faded pink color when saturated; use alone or add to regular grade for moisture indication. Available in 1 lb. container.

Cat. No.	Size	Weight	Price
404-44A	3 - 8 Mesh	1 lb. (448 grams)	\$14.20



Silica Gel

Silica Gel, the highest capacity absorbent available today, is a porous granular, chemically inert amorphous silica. When used as a desiccant, standard grades of silica gel can absorb 40% of their own weight of water. No visible physical change occurs when they become saturated; however, the gel can simply be dried and reactivated by heating for 3 hours at 300 degrees F.

Cat. No.	Size	Weight	Price
404-41	3-9 Mesh	5 lbs.	\$24.40

Desiccant Reusable Canister

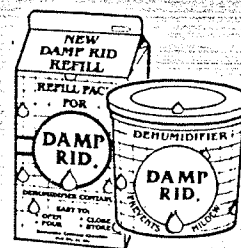
Compact reusable aluminum canister can be placed in display cases, boxes, drawers, anywhere moisture or humidity may become a problem. Canister contains 43 grams of TEL-TALE® indicating silica gel and will last indefinitely since it can be regenerated in an oven at 300°F. Case is 4" across and 1 7/32" high.

Cat. No.	1	6	12
404-X1009	\$7.50	\$6.65/ea.	\$5.50/ea.

Damp-Rid®

Damp-Rid® is a "Chemical Dehumidifier" designed to remove excess humidity from the air. These odorless calcium chloride flakes are packed in a plastic (two-cup) reusable container which acts as its own mini-dehumidifier. Easy-to-use crystals help prevent mildew, mold and musty odors associated with humidity problems. Recommended for storerooms, closets, cabinets, basement areas, etc.

Cat. No.	Description	1	6
2-FG01	Damp-Rid® container w/12 oz. crystals	\$7.05	\$6.40/ea.
2-FG03	Refill Pak with 38 oz. crystals	7.05	6.40/ea.



Questions? Call Customer Service Toll Free 1-800-628-1912, In MA call collect 1-413-532-9431

Humidity Indicators