THE FOXFIRE FACILITY

A Center for the Preservation

of Mountain Crafts and Lore

Todd Dennis Corbet
Fall 1972

Section A; INTRODUCTION

The Foxfire Facility: A community education center dedicated to preserving and passing on the skills and crafts of southern Appalachia.

I. Project and Location

This facility will act as the cultural and educational (and sometimes social)center of the mountain community. It will act as the rallying point of an already strong local chauvinism. Its' functions will be to: E.IV.a.

1. Preserve, order, and display the tools and art of this culture.
2. Educate the youth of this area in their cultural heritage.
3. Serve as a place where the community can come together on common ground.

The facility will include an exhibit hall, archives, and library; a publication center, restoration and storage facilities; a workshop and demonstration area, and outlets for local and visiting craftsmen; administrative offices, limited meeting and conference facilities, and possibly, in the future, an alternate highschool oriented toward the local art and history for about fifty to seventy five students. The school would include classrooms, administration, and dining and dormitory facilities. Also located on this site will be an outdoor museum consisting of relocated and rehabilitated structures of the area.

This project is located in northeast Georgia, approximately five miles from the NorthCarolina border and seven miles from the South Carolina border.

II. Social and Economic

This project is a proposal that will be built when the money is raised and this terminal problem may become part of the funding proposal.

The purpose of this project is to preserve the unique crafts of this area that are in danger of being lost due to the "progress" of our present day society. The skills of the local craftsmen have been handed down from generation to generation for hundreds of years and it is the idea of the Foxfire proposal that these skills should not be lost to future generations.

To do this involves two fundamental processes. First, the information must be gathered and organized. Then it needs to be distributed to people previously unfamiliar with it.

The gathering of information includes taped interviews with craftsmen and local residents, videotaped demonstrations of particular skills, gathering and analyzing existing artifacts, and gleaning folklore and customs from old letters and manuscripts.

The distribution of this material is handled through publication and, with the advent of the proposed facility, by demonstration and exhibit.

All of these functions are presently being handled by the staff of the Foxfire Magazine located at the Rabun Gap-Nacoochee School and under the direction of Elliot Wigginton. Aside from Mr. Wigginton and two or three paid staff members, the magazine is produced entirely by the high school students.

At this time they have only a few rooms in the school administration building. They are gradually being driven out of these by the sheer bulk of the material neede to carry on the publishing and mailing of the magazine. Not only this, but they have collected, bought, or been given many examples of the local skills, like spinning wheels, looms, ox bows, wagons, and baskets, and most of these are stored in their office space.

It seems that if relief is not soon forthcoming, this excellent magazine will suffocate for lack of space. From the readers of Foxfire will come the people to take up the skills of the local craftsmen and to survive and grow, Foxfire needs new space.

III. Scope of the Design

The scope of the terminal project design will encompass overall site planning for the facility, including the possible future addition of the alternate school and the outdoor display. The main bulk of the design will be the study of the exhibition, publication, demonstration and meeting facilities. The presentation will include all plans, elevations , and sections necessary to completely explain the project.

THE FOXFIRE PROPOSAL

To: Mr. Garland Reynolds
Gainesville, Georgia
December 5, 1971

FOXFIRE Magazine was started in March, 1967, as a means of supplementing the English curriculum of the ninth and tenth graders at the Rabun Gap-Nacoochee School. It was hoped that, through it, they would master many of the skills in grammar, writing, proofreading and so on that they were supposed to be learning in the class - but they would learn them in a far more meaningful, forceful way.

Initial funds were raised by the students themselves in the community, and the magazine has remained completely independent of the school financially, maintaining itself through subscriptions, gifts, and grants from such organizations as the National Endowment for the Humanities.

Now about to enter its sixth year of publication, FOXFIRE has attracted attention from publications, universities and organizations around the country. The fascination seems to be for the fact that a group of high school students from a tiny (240-pupil) Appalachian school can run, themselves (doing everything from circulation and correspondence to all the photography - including printing all their own photographs - layouts, writing, editing, promotion, and some of the most responsible research being done anywhere in folk and material culture), a magazine that now has subscribers in every state in the country and a dozen foreign countries. This attention is about to be climaxed, at the end of the fifth year, by an article in LIFE Magazine and the publication of a book of back articles - with over 300 photographs - to be brought out in February by Doubleday. The paperback version, with a first printing of something around 40,000 copies, will be brought out simultaneously by Anchor.

During its five-year history, the staff has accumulated enough material to fill a small museum. All of the negatives (over 7000 of them), tapes and videotapes have been saved and filed. In addition, there are numbrous items that the students have collected during the course of their research (see enclosed list for a sampling). These materials rightfully belong to the community from which they came. In fact, they are often drawn on even now. Recently the daughter of Bill Lamb, one of our finest contacts, came to us and said that we had taken the last photographs of Bill made before his death. She wanted to buy from us 30 copies of several of the prints to send out to various members of the family. Two students went into the darkroom, made the photographs, and gave them to her free as our way of thanking her for her family's cooperation with us. And such incidents happen frequently.

Thus it is our plan now to create a facility that will house and make available to the community at large not only these materials, but also new ones that we will be continually adding.

Funds for such a facility (described in more detail shortly) will, it is hoped, come not only from royalties from THE FOXFIRE BOOK (and its sequel, now in preparation), but also from foundations that have already indicated their interest. The cover letter to Mr. Garland Reynolds details some of these.

In order to approach such foundations, however, it will be necessary for us to be able to tell them exactly what we want and how much it will cost. We cannot do that alone. We simply do not have the expertise. And so we come to you.

THE FACILITY ITSELF

The facility (for which land has already been donated) would, as we see it now, be composed of a series of independent but interconnected "cells," each with its own function. These cells would be of varying sizes and would serve different functions. Each would be staffed by a FOXFIRE veteran and subsequent college graduate that we would attract back into the community and hire full-time. These cells would house the following operations:

1. <u>The Museum</u> -
In order to find out how something was made, we often contract a local craftsman to make a duplicate for us. Thus we now have in our collection a number of items ranging from wagon wheels and mill wheels to chairs, baskets, quilts and pottery made for us by people we have hired. The whole process has been documented in still photographs, videotape and audio tape. A number of the exhibits, therefore, would be made up of some combination of all these elements: perhaps the object itself backed up by enlargements of the person making it and a tape loop with the person who made it talking about the object itself and

the directions for making it.

In addition to this collection, which will be constantly expanding as our staff fans out through the countryside and as we acquire funds for making even bigger objects such as full two-mule wagons; we have also been promised the fine collection put together by Georgia Mountain Arts as soon as we have a place to house it. The collection has been carefully documented by John Burrison of Georgia State's Folklore Department.

Perhaps even more important in our thinking, however, is our belief that this should truly be a community museum to which people can feel free to bring their grandparents' artifacts and know that they will be safe and well cared for. In order to accomplish this, it is necessary that community residents be involved as much as possible in the planning and construction of the exhibits themselves. And this needs to be done quickly while there are still residents living who can guide the construction of these exhibits. As I see it, John Connelly would be hired to guide the construction of an authentic blacksmith shop just like the one his father had. Sam Burton would be hired to build a mill. Will Zoellner would be hired to guide the wagon-making section. Lon Reid would be employeddto set up a hand-turned lathe and a furniture shop. And always they would be working with the high school students from the community who would be doing the actual work under their guidance. Not only would this put much-needed income into their pockets, but it would also make them truly a part of the museum, and it would be an activity of tremendous significance to those high school students involved.

Such a museum area would also need to have an adjacent "cell" for storage of duplicates, for reconstruction of damaged materials, and for preservation of other materials in such chemicals as polyethelyne glycol.

2. The Craft Area -
A cell adjoining the museum would be devoted to a work area that would be open to any member of the community who wanted to produce a craft of whatever description. If a group in the community such as a home demonstration club wanted to have a quilting, for example (as they still do four times a year here), we would hope that they would feel free to come to this facility. In addition, such a facility could be used for giving demonstrations in making certain crafts during which the students, if necessary, could document the procedure easily.

We are also hopeful that the area could be open to tourists. If a tourist saw something such as a quilt in the museum that he particularly liked, we feel he should be able to check into a local motel and spend several days in our craft area with a local person making a copy of that item. When finished, he would pay the instructor, pay for the materials used, and take the quilt along. This area could even be expanded to house classes in certain crafts on a regular basis if the demand was found to exist.

A separate room adjacent to this area could serve as a craft outlet through which any local persons who wished could market their skills. Individuals like Bob Gray of the Southern Highlands Handicraft Guild have already promised that they would be available to help set up and organize such an operation whenever we needed their help. Such an outlet would be combined with the already-existing Rabun Gap Crafts and the Georgia Mountain Arts sales network to create a truly stwong organization. Not only could these materials be sold through the shop itself, but they could also be advertised in FOXFIRE and marketed by mail.

3. The Archive/Library -

A separate room would house an extensive collection of books on the Appalachians, and, more importantly, our own collection of tapes, videotapes, and photographs. Copies of these would be available for use by not only local people who would bring in their children to listen to their grandparents talk again, but also by scholars and students doing research in the field. Other copies of the same tapes and photographs could be made available free to community residents and families, and at a charge to others.

4. The Publishing Center -

A separate section of the building would be devoted to the publishing activities of the organization. This area would include darkrooms; rooms to store supplies such as film, tape, cameras, etc.; a videotape workshop and editing area; a mailing room with an addressograph; a large layout and design area; and editorial offices that would house our files and provide space for writing and typing the articles themselves.

Such an area would be used not only for the publication of FOXFIRE, but also for such things as a pamphlet series that would deal with issues like "The Great Rabun County Land Grab", clear cutting, the Blue Ridge Parkway extension; and a seties of small books from The Foxfire Press exploring such topics as how to create a FOXFIRE-type publication; and perhaps even a series of calendars, cards, posters, etc. designed by the students and marketed in the craft center.

There is also the possibility that we will be able, in the near future, to acquire the local newspaper. If this is accomplished, offices for this paper would probably be located on the premises as well.

5. <u>The Administrative Area</u> -
This final section would house the administrative functions of the parent organization. Here would be the office of the director and his secretary, and well as the offices of individuals who would be running such aspects of our program as:

A: The "Kids In Action" program. This program has been operating informally for some time now, but in the new facility, it would be given a full-time director. Its purpose is to be available at any time to lend a hand wherever needed. Up until this time, the kids have concentrated on helping older residents slaughter and salt down their hogs, haul in enough wood to last for a month or more, helping to plant and harvest crops where needed (see the most recent issue of FOXFIRE - Volume 5, Number 4 - for an example), helping to repair the house of an Aunt Arie, and so on. In its expanded version, the students could also be used for trash cleanups, for taking older people to doctor's appointments, etc.

B: A public school course we are now formulating which would be an elective, and to which would come in one-week blocs local residents such as Aunt Arie who would simply sit and talk to the students about living, life and their own personal philosophies. If they wished, they could also demonstrate various skills that they possess. All such sessions would be taped and held on file - and possibly used in articles in the magazine. Participants would be paid thus adding one more potential source of income.

paid
paid

C: A training area for both students and teachers from around the country who want to both start magazines like FOXFIRE, and also organize activities in their communities of benefit not only to local families, but also to the public schools of the area at large. In association with IDEAS, Inc. of Washington, D.C., we have already participated in one such program which culminated in the creation of the FOXFIRE-type magazine, HOYEKIYA, on the Oglala Sioux reservation in Pine Ridge, South Dakota. That magazine, run completely by the Indian high school students, is now on the verge of sending its second issue to the printer; and all indications are that it is doing well.

A second such publication, THE FOURTH STREET i, was started with Puerto Rican high school students working with FOXFIRE staff members. The magazine, located in the Lower East Side of Manhattan, is now about to come out with its third issue; and it, too, id doing quite well.

A number of new such publications are already in the planning stages, and letters come in frequently asking for help and advice in not only the area of magazine work, but also in public school education and in community poograms. The number of conferences we are invited to yearly is a good indication of the growing interest in this area.

And that is the facility as we see it now- Our hope, of course, is that it will be a truly integral part of a community that has a great deal to offer not only our high school students, but also the country as a whole. FOXFIRE was the first magazine of its type in the Unitdd States. Now it is engaged in experimenting in a whole new series of equally exciting spin-offs. We are rapidly becoming a laboratory for a wholof programs that will be widely duplicated, expanded and refined; and we hope you will be able to help us shape one of the boldest ventures ever undertaken by a high school group anywhere. It sounds, at times, almost absurd to hope that such a giant undertalking will come to pass - but then, five years ago, FOXFIRE was just an absurd dream too.

Section B: HISTORY

Aside from the notable early examples of the British Museum, the Vatican Museum, and the Louvre, the museum as a public institution is barely over one hundred twenty years old. At first they were little more than private collections on public display. More and more the museums have taken the visitors needs into consideration and tried to educate them with the vastness of the collections.

The first folk museum was started by a private collector, Hazelius, who donated his life's work to the people of Stockholm in 1872--the Nordiska Museum. Other examples of major folk museums opened in Odense, Denmark and Bergen, Norway in 1945 and St. Fagan's Castle, Wales in 1946. E.II.p.3.

The United States' contribution in this field has been in the area of outdoor museums like Williamsburg, the Winterthur Museum and the Farmers' Museum at Cooperstown, N.Y. One of the few folk museums in the U.S. with both outdoor reconstructions and indoor explanatory exhibitions is located at Berea, Kentucky. This small museum, associated with the Berea College Appalachian Center, is based on research programs similar to the Foxfire program using college students instead of high school students. The Appalachian Museum is running critically short of space and is about to overflow the two small warehouse type buildings. E.IV.b.

One of Rabun County's first college graduates, Dr. Andrew Jackson Ritchie, received his B.A. and M.A. from Harvard University before returning to his native county to devote his life to the education of the mountain people.

In 1903, he founded the Rabun Gap Industrial School and in 1917, originated the "Farm Family Plan" by which entire families work their way through school. The school operated independently until 1926, when it merged with the Nacoochee Institute, a school owned and supported by the Presbyterian Synod of Georgia. Under Dr. Ritchie's presidency, the new school, renamed Rabun Gap-Nacoochee, acquired more land larger dormitories and classrooms, and began new educational programs. Dr. Ritchie established a policy of adopting fresh educational techniques that survives today. Out of this traditionally open format emerged the Foxfire Magazine journalismprogram.

As mentioned previously, the Foxfire group is very overcrowded, and in need of many new facilities. The magazine was started five years ago as a journalism exercise and because of its' popularity and its' excellent execution, it grew into a publication with national circulation. All aspects of the publication have been handled by the students; photography, art, storywriting, interviewing, and editing.

From past issues , the Foxfire Book was put together and is selling well all over the country. The royalties resulting from the book gave been used to buy property for the museum. If the gtoup can take the next step and build their facility, they will have one of the most significant folk museum facilities in the nation, if not the world.

Section C: BUILDING ANALYSIS

I. Activities Being Accomodated

a. General
1. Education
2. Publication
3. Exhibition
4. Demonstration
5. Restoration and Storage
6. Research
7. Community Action and Events
8. Administration
9. Craft Sales
10. Support Services

b. Specific
1. Education

a) The education of the high school students taking part in the Foxfire research and publication program is the driving force of the present organization, and will be expanded to include students of the other area highschools. This will be done by taking advantage of the prevailing early day class schedules and offering afternoon credit in art, english, history, journalism, photography, and cinematography.

b) The education of the general public will be carried on by the publications and with the proposed exhibit and meeting facilities. Lectures and demonstrations will become part of the educational process.

c) In the future, an alternative highschool may be run as part of the center's functions. It would have classrooms, dormitory and dining facilities, and, if necessary, its'own administration.

2. Publication

All processes involved in the publication for the Foxfire Magazine, except the actual printing, will be handled at thisfacility. This involves space for editors and writers, files, mailing machines, back issue stock, layout areas, darkrooms and equipment storage. Future museum publications and additional editions of the Foxfire Book would be written and edited here also,

3. Exhibition

The museum exhibition area would be divided into a main area holding general explanatory exhibits and side galleries holding exhibits of specific interest, such as quilting and basket weaving, and the work of particular craftsmen. The exhibition halls will be supplemented with video and audio tape receivers. An exterior exhibition area will be set aside for restored and reconstructed buildings.

4. Demonstration

Workshop space will be provided for craft demonstrations by local artists to interested groups or individuals. Classes in these skills would also take place here.

There is to be an exterior area partially covered, equipped with a forge and kiln and with adjoining amphitheatre seating.

These areas may also be used as community event facilities.

5. Restoration and Storage

Workshop space is also neede tor the museum staff to prepare exhibits, construct new cases and restore deteriorating artifacts. A studio area should be included to photograph and catalogue the collection and a fumigation room will be needed to protect the collection from insects. A storage space approximately one half the size of the exhibition space will be needed to store that part of the collection not on display. This area must be directly connected to the exhibit area.

6. Research

Although most of the actual research going on in connection with this facility will take place in the surrounding areas, there will be a need for space in which to organize and store the new material. This will be a catalogued library of pertinent books and manuscripts, video and audio tapes, photographs, and microfilm. This will be open to visiting scholars and the publication staff.

7. Community Action and Events

These activities will take place in the demonstration areas and in a small meeting area that will double as a lecture hall.

8. Administration

All administration activities will work out of these offices. There will be offices for the director, two assistants to handle affiliated programs, two secretaries and a receptionist. There is to be a waiting lobby associated with this, the publication and archives department. An information booth control station will be located at the entrance to the exhibit area. A conference room, equipped for video tape viewing will be directly accessible to the publication area.

9. Craft Sales
A craft store is associated with the museum to provide an outlet for local craftsmen and as a service to visitors who wish to buy objects they have just viewed on exhibition or seen made.

10. Support Services
The main heating and cooling units will be located near the exhibit and storage areas and equipped with emergency generating equipment. There will be at least two sets of rest rooms, one in the administration-publication area and one in the exhibition-demonstration area.

II. Space Requirements

a. Education
1. Alternative school
a) four classrooms.............900 sq, ft. ea.
b) dining area.................1500 sq.ft.
c) administration..............1200 sq.ft.
d) dormitories.................5000 sq.ft.
2. To be clustered together on the site and joined directly to the publication department of the museum.

b. Publication
1. Editor's Offices(2people) .... 150 sq.ft.
2. Writers offices(4people) .... 200 sq.ft.
3. Circulation Office .... 180 sq.ft.
a) magazine orders and correspondence files .... 50 sq.ft.
b) book order and etc. files ..... 50 sq.ft.
4. Mailing Area .... 180 sq.ft.
a) office and addressograph ...... 80 sq.ft.
b) back issue stock .... 60 sq.ft.
c) files .... 20 sq.ft.
5. Layout .... 400 sq.ft.
6. Equipment Room .... 80 sq.ft.
7. Darkroom .... 180 sq.ft.
8. Advisor's Office .... 180 sq.ft.
9. Relationships .... 150 sq.ft.

All areas grouped around the layout area. Direct access to administration and archives mandatory.

c. Exhibition

1. Free Area .... 5000 sq.ft.
2. Small Galleries .... 1500 sq.ft.
3. Exterior (reconstructed buildings).. 3 acres
4. Relationships

Exhibition areas should have access to storage and shop through large overhead doors and indirect access to the demonstration areas through a common area from the information-control booth.

d. Demonstration Areas
1. Multipurpose workshop equipped with a loom, spinning wheel, quilting frame, etc 1500 sq.ft.
2. Exterior work area with amphitheatre seating, kiln and forge .... 900 sq.ft.
3. Storage .... 500 sq.ft.
4. Relationships
    a) controlled access at information booth
    b) direct association with craft outlet
    c) access to restoration from the exterior

e. Restoration and Storage
1. Workshop .... 1200 sq.ft.
2. Photo Studio .... 200 sq.ft.
3. Fumagation .... 150 sq.ft.
4. Superintendemt's Office .... 1500 sq.ft.
5. Storage .... 2000 sq.ft.
6. Relationships
    a) large doors to the exhibition room and exterior.
    b) adequate sinks, benches, and shelving.
    c) access to darkroom and administration.

f. Research
1. Reading Room, stacks, and control .. 1800 sq.ft.
2. Videotape storage .... 300 sq.ft.
3. Photography files .... 200 sq.ft.
4. Office .... 150 sq.ft.
5. Work space .... 150 sq.ft.
6. Relationships
    a) direct access to publications
    b) direct access to administration
    c) closed to all others

g. Community Events
1. Meeting room .... 1200 sq.ft.
2. Projection and storage .... 250 sq.ft.
3. Relationships
    a) access to demonstration area
    b) access to outside recreation
    c) access to area and parking

h. Administration
   1. Offices
      a) director .... 160 sq.ft.
      b) assistants (2) .... 300 sq.ft.
      c) secretaries (2) and files ...... 480 sq.ft.
   2. Reception Area (receptionist and waiting
      area) .... 240 sq.ft.
   3. Conference room .... 240 sq.ft.
   4. Information-control booth .... 160 sq.ft.
   5. Relationships
      a) positioned to maintain control over
         publishing and archives
      b) control over exhibition and demonstration
         through the information booth
      c) access to restoration

i. Craft Sales
   1. Sales Area ....1200 sq.ft.
   2. Stock room .... 500 sq.ft.
   3. Restroom and office .... 150 sq.ft.
   4. Relationships
      a) delivery from exterior into the stockroom
      b) near museum entrance, but not necessarily
         tied structurally to the building

j. Support Facilities
   1. Mechanical room .... 600 sq.ft.
   2. Electrical room .... 80 sq.ft.
   3. Janitor's closets (2) .... 80 sq.ft.
   4. Restrooms (4) .... 500 sq.ft.
   5. Exterior mech. .... 250 sq.ft.
   6. Relationships
      a) mechanical room closely connected to the
         exhibition and storage areas.
      b) restrooms and janitor's closets divided
         evenly between administration, publication,
         and exhibition-demonstration areas.

k. Parking
   1. Museum
      a) staff .... 10 spaces
      b) public .... 30 spaces
   2. School administration and faculty ... 10 spaces

III. Lighting, Acoustic, and Climatic Factors

a. Lighting

Lighting in the exhibit room must be completely controlled and completely flexible.

The distribution of light should be such as to give the greatest amount of light on the objects.

The brightness level of the background should be related to that of the object so that the eye can E.II.a.1.

adapt to the two and see detail clearly.

No bright source, natural or artificial , should be in the visitor's cone of vision while he is viewing an object. E.III.b.

There should be no reflected images from case glass. Dark backgrounds tend to accentuate these images and should be avoided even when cases are lit internally.

The room, as a whole, should appear well lit.

Most modern museums have eliminated natural light as a light source because:

1. It causes glare and areas of brightness within the field of vision brighter than the objects.
2. Glazed areas cause excessive heat gain and loss. E.II.d.3
3. Double expense of daylight provisions and lighting equipment when daylight is not available. This factor is increased in this case due to the mountainous location.

These drawbacks can be overcome by eliminating glare and the large glazed areas through the use of optics and minimizing the additional expense by combining fixtures. E.II.3.

Rules of thumb for exhibition lighting are as follows:

1. Diffuse lighting of sculptural objects may detract from their appearance. A luminance ratio of 6 to 1 with concentrated sources is suggested. E.III.a.
2. Presentation of concentrated light to wall displays should be at an incident angle of 60 degrees with the horizontal centered at an adult sight-line height of 5ft.-6in. from the floor.
3. A nominal level of 30 footcandles maintained, on both horizontal and vertical planes, is recommended to meet all normal visitor functions.
4. The following values of concentrated sight line illumination should not be exceeded.
   a) 60 footcandles for short-term or temporary exhibits.
   b) 20 footcandles for fixed or permanent exhibits.
5. Overall luminance ratios between adjacent luminaires or surfaces should be reduced to 3 to 1.
6. Floor reflectances in galleries and exhibition spaces should be below ten percent.
7. Case interiors should not exceed 30 footcandles.

b. Acoustical Factors

Special consideration must be given to insulating the exhibition spaces from the workshop and demonstration

MUSEUM LIGHTING STUDIED IN LABORATORY

ARCH RECORD ~~SEPT~~ DEC '48

By Laurence S. Harrison

Business Administrator, Metropolitan Museum of Art, New York City

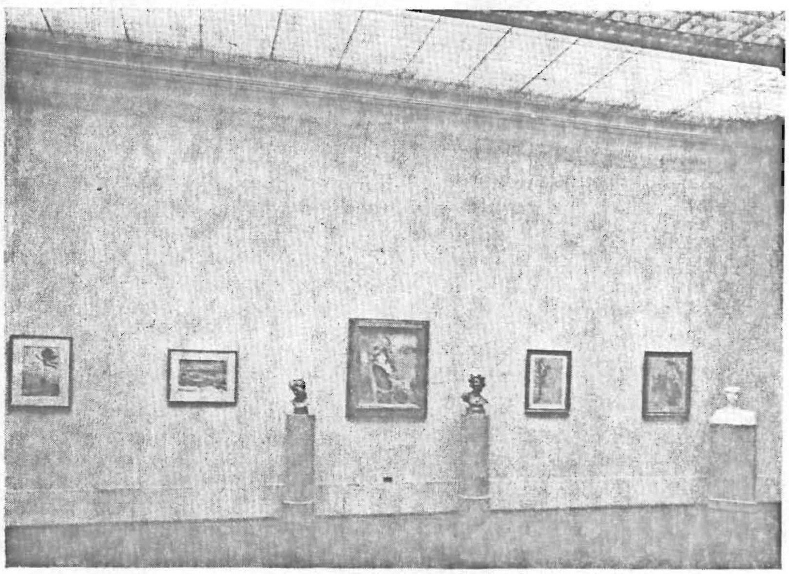
One of the most important areas of planning for the proposed reconstruction of New York's Metropolitan Museum of Art is, of course, the application of modern lighting techniques to the exhibition of art objects. It is axiomatic that good seeing is the primary requirement in any field of visual education. To the Metropolitan Museum, the problem is not a simple one. Its ten curatorial departments represent a vast collection of many classes of material ranging from the archeologies through Medieval, Renaissance, Far and Near Eastern to Modern European and American cultures.

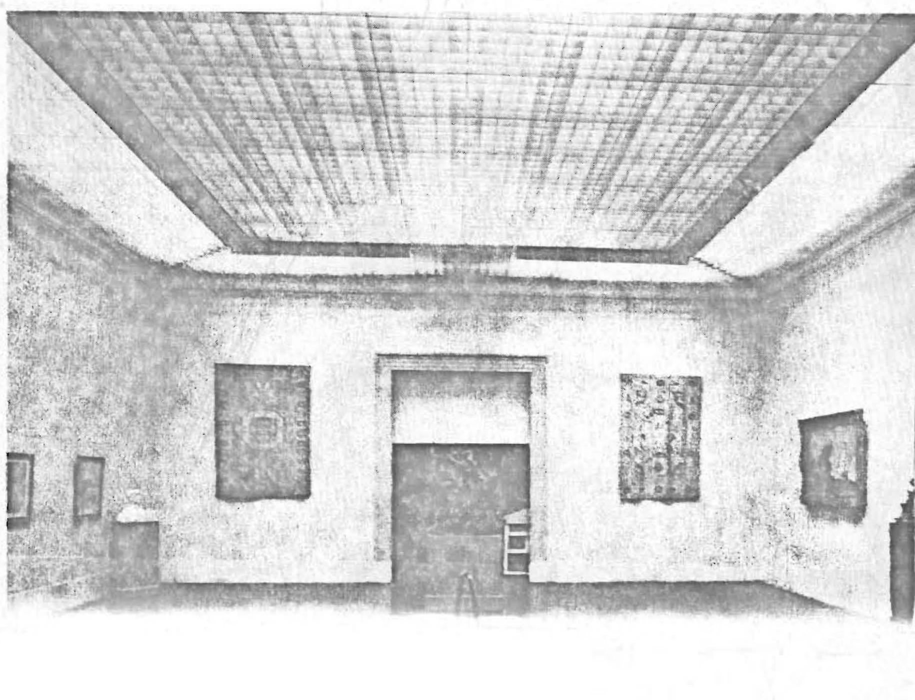
The determination of proper intensity levels, as well as color tonalities and angles of presentation is complicated by factors, esthetic and other, which have not as yet any quantitative weight in applied lighting calculations. Nor do they seem susceptible of the same kind of determination as do factors governing commercial or industrial installations. The chief reason for such complication is that, in the field of art appreciation as well as art creation, each individual is entitled to his own criteria.

Since the mission of any historical art museum (and there are many of the Metropolitan's character) is chiefly to preserve the products of individual expression, this fact, as a principle, cannot be denied, nor should any attempt be made to change its aspects. This is to say that common denominators of opinion as to what kind of lighting makes objects look "best" are discernible neither among laymen nor even among the experts. The reasons for this, as will appear, make the task of prescribing for the artificial lighting of museums a risky one to say the least.

LIGHTING VS. TRADITION

It is also to say that whatever is proposed must not be forced into adoption, but rather weighted carefully against curatorial or esthetic concepts on one hand and the realities of museum economy on the other. Certainly, for example, theatrical lighting or standards deemed suitable for mass selling appeal, though they may be necessary to retail merchandising, are to be used with extreme caution in showing works of art which, as historical documents, should suffer no distortion, and, as objects of

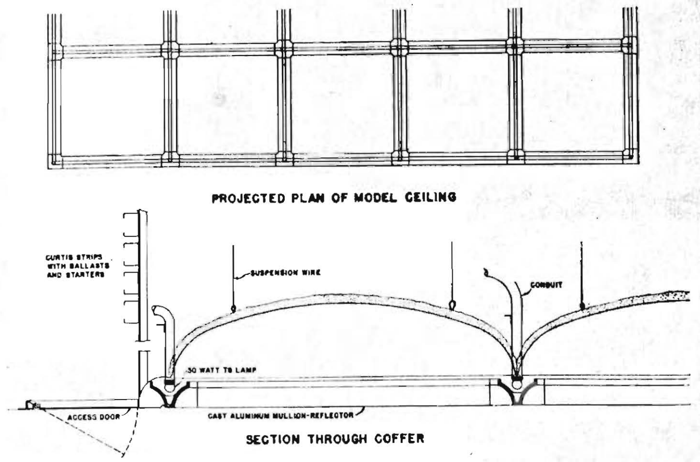




A view of the louvered ceiling in one of the test galleries. This installation gives about three times the light the Museum has at night in other galleries. Color of light is also tested. Upper view shows a test of 6500° K fluorescent lighting on paintings with predominant blues and pastel shades. This lighting is good for them, not so good for reds and greens beauty, need no distortion. As a matter of fact, one of the most critical questions to be answered is just how far may available modern lighting means be employed to dramatize art objects without distorting their appearance?

To those responsible for museum economy and for maintaining, if not increasing, public interest, these realities are uncompromising. Most of the ranking art museums of this country sadly lack either capital or operating funds or both. Most of them have long needed modernization of their lighting systems.

Consequently, with the exception of a few, individual gallery installations, in which occasionally brilliant ideas have been tried out, there is no existing example of an entire museum installation in which completely satisfactory applications of the most recent lighting techniques may be seen in this country. The museum field is, therefore, one in which an architect or an engineer, unless he adopts strictly traditional standards, simply cannot be sure, without a full-scale sample demonstration, that what he proposes to specify will be accepted. The risk of extras exceeding a contract price is, under these conditions, too high. This situation, of course, poses the question of the validity of retaining traditional concepts of museum lighting in the light of present day developments.

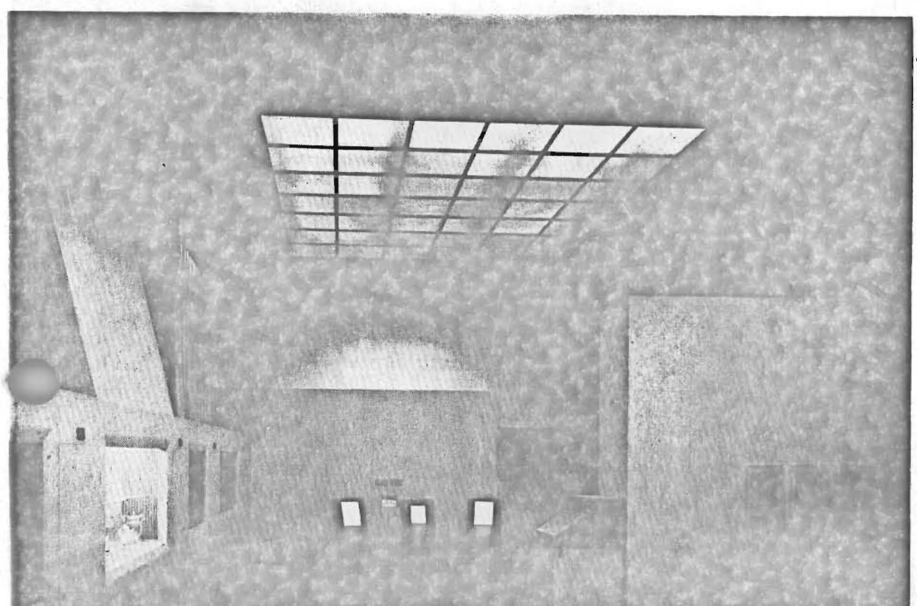


Detail of coffered ceiling used for lighting another test gallery. This is a test installation designed merely to test deep coffers with fluorescent lamps in square pattern (see photo opposite page)

ARTIFICIAL VS. DAYLIGHT

No competent illuminating engineer will take the position that daylight, when available, is not the most desirable for human vision. But, at the latitudes of the cities in which most of our museums are located, under average weather conditions from October to May — which are the months of peak attendance — adequate daylight is not available and supplementary artificial light is required for 75 per cent of the time during public visiting hours. More important is the fact that such supplementary light is required on a highly intermittent basis. The result is actually an immeasurable lack of uniformity of both light intensities and color values on gallery walls and floor areas. For example, on a bright, sunny morning, the east wall of a top lighted gallery may remain in comparative gloom with brilliant intensity on the west wall. The reverse would occur in the afternoon. Moreover, the frequent and intermittent obscuring of sunlight by clouds and the lack of sufficient manpower to monitor adjustable skylight louvers, where used at all, imposes a severe task on the adaptive processes of the public's eyesight, or, when too severe, kills the enjoyment of visitors while the condition obtains.

It is argued that these changes of light are indispensable to the esthetic enjoyment of great paintings, tapestries, sculptures, etc., and that to maintain a rigid uniformity of lighting values in a gallery would be oppressive and monotonous. The validity of this viewpoint must be admitted if the authority of individual criteria, as stated before, is accepted. Right here, however, is the area of controversy in which certain curatorial opinion has come to grips with the already discernible trend toward fully artificial lighting in the future. The architect or illuminating engineer would do well to recognize this situation and not to discount it, because the preservation of these changes of



Artificial skylight with light polarizing screen. Note extremely low brightness of ceiling itself relative to that of white paper sheets pinned to backs of chairs natural light are felt to be a fundamental requirement in gallery lighting by many curators of distinction and their associates in the field of fine arts, both here and abroad.

It is surely no offense to esthetic ideals to say that if it be too costly to serve all of the people, it becomes necessary to serve only the majority. An "experienced" curator of historical paintings, let us say, or one whose authority and connoisseurship respecting great art has become recognized, has the same attitude toward these masterpieces as had the original owners or their succeeding collectors who, through the centuries, have lavished the care upon them which has made them available to us. These people saw and admired these great works every day with the same stimulus which sought their possession in the first place.

They also had the privilege, as has the curator, of viewing them under the continuous symphony of color and shade which natural light plays daily from dawn to evening. It is understandable that to them, the changing aspects of the great paintings, sculpture, or tapestries had special meanings. These meanings were and are, without doubt, emotionally moving, but there can be no denial of the fact that such spiritual significance, if it could be so characterized, was and is, personal to the curator, the artist or to anyone who, knowing great paintings, haunts the gallery continually.

These, however, are not a majority, nor does there appear to be any course of instruction by which such reactions might be assured to the uninitiated. Even if there were, and Mr. and Mrs. Smith could be persuaded to revisit the museum often enough to catch the evanescent splendor of some luminous aureole on a Rembrandt or an El Greco, they could, as a matter of principle, say that they didn't like the way it looked and be just as right as the curator was.

All this is meant to state that uniform lighting would by no means strip great works of art entirely of their esthetic qualities any more than does the mistreatment they now get from the gloom in which the public is too often expected to view them. Perforce, a museum *must* use artificial light if its collections are to be seen at all, on all floors, and at all hours of the day. Most of the long-established art museums show evidence that lighting installations have, in the past, been planned with tolerance rather than enthusiasm. The result has been, in many instances, a characterless mixture of both natural and artificial light which cannot be argued for on any grounds — esthetic or practical. The two do not mix to the advantage of either. Any daylighted gallery, so situated as always to require some artificial light will, if the latter is designed properly, look its handsomest at night.

It must be said, however, that incandescent light has been and is, for museums, much too costly to operate in a system designed to achieve the foot-candle levels and shadowless diffusion of clear, sunless daylight. The practical ability of modern fluorescent lamps economically to approach daylight values, their complete reliability, length of life and versatility being at present established, it now appears fair to test the proposition as to whether the overall benefits of fully artificial lighting may not outweigh its esthetic deficiencies.

There is a strong case for it in probable evening openings. The museum of the future must recognize more broadly its obligation to the industrial and office worker who has no opportunity to visit its galleries except at the sacrifice of weekends which quite properly belong to outdoor pastime. Already certain ones are opening their doors from one to nine P.M. daily. This means, of course, that the margin of daylight hours, which now redeems the depressing inadequacy of museum artificial lighting, will be reduced to a point at which poor attendance after dinner hour can almost be guaranteed unless the lighting problem is solved.

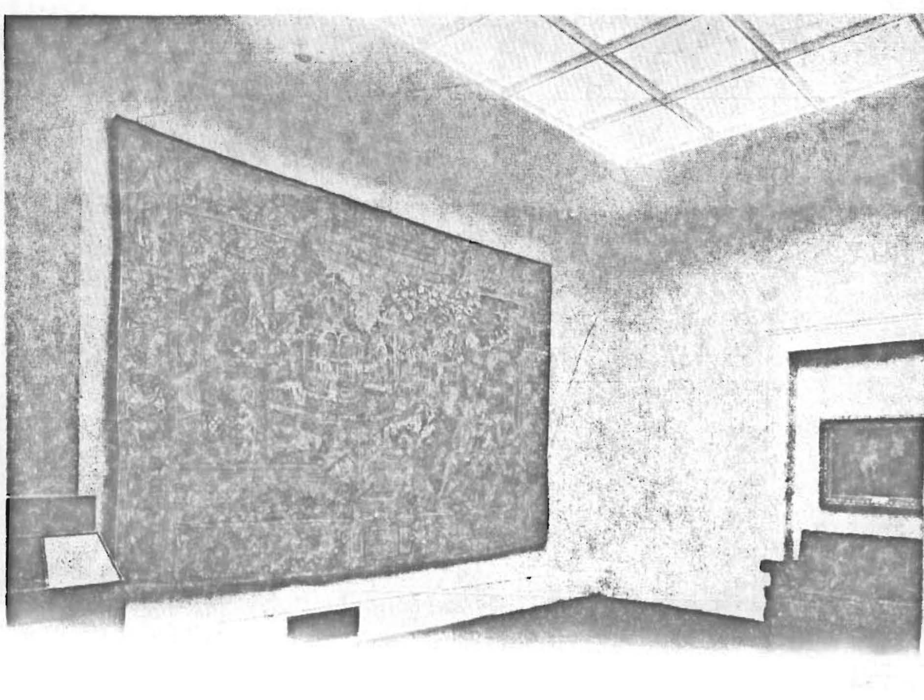
Then there is the question of the investment and maintenance costs of skylights relative to simple roof slab construction. Counting the loss of investment income at 4 per cent in lieu of depreciation estimates, the present-day added annual cost of glass skylights installed and maintained is approximately $550 per 1000 sq. ft. of roof area.

In the case of the Metropolitan Museum, there is no point in converting existing top-lighted galleries to solid roof construction, but such conclusions as are reached would certainly govern the design of additional wings.

A LIGHTING LABORATORY

With design problems related to the foregoing in mind, the Museum's Architects, Messrs. Robert B. O'Conner and Aymar Embury II, requested the trustees of the Metropolitan Museum to authorize an experimental program. Accordingly, a testing laboratory was designed and built by the Museum using only commercial equipment and open-market material. Valuable counsel and much of the basic calculations of lighting elements were rendered by Dr. Ward Harrison and Mr. James Ketch of the General Electric Company's Nela Park Laboratory. The effective co-operation of the Museum's curators and their professional staffs has provided, in the discriminating selection of objects for test, impressive demonstrations and cues to the solutions being sought.

These galleries, located in the south wing of the Museum, are not open to the public, but are now employed by the departments of the Museum for test installations, the recording of staff and membership reactions and the ultimate writing of specifications. It should be emphasized that no attempt was made to install the "ideal" gallery but rather to make available a reasonable choice of



A XVIth century Flemish tapestry lighted by coffered ceiling detailed on opposite page, with all lamps lighted. Note uniform distribution of light up and down systems — i.e., incandescent, fluorescent, diffuse and concentrating — with sufficient flexibility to obtain three to four levels of intensity, as well as adjustment to color values.

From the standpoint of occupancy, two distinct classes of space exist in most museums. Top-lighted, second floor galleries, directly below skylights, require either the separate or simultaneous transmission of daylight and artificial light. Such galleries are usually used for paintings, prints, water colors, drawings, rugs, tapestries or other wall mounted material.

First floor galleries must depend almost wholly on artificial light, with or without side fenestration. Here again, good seeing is burdened with tradition. Window glare is, elsewhere, one of the most bothersome problems of the illuminating engineer. In a museum, windows take up needed wall space which, as those who have tried to raise building funds fully realize, is hard to come by. Moreover, any attempt to make shadow areas around and below windows useful by artificial light is hopeless because of the window glare, and if it be so designed as to avoid artificial sources of glare as well, such an attempt must seriously dilute, if not cancel, the effect of any changes of natural light in the rest of the room. If case material is exhibited in window-lighted space, care must be exercised to avoid the annoying and obscuring specular reflections from case glass. The number of cases which may be shown and the most desirable layouts thereof, are hence limited and restricted. If cases are artificially lighted internally, there is no point to window lighting anyway, except for occasionally relieving the psychological impediment in any closed space.

The experimental galleries, designed primarily to cover the specific conditions at the Metropolitan Museum, assume the use of daylight through ceilings only. Test gallery K-29, being top-lighted, is equipped with a baffle or louvered ceiling, at a height of 16 ft., consisting of 30-in. square removable sections having oblong, aluminum cells, with a shielding angle of 53°, in the center of the room, suspended below a conventional T-bar grillage with clear glass lights. These latter are "blacked out" with wallboard panels, laid on top of the glass, when necessary, to create fully artificial conditions. Around the periphery of the room, extending a little over six ft. from the walls, a system of directional louvers was installed with fins parallel to and slanted 20° toward each wall in order to permit a relatively high-level concentration of light, from special, Curtis parabolic, fluorescent strips or from various forms of concentrating incandescent units, to be projected on the walls.

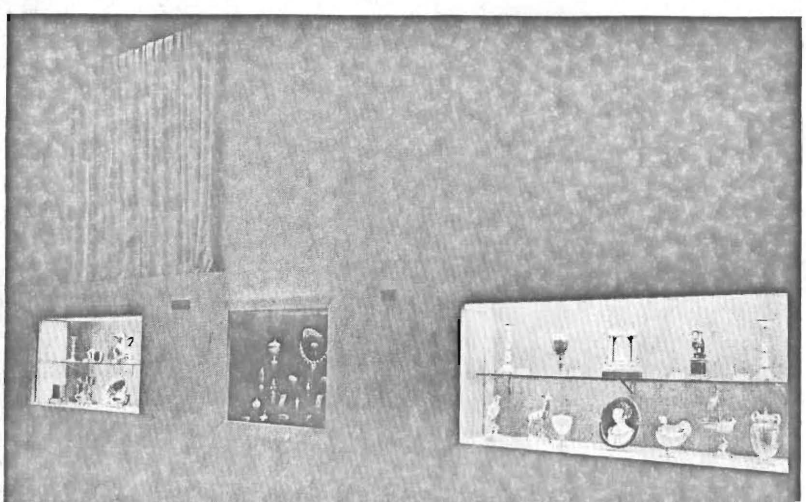
The chief virtues of this arrangement are: its extremely low brightness, concealment of fixtures, ability to change circuits and rearrange units without disturbing the ceiling's appearance. The behavior of this construction with daylight from above is highly satisfactory, and without doubt there are certain galleries which eventually may require adaptations of this type of louver ceiling.

Provision has also been made to test combinations of primary colors by means of adequate glass filters and rheostat controls so that wide adjustment in tonality, or color composition, of *white light* may be used to project on rugs, tapestries and textiles. (There is no requirement for any single color projection.)

The method of adjustment of color composition consists of an initial concentration over the wall of approximately 50 foot-candles of fluorescent light of 6500° Kelvin which carries enough blue so as to obviate the need for separate blue filters. With a tapestry in place, for example, R-40 spots with red, green, and amber filters are focussed on the object and the proper combination of tones adjusted by dimmers, until, as the curator may dictate, the proper "balance" between the colors which make up the fabric itself is secured.

When such adjustment has been completed, and the described combination of lamps switched on simultaneously, it is almost impossible to detect what color adjustment has taken place, or that any liberties at all have been taken with the "white" light on the tapestry. Until one color of the several contributing light sources has been switched off, the effect becomes brilliant without suggesting exaggeration. The scheme provides efficient means for obtaining qualities of light which can otherwise only be obtained from natural light, but under control rather than accidentally. Since an initial concentration of "seeing" light is used first, a *minimum wattage* of color filtered incandescent light is needed. The usual inefficiency of building up of white light by mixing primary colors is, therefore, not present.

The second test gallery, K-24, is equipped with two types of ceiling treatment as may be required for first or ground floor spaces. The height in this gallery is also 16 ft. The first form of treatment resembles in general character the indirectly lighted coffer system designed by Saarinen for the Cranbrook School at Bloomfield Hills, Michigan. In this case, the coffers, each weighing 30 lbs. and mounted together closely with about ½ in. separation at the spring lines, are precast of plaster with steel wire armatures for ready suspen-



Contrast between artificially and naturally lighted cases. Unit on right, lighted by daylight from above, contains miscellaneous crystal and metal work having 49 lamps and 1470 lamp watts, has maintained an average of 35 foot-candles over 576 sq. ft. of floor area during the past three months or with less than 2.6 watts per sq. ft.

The other type of ceiling treatment consists of conventional ceiling sash of 1-1½ in. T-bars glazed with a light-polarizing screen of Polaply plastic sheets "sandwiched" between ¼-in., obscure wire-glass and ⅛ in. thick, clear picture glass. This material does not distort color. It produces maximum polarization at a 57° angle of incidence. In order to increase its inherently low transmission efficiency, in the polarizing plane, a surface of high reflectivity was painted inside the housing within the hung ceiling above the sash. With successive rows of simple, fluorescent strip installed about 18 in. above the glass, this scheme takes some advantage of the interchange of reflected light between the top surface of the glass and the painted interior and, in this manner, as much light as possible is passed through the polarizing film at the required 33/57° angle.

This assembly has two promising results. Its partially polarized light, falling on highly specular surfaces, helps to reduce glare, and suggests its use in galleries showing period furniture having unusual burls or grains, intricate inlays or marquetry designs, below highly polished and obscuring surfaces. Its second result is a sharp cut-off beyond 45°, so that the brightness of this type of ceiling is phenomenally low within normal line of sight.

In order to obtain fair, comparative values between these two ceiling treatments, forty-five 40-watt lamps were installed above the polarizing ceiling sash. The assembly, with 1800 lamp watts, has also maintained approximately 35 foot-candles over 576 sq. ft. of floor area, or with 3.1 watts per sq. ft.

The remaining features in the gallery are devoted to experimental, case and feature lighting designed primarily for the development of means to control source brightness as well as to reduce relative brightness of surrounds; in other words, to subdue art objects' "competition".

CONCLUSIONS

During the few months in which this testing laboratory has been in operation, several general conclusions have become established. The first is that response to the color composition of light is fully as important a consideration as are the presentation and volume of light. Another is that "seeing" in a museum gallery should be pleasant and satisfying as well as educational. This is to say, for example, that extraneous glare and brightness, if intelligently controlled, may be stimulating rather than injurious to the visitor. Christmas tree lights can hardly be denied to young and tender optic systems on the ground that glare is poison to the eye. A bland diet may be beneficial but it is not much fun, and art curators of impeccable scholastic integrity, which is to say all of them, have long accepted the discreet use of the spotlight as a necessary adjunct to exhibition methods.

This does not mean that concentrating sources of light should be applied indiscriminately. On the contrary, every effort should be made, when desirable, to achieve bold contrast and "sparkle" on an object, but with least consciousness in the observer as to how they are being obtained.

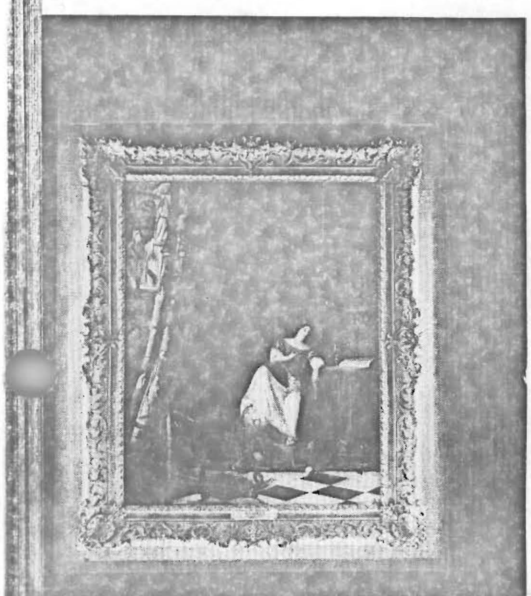
A third and most important conclusion is that *visible fixtures in gallery spaces are definitely a thing of the past.* The advent of the commercial fluorescent lamp, less than 15 years ago, crystallized a concept which had been developing in applied lighting for many years. This concept holds that "good seeing," which is the objective of all artificial lighting, is best served by a "system" which includes all elements and surfaces contributing to optic sensation in a given area. The amount of light is, therefore, not as important as are the brightnesses of light sources, and of the objects and their surrounds, which are being illuminated.

The fluorescent tube is not a decorative device in terms of traditional fixtures, and there is hence no incentive to have it exposed when its performance, in terms of good seeing, is better for being out of normal line of sight. The museum gallery of the future will have no fixtures, but rather luminous surfaces to provide seeing.

Lastly, it has also become clear that the fluorescent lamp of 4500° Kelvin gives, by far, the most neutral, balanced and accurate light for color response. It is far superior to any other production phosphor yet developed for color matching, but like a "pure" musical tone, it needs overtones. As a diffuse background for incandescent concentration, it seems to have outstanding properties for gallery walls.

One specific decision has thus been reached, based on the last-described general conclusion. Through a series of demonstrations and resulting study by the Museum's Director, Francis Henry Taylor, and the Curator of Paintings, Theodore Rousseau, Jr., a basic specification for the artificial lighting of paintings' galleries has been derived. Designs are completed for a sample installation employing special shielding and light obscuring methods incorporated into traditional ceiling sash to reproduce the desired effects as established by test. The new gallery is now under construction for opening to the public sometime in the spring of 1949.

Should experience with this scheme be found satisfactory and the design prove to be within construction cost limits, one important step will have been taken toward the final objective of this program. If the ultimate results, in glass, metal, plastics or whatever materials may be indicated, can be achieved at a cost in money which museums can either afford to spend or raise, then this laboratory will have justified itself.



A special experiment with recessed lighting on a XVIIth century Dutch painting; 4500° K. fluorescent light, from the bottom and sides, emphasizes Vermeer's original lighting of the subject and provides faithful response to the original colors

MUSEUMS AND ART GALLERIES

Although both accurate and comfortable viewing are of the first order in museums, the importance of dramatic emphasis should not be overlooked. Lighting should be applied carefully, to avoid violations of normal standards of good seeing and to avoid risk of injury to objects as well.

Concentrating vs Diffuse Lighting

Flexibility of positioning all concentrating light sources is a basic requirement. The use of surface-mounted runs of narrow, plug-in or twist-in, channel duct, is now widespread for this purpose. The only exceptions to the full flexibility afforded by such means are (a) for individual, permanently installed features, and (b) for certain galleries of large fine art museums, *e.g.*, those which own collections of paintings that substantially exceed in number the available wall space (here a rotation of items, as well as the long-term exhibition of the best known of great masterpieces, require approximately full wall coverage of vertical illumination so that repeated adjustment of the lighting is not needed). See Fig. 12–18. All concentrating sources may then be in a fixed position and may be concealed.[12]

Concentrating light sources (spots or floods) should *not be used* without the softening relief of diffuse light. Concentrating sources alone, tend to obscure the esthetic quality of sculpture and to discourage examination of detail. Diffuse light alone may detract from the appreciation of sculpture but if luminance contrasts are held within 6 to 1 limits, as is possible with both sources, subtle results may often be obtained. See Fig. 12–19. These limits conform to the special talent of many museum curators, who manage the "molding" of sculptures with electric light to equal the best which daylight affords.

The principle of three-dimensional lighting applies to forms of all kinds. A sufficient diffuse component may be frequently supplied by light reflected from adjacent or surrounding surfaces, or by general room inter-reflections. Freestanding sculpture, in central areas without some kind of backdrop to limit viewing to three sides, will risk discomfort glare.

Another characteristic difference between diffuse and concentrated light is quite important to the accurate and pleasant viewing of color. Diffuse light alone, tends to "desaturate" colors and imparts a dullness to them. Concentrated (directional) light strongly renders saturation in colors.[15] Paintings, such as those of Van Gogh, which have very irregular surface textures in addition to the interspersing of saturated color were apparently intended to produce a specific *post-retinal* relation between the colors and the texture. Both concentrated and diffuse light together are desirable for full appreciation of such surface characteristics. This post-retinal phenomenon is often experienced in judging relative brightness contrasts. This difference between diffuse and concentrated light shows up markedly on paintings having more than one coat of varnish.[16] The latter are usually kept cleaned and conditioned by experienced restorers in larger museums.

Color of Light Source

For two or three-dimensional lighting requirements (wall-hanging and freestanding), aspects of both color and texture must be specifically visualized. From experience outdoors, one knows that diffuse daylight is higher in color temperature than concentrated light (north overcast sky, 6500° K and sea-level sunlight, 5300° K—a difference of 1200° K, outdoors). Within the general dimensions of interior spaces, experience demands a generally lower order of color temperatures in lighting. The difference is very satisfactorily met by relative values already selected in cool white fluorescent lamps (4300° K) and of both reflector and projector incandescent filament lamps (2700–2800° K).

Good color rendering provided by modern fluorescent lamps[14] is desirable for all classes of museums.

Fig. 12–18. Daylighted gallery at night. Concealed services are shown at the right. Wall lighting (from concentrated sources) is beamed through lenses and is spread evenly. Fluorescent luminaires provide the diffuse illumination.

The Metropolitan Museum of Art, Rogers Fund, 1912.

Fig. 12-19. Lighting of sculpture. a. Concentrating sources alone, from front left. b. Total overhead diffuse lighting conforms to expression of features. c. Low diffuse lighting and strong concentrated accent adds to stern expression. d. Light concentration from upper right. Strong overhead diffuse lighting aids in viewing the details of this complex sculpture.

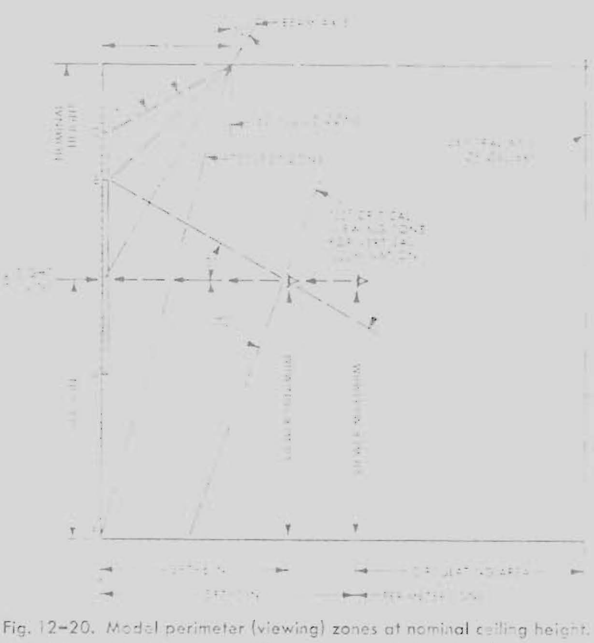


Fig. 12-20. Model perimeter (viewing) zones at nominal ceiling height. Model based on: (1) primary diffuse component (of vertical footcandles) at approximately 40 per cent of horizontal footcandles at S, (2) height of wall-hung display, (3) ideal utilization of beam cones, and (4) minimum effective viewing distance relative to a nominal height of object (A to B = 52 inches for a 30-degree cone, A to C = 65 inches for a 60-degree cone). To calculate viewing zones for higher objects, increase horizonal dimensions 1.5 inches for each 1.0 inch increase in height of object.

however, a greatly improved quality is necessary for the fine arts. The modern improved color cool white fluorescent lamp is now sufficient for general diffuse lighting in fine arts galleries without mixing any incandescent component. The line spectra of mercury appear sufficiently compensated for in the improved-color fluorescent lamps presently available in America and in Europe. If standard cool white lamps are used, it will be necessary to mix their output with that of daylight (blue glass) incandescent filament lamps in the amount of 20 to 25 per cent of the total flux. By far, the costs of such a combination justify the reduced lumen/watt output of the improved-color lamp.

Tinting of standard incandescent projector lamp output may often produce outstanding results by the use of pale, blue-white, "daylight" color roundels. Paintings which have the delicate blues or other colors of unsaturated quality, such as French impressionist, particularly respond to "daylight" tonality in accent lighting. Tinting, other than with "daylight" tones should be done only under curatorial judgment in the lighting of fine arts.

Gallery Design Principles

Presentation of concentrated light to wall displays (tapestries, paintings, etc.) should be at an incident angle of 60 degrees with the horizontal, centered at an adult sight-line height of 5 feet 6 inches from the floor as shown in Fig. 12-20.* This angle provides a good balance between frame shadow, specular reflections from protection glass or varnishes on paintings, the "raking" of surface textures (see Fig. 12-21), and maintaining a practical width of viewing zones. These, of course, will change with the height of hanging displays. (See Fig. 12-22).

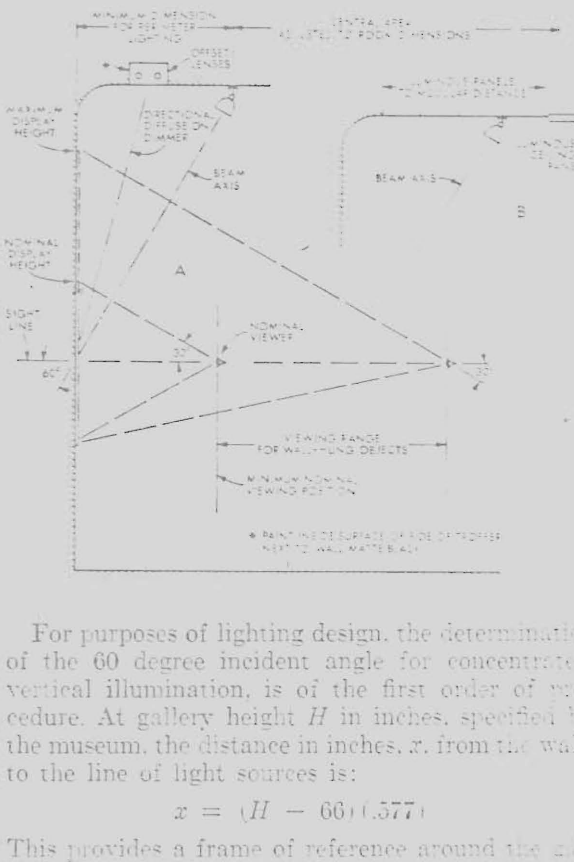
A nominal level of illumination of 30 footcandles maintained (being total flux from all sources), on both horizontal and vertical planes, is recommended to meet all normal visitor functions of gallery viewing, copying, and studying. Vertical footcandles should be figured for these purposes on a 60 per cent full wall coverage basis, but, due to variable factors, may not, in practice, average that figure.

Sight-Lines, Ceiling Heights, and Viewing Zones. A sight-line height of 5 feet 6 inches from the floor has been found most responsive to adult seeing habits. Sight-lines in rooms set up for school classes may be lowered, but not more than one foot, because of wide age differences between grades. High schools invariably use the regular galleries.

* These points control the over-all geometry of viewing.

Fig. 12-21. Raking of weave of Renaissance tapestry by high angle directional light (left). Same tapestry with concentrated light at 60 degrees incident angle (right).

Fig. 12-22. Range of perimeter zone width. A—with fully controlled wall illumination. B—with full width luminous ceiling.



For purposes of lighting design, the determination of the 60 degree incident angle for concentrated vertical illumination, is of the first order of procedure. At gallery height H in inches, specified by the museum, the distance in inches, x, from the walls to the line of light sources is:

$$x = (H - 66)(.577)$$

This provides a frame of reference around the gallery ceiling for the respective designs for lighting the perimeter (viewing) zone and central area. However, such calculation neither defines the viewing zone [illegible] nor its basic relation [illegible] The control of ceiling heights should [illegible] based on the anticipated maximum height [illegible] hung displays. In a small museum the [illegible] ings may be needed in only one or [illegible]

Unless ceiling heights are [illegible] established, the dimensions of perimeter [illegible] be related, for the purpose [illegible] to three pertinent factors [illegible] Fig. 12-2[illegible]

1. The height of paintings or tapestries [illegible]

[illegible]

2. [illegible] of [illegible] light-beam [illegible]

3. Minimum effective viewing distances for the maximum permissible beam [illegible].

At the specified 60-degree incident angle of presentation, a projected light-beam [illegible] becomes oval. Because the maximum candlepower at the beam axis is the one critical point governing (a) relative brightness as a function of good seeing, and (b) any over-exposure to photochemical damage hazards (see below), measurement of vertical illumination at the sight-line becomes one of the most trustworthy, yet simplest of criteria for the management of lighting in a fine arts museum. It will also provide a guide for the number or horizontal spacing of emphasis lighting units [illegible] any single display setup.

A study of Fig. 12-20 [illegible] performance data on projector and reflector lamps will show that for good visual performance, and maximum safety of the art collections, the following approximate sight-line ranges of [illegible] illumination [illegible] maintained footcandles [illegible]

1. 60 footcandles [illegible] temporary exhibits.

2. 20 footcandles for [illegible] permanent exhibits. Combined with [illegible] diffuse component, the total vertical footcandles [illegible] to the [illegible] limits.

[illegible]

Since [illegible] are handled much more frequently, they are cleaned more often. The above equation is, therefore, based on an 80 per cent maintenance factor, of 95 per cent median candlepower, with a 10-degree cone, over the life of the lamp, the length of beam throw squared, and the cosine of the specified incident angle.

It will be seen at once that any real balance between horizontal and vertical illumination contradicts the idea of flexibility. However, it is equally plain that the cost of vertical lighting in terms of good seeing favors diffuse light. The over-employment of concentrated light may be shown to *decrease* visual efficiency and *increase* photochemical damage hazards. The over-employment of concentrated light has become a commonly demonstrated tendency in the absence or lack of sufficient diffuse light. It is a potentially harmful trend. To the extent that the two are made complementary, and kept under control, unnecessarily high electric current costs, and the impaired visual performance of visitors are avoided.

There are, of course, a large number of ways to meet these needs. They depend upon the architectural and structural character of the building, whether or not lighting auxiliary to daylight is involved, availability of ceiling cavity space, the incidence of arches and doors, dimensions of rooms, the physical features of the material for exhibition, and available operating funds. Ceilings may be fully luminous, or with luminaires distributed in the central area.

For the best seeing a viewer should be unaware of where the light is coming from, but in many museums the ceiling and the lighting appear in the view of approaching visitors. Viewers then quickly become aware of any over-busy, or cluttered ceiling appearance. It is recommended that luminance ratios between adjacent luminaires or surfaces be reduced to a ratio of 3 to 1. If fully luminous ceilings are preferred, they should extend to within one foot of walls for galleries having ceiling heights of 15 feet or less, and within two feet of walls for those over 16 feet in height, in order to insure that at least 40 per cent of the calculated diffuse horizontal illumination is available as vertical footcandles at the wall, measured along the sight-line height. Such a ceiling should have its control divided between the perimeter and the central areas; the latter may be subject to dimming—no closer than a 50 to 1 range being necessary.

Floor luminance is important in all rooms devoted to wall hung displays. It is very distracting at or near the base of walls in the normal position of viewing. This can be clearly seen by reference to Fig. 2–7, page 2–4, showing that the angle of visual sensitivity for both eyes, increases to 70 degrees below the horizontal, at the bottom of the field of view (see Fig. 12–20). Floor reflectance in galleries should be held below 10 per cent (see Fig. 12–18), being totally unlike the ideal conditions for task lighting where the higher floor reflectances often aid the available working flux. Floors of this reflectance appear lighter under diffuse light when waxed, as is frequently the case, but this effect disappears when directly viewed at the walls.

Lighting for Displayed Materials

Display areas are devoted to case or vitrine exhibits, dioramas, habitat groups, etc., where viewers stand or move in relatively low levels of illumination. Unlighted display cases or table cases are now rarely used in modern museums of fine arts. They are employed there largely for study-storage. In natural history and science museums, however, they are invaluable for large cases requiring the exhibition and protection of varieties of specimen and large objects of archeological, ethnological, or geological interest, etc. These cases can be well illuminated by general lighting through the top glass without significant problems of specular reflection.

The principal consideration in case lighting, for the comfortable visual performance of visitors, is the brightness of any exterior object, when seen reflected from enclosing glass fronts, should be substantially less than that of the objects on display within the case. Competing images, including brightness of "viewers" faces and those of the exterior surround, detract greatly from visual efficiency. These interferences may be minimized if the reflectances of the interior backgrounds, decks, and mounts within cases strongly favor the objects exhibited. This also means *as low a luminance as possible of the illuminating source within the case.*

The image brightness of viewers' faces is almost solely due to unshielded, translucent diffusing panels in the light openings. Particular care should be exercised in laying out case galleries, to avoid image interference from the brightness of the room ceiling luminaires, and of lighted cases on opposite walls. Frequent practice is to provide wall cases which have their glass fronts tilted forward slightly at the top, to throw reflections downward below normal sight-lines. The frequent practice of mounting free-standing cases *endwise (normal) to one wall* of a room, their exposed ends being paneled, also minimizes this problem.

It is regular practice to conceal the interior light sources within enclosures called "attics", mounted at the top of wall or free-standing cases. If displays are sensitive to temperature, humidity, irradiation from light sources, or because their rarity or intrinsic value must be safeguarded, attics are placed *over* the glass top enclosure to control opening of the case. Illumination in either event is best presented through relatively deep (60-degree cut-off) low-luminance louvering. The etched aluminum type with small, hexagonal cells has very satisfactorily met these requirements. Matte black or gray finished square cells, or plain longitudinal louvering, with the deeper cut-off and the same finish, have also been acceptably used.

Daylight fluorescent color enhances silverware;

other tonalities of the family of white fluorescent lamps are sometimes used over the great variety of decorative arts, antique jewelry, folk artifacts, and archeological material, when color rendering is not important.

Lighted case interiors should have clear, transparent shelves, or the well-planned use of fabric-covered block mounts of varying heights. The latter scheme lends itself well to labeling, and very striking effects are achieved with them. Case interior illumination levels very rarely should exceed 30 footcandles, measured at the usual waist-high deck, or three feet from the floor in full-length cases. In measuring results, the factor of internal reflections from the inside surface of glass fronts should be noted. These add considerably to the flux available in the lower half of a case. Footcandle measurement may properly be made only with the front closed.

Consistent with safety and room-cleaning maintenance, the level of general illumination in case-lighted galleries may pleasantly range between 5 and 10 footcandles. Substantial spill-out of light from cases will always add considerably to lighting the circulating areas of the room. Floors should be lighter than elsewhere at 40 per cent (maximum) reflectance, and ceiling finishes should be at the same level. Low-luminance downlights, recessed or surface-mounted and finished to blend with ceiling luminance, will conform well to the foregoing. General illumination at these low levels should have the warmer tones of incandescent lamps.

Period and Historic Room

The over-riding limitations in these applications is the faithful maintenance of the orginal aspects of the room, and this is uncompromising in rooms of historical significance. The problem of integrating the instruction of visitors and school classes with the original illumination levels was never anticipated by the first owners or designers. Rarely, does the original lighting means serve to permit critical examination of the interior.

If the period room is not specifically historic, but rather an example of period design, its elements usually are chiefly original, and therefore, irreplaceable. Visitors are rarely allowed to enter and circulate at will around the room, but may be limited to a restricted area near the doorway, or "in" and "out" another nearby. Any treatment must be specially created if a museum chooses to provide modern illumination levels in the room. Various means have been used, such as employing optical beam projection, under curatorial supervision and responsibility, but all methods of this nature must involve penetration of walls or ceiling, for which no suggestion here is possible.

Assuming the existence of a barrier behind which viewers stand, it is usually feasible to mount out of sight, two or three swivel type reflectors in one cluster over an outlet above, or at the end of the entrance doorway, fully exposed, but above and behind the group. Not more than two 75-watt reflector floods at sides, and one 75-watt reflector spot in the middle, are needed if the cluster is near the corner of the room. Two blue-white, 100-watt, PAR-38 flood lamps are usually ideal for the average room. This unit is connected to control switch at the door jamb, where the guide stands to demonstrate. The room is first seen in its original aspect for the full verbal explanation. Then, the examination light is turned on to show detail, and extinguished when the group leaves. This is a forthright alternative to either a flashlight, or a portable indirect torchiere, plugged in to base outlets of the room, and left lighted.

The treatment of *false window lighting* is of major importance in this class of room. When this is required, it should be kept in mind that originally such window light presented all the characteristics of outside daylighting, the sources of which were not only sun and sky, but also very largely from *ground reflections*. It is not necessary, nor desirable, that false-window cavity reflectors reproduce landscaping, nor city streets, nor any noticeable added indication of outdoors. But excessive direct glare from the lower half of a false window is unnatural and a direct burden on ocular accommodation. It can be minimized if a plaster-smooth surface is on the reflector; the cavity floor returned as far below the sill as possible—the return to have a darker gray paint finish (Munsell GY 5/2). The lower half of the reflector is then finished in three stages of graduated, matte, low chroma (green-yellow-gray), beginning about Munsell value GY 7/2, and growing lighter in two more stages of G 8/2 and G 9/2, (Gray-Green) respectively, to about half-way up the window opening, or where it may be reasonably judged as the area of the horizon. Above this, the finish would be as usual, a high reflectance matte white. If this is done, the effect will be that of a light, early morning fog, obscuring the surround. This is not too difficult a job for an experienced painter. Appropriate glazing of sash is desirable.[17]

The light source should be standard cool white fluorescent lamps in strips mounted vertically on both sides, concealed behind the outside reveals, and located in the upper part of the opening. With a shallow, curved reflector, the total flux of these lamps should be at approximately 300 lumens per square foot of window opening, on a maintained basis. If there is sufficient cavity depth available, projector lamps may be beamed obliquely through the sash from an upper corner of the cavity, across the sill and down onto the floor, simulating high angle sunlight. For a window height of six feet or less, not more than two 150-watt R-40 lamps are adequate for this purpose. Ventilation is necessary.

Museum Conservation

The great art and other collections of this country are part of our national wealth, and today museum conservation is a scientifically organized technology in the restoration and preservation of historic and artistic works. One of the constant exposure hazards to material on exhibition, is photochemical damage, due to spectral radiation of light.

The so-called reciprocity law, while important to consider, is far less an uncertainty than the character of the shorter wave spectral distribution in daylight and electric light sources, together with the wide variation in resistances of materials themselves to deterioration. The first definitive advance was made by the U.S. National Bureau of Standards in 1950, for the preservation of the Declaration of Independence, and the Constitution of the United States.[18] Extensive research is continuing.* [19] Any exposure under the relatively high levels of common merchandising practices is usually of little significance when goods are continually sold and delivered. Title to museum objects rarely passes.

Data now available[20] show that the commonly employed light sources in museums provide an order of photochemical damage hazard, as shown in Fig. 12-23. These values are expressed in the Probable Damage per Footcandle (D/fc), of six different light sources, compared with clear zenith sky light taken as 100 per cent, both under direct exposure and through a tested available commercial acrylic filter material.

It can be noted that the most hazardous radiations are those having spectral distributions which are dominant in the shorter wavelengths. The relative damage factor increases logarithmically in inverse ratio to wavelength. Thus, ultraviolet is far more hazardous than visible light. If, however, footcandle levels are sufficiently high, such shorter wavelength visible radiation may become significantly hazardous, even if all ultraviolet is filtered out.[21]

The foregoing should not be taken to infer that damage must occur regardless of the fastness or light stability of any substance, but the possible hazards of exposure to irreplaceable materials must be carefully considered in museums. Exhibition case lighting, due to the levels at which objects are mounted in proximity to light sources, such as on high shelves, provides the point of the most critical exposure to fading or structural damage. The filters widely used are those which test equally with the performances of types UF-1 and UF-3 acrylics. Type UF-1 has a zero cut-off at 360 nanometers, a cut-off of 60 per cent at 400; and of 89 per cent at 420, giving "water-white" transmittance of the visible spectrum.

Type UF-3, slightly yellowish in appearance, has a zero cut-off at 395; of 56 per cent at 400; and 79 per cent at 420 nanometers. Since, at least, 79 per cent of blues are thus transmitted, color rendering is not noticeably affected, and the material further reduces the hazard in zenith sky light to 50 per cent below that achieved with UF-1.[22] This filter material comes in two forms, one in 1/8" thick cast sheets, which would be cut to size and laid on top of the vitrine beneath the lamp attic. The second form comes in 1/8" thick, extruded tubing, made to slip over the fluorescent lamp itself. The tubing should not be used over tubular incandescent lamps because excessive heat will deteriorate both lamp and the acrylic. Further, if any incandescent lamps are used without the use of an adequate filter, for case lighting of susceptible material, the maximum flux density *at the point of closest* proximity to exposed material should not exceed 12 footcandles.

* Particularly by the Mellon Institute, Pittsburgh, Pa., in cooperation with The National Gallery of Art (Smithsonian Institution, Washington, D.C.)

Fig. 12–23. Probable Damage per Footcandle (D/fc) Inherent in Museum Light Sources

Light Source	Color Temperature (degree K)	D/fc (Per Cent)	
		Unfiltered	Filtered*
Zenith Sky Light	11000	4.800 (100.0)	.407 (8.5)
Overcast Sky Light	6400	1.520 (31.7)	.243 (5.1)
Sunlight	5300	.790 (16.5)	.192 (4.0)
Fluorescent (CWX)	4300	.551 (11.5)	.147 (3.1)
Fluorescent (WWX)	2900	.444 (9.2)	.086 (1.8)
Fluorescent (Daylight)	6500	.402 (8.4)	.245 (5.1)
Incandescent	2854	.136 (2.8)	.062 (1.3)

*A special ultraviolet absorbing formulation of polymethylmethacrylate (UF-1 Rohm & Haas) producing clear transparency to visible radiation.

OFFICE BUILDINGS

From a visual standpoint, decorative lighting that produces 20 footcandles in a lobby usually may be considered sufficient for safe passage of pedestrians, provided there is auxiliary lighting at directory boards, and directional signs, and adjacent to the elevators and stair wells as a safety measure. However, since most office buildings have their maximum traffic in the daytime, this level may be found insufficient to provide satisfactory visual adaptation as the visitor steps into the lobby from out-of-doors (from an illumination level approaching 10,000 footcandles in direct sunlight). This necessity for adaptation combined with the advertising value of higher levels and brighter surroundings has led many building designers to provide higher levels of illumination.

In hallways and corridors of ordinary ceiling height (less than 30 feet) luminaires should be spaced not more than 20 feet apart. No branch corridor should be without a luminaire. A luminaire located at a main coridor junction will serve two branches not more than 10 feet deep. For safety in such locations, at least two lamps should be used in each luminaire.

No entrance to an elevator or a stair well should be more than 10 feet from a luminaire. For recommended illumination levels for elevators and stairways, see Fig. 9-53. The luminaire and layout should provide such a uniform level that the maxiareas.

Echoes in the exhibition space can be controlled by the careful selection of materials for construction, room shape, and the addition of background noise from the mechanical system.

c. Climatic Factors E.II.a.1. E.III.a.

The interior conditions of the exhibit, workshop, and storage spaces must be maintained at 65degrees F drybulb, and 50-60% relative humidity. These are the conditions recommended for the preservation of organic materials which will make up the largest part of the museum's collection.

Dust control is also a major factor in that it is anticipated that most of the collection will be open to the atmosphere. This will necessitate the use of electrostatic precipitators to curtail dust deposits

IV. Economic Factors

This design will become part of a funding proposal for this facility and if there is any economic factors to be considered it is to make this design as complete as possible in order to maximize the possible grants. The project will be phased to provide the bare essentials first and the rest at a later date.

V. City Planning, Zoning, and Building Code

The only land use plan for this area was prepared by the Georgia Mountains Planning Commission. Their report classified the selected site as rural residential, and the facility in question is acceptable under this classification.

A sewage and water plan was prepared for this area by the same agency and it will be feasible for this facility to tie into this system if it is carried out.

Present land use in this area is predominantly farm activity with residential in small pockets around the highways. There is also a small amount of light industrial.

The building code for Rabun County is the Southern Standard Code, 1969 edition.

VI. Structural Factors and Construction Problems

a. Spanning the exhibition area is the only space where there might only be small structural problems.
b. Surface inspection of the usable building locations on the site indicate that the plateaus may have been formed by a settling along the eastern slope. This could result in footing, foundation and retaining wall problems.
c.

c. The biggest problem is the availability of construction resources in this remote area. Prefabricated components may ve the answer to part of this problem.

VII. Equipment

a. Exhibit Cases

E.II.o.1.

1. Function
   a) protection from
      1) dust
      2) insects
      3) theft
      4) fire
      5) visitors
      6) light
   b) visibility
      1) no obstructions
      2) no reflections
   c) accessability
   d) flexibility
      1) internal-adapt to different exhibits and arrangement
      2) external
         (a) mobility
         (b) adaptibility
   e) visitor comfort
      1) ease of vision
      2) physical comfort
   f) mobility
   g) storability
   h) durability
   i) esthetic compatability with surroundings
   j) effective display
2. Types of Showcases
   a) table
   b) upright
      1) freestanding
      2) wall
   c) inset
   d) panels and drawers

b. Video and Audio Tape Display Equipment

c. Darkroom Equipment
1. two enlargers
2. Print sink and wash
3. Developer equipment

d. Publishing Equipment
1. Addressograph
2. Correspondence files
3. Layout tables
4. Desks

e. Restoration

1. Storage racks
2. Fumigation vault
3. Work tables and sinks
4. Studio equipment (lights, tripod, etc.)

f. Fire and Theft Protection

1. Locks and alarms
2. Heat and smoke sensors
3. Localized sprinkler system

VIII. Psychological and Esthetic Needs

a. Psychological

The main concern in this section is a phenomenon known as "Museum Fatigue". It is characterized by tired eyes, sore necks and feet, and overall weariness.

This fatigue is generally the result of interminable circulation patterns, cluttered and confusing exhibits, excessive walking and climbing between rest places, information saturation, and exhibits higher or lower than the normal cone of vision.

This condition can easily be avoided through careful planning. Seats and handrails can be provided to let the viewer rest while he studies the exhibits. The circulation pattern should suggest a route to the vistor, but not trap him into it. Visual experiences totally divorced from the exhibits provide relief and contrast. The visitor should also be able to comprehend the logic of the exhibit readily and be able to move to the area that interests him most. Ramps can replace stairs as they facilitate the use of wheelchairs and make it easier to service the exhibits.

Cases should be arranged for easy comprehension. Labels for objects on display should be keyed by a legend at eye level. This frees the case for exhibit arrangement and reduces eye strain in the viewer.

The visitor's cone of vision is very important. Anything out of the normal cone of vision when standing or sitting will result in neck and eye muscle strain. Large and irregular should be in floor cases while similar smaller objects should be raised or in table cases closer to the observer. Objects should be kept away from the back wall of larger cases to help facilitate detailed viewing. Reflections on glass cases are annoying and can be avoided by eliminating bright light sources by using internal light sources in cases and by not using dark backgrounds. Colors should be used carefully as they can overpower the objects they are supposed to be calling attention to

b. Esthetic

The physical form of this building should reflect the vitality of the culture and the environment that this facility is dedicated to preserving. It should blend in and compliment the site, which is typical of geography that gave birth to this culture.

1. The project should reflect the local architectonic forms.
2. The project should incorporate local materials
3. The site should be disturbed as little as possible and the building designed around the various rock outcroppings and dense groves of trees.
4. The building should be oriented to take complete advantage of the views from the site.

IX. Building Type Analysis

There are very few buildings in existence that even come close to functioning as outlined in the previous eight parts of this secrion. The ones that do are generally published in museum journals without plans or sections and only a little written on general organization.

The Appalachian Museum at Berea, Kentucky has had to adapt their operation to two old warehouse type buildings and are critically short of space. These buildings are ill suited to exhibiting and have been mauled by institutional planners and workmen. The director, Harry Jack Segedy, has done much with what he's had to work with, but it is hardly a usable example.

Section D: SITE SELECTION

I. Relationships Needed to Other Land Use Areas of the Region
   a. The site should be centrally located with respect to the local high schools.
   b. It should be an area that will not be encroached on by future development.

II. Transportation

The site should be accessable, by car, to everyone, but not blatantly positioned on a major tourist thoroughfare. This is an educational center and not particularly tourist oriented.

III. Utility Needs
   a. Electricity
   b. Water
   c. Trash removal
   d. Sewage Treatment

An emergency generator will be required to maintain the mechanical equipment due to the critical nature of the relative humidity, temperature and dust content of the museum atmosphere

IV. Geographical Needs

The site should be situated in the culture and the environment that the museum represents.

V. Economic Factors
   a. This is a public institution, and as such is tax free.
   b. Land cost is negligable on this project as all sites under consideration are purchased or donated.

VI. Administrative

The facility is to be oriented toward all area high schools and not just one, as it is now. It should not be formally connected with any one school. This allows the facility to survive administrative changes within the individual school.

VII. Site Selection
   a. Site I

This site was made available to the Rabun Gap-Nacoochee School when the center was first conceived as a tourist oriented museum. The property is about 600 yards from the school and has adequate utilities. At this time there is a local farmer's market located on this site that would have to be demolished and the property is a little over two acres. The reason for the rejection of thesite is that the widening of U.S.

441 will eliminate much of this property as useful area.

b. Site II

This site was also rejected for many reasons, the biggest being that it is a flood plane for Betty's Creek. At present it is a cow pasture with absolutely no trees on any of it. The property is owned by the Nacoochee School and is located directly across U.S. 441 from the present campus. This places it under the school's administration and as stated before, this is not a desirable situation.

c. Site III

This is the site chosen for the project. It is 150 acres of land located on the eastern slope of the western ridge of the valley that holds Clayton, Mountain City and Rabun Gap. The land extends from the top of the ridge to the gentle slopes, just before the valley floor. The other side of the ridge is occupied by the Black Rock Mountain State Park. This is a desirable condition in that it will insure against incroaching development, and if the museum is unable to support itself in the future, it could be deeded over to the government and run as part of the park.

There is an unimproved road into the property with electric and telephone lines running along it on poles. There is a spring on the site, but if this proves inadequate, water will have to be supplied in other ways. A private sewage plant may also be needed.

This site is also more characteristic of the type of country that gave birth to the art that this facility is dedicated to preserving. The land is rich with wild growing things and from this vantage point, one can easily see the hills of North and South Carolina. It is more centrally located than the other proposed sited with respect to the local high schools. The actual positioning of the building on the site will be on the lower slopes that have been previously cleared as pastures.

There is the possibility of the Nacoochee School going completely private which would exclude the local students that this program is aimed at. This property has been bought with royalties from the Foxfire Book.

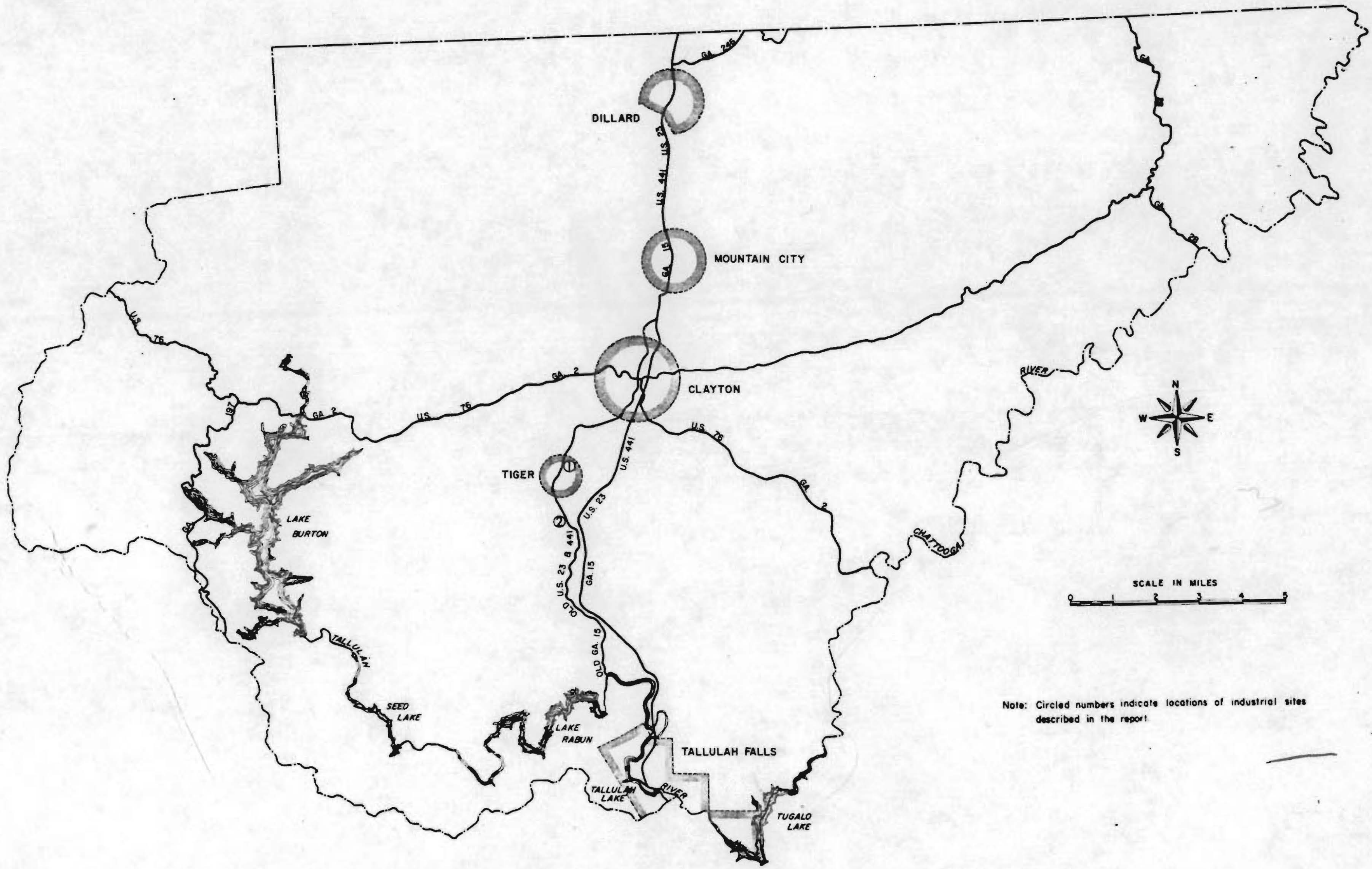


Figure 2. Map of Rabun County showing locations of industrial site areas

FACTUAL INFORMATION ON RABUN COUNTY

Rabun County, located in the northeast corner of Georgia, is approximately 116 miles northeast of Atlanta and 77 miles west of Greenville, South Carolina. The county population in 1960 was 7,456. The city of Clayton, county seat of Rabun County, had a 1960 population of 1,507. Other incorporated towns in the county are Dillard (1960 population: 204), Mountain City (550), Tiger (277), and part of Tallulah Falls (Rabun County, 54; Habersham County, 171).

Major industrial activities in Clayton-Rabun County presently include the manufacture of carpets, shirts, metal products, and lumber.

Labor

A recent survey of the Rabun County labor market by the Georgia Department of Labor indicates an adequate labor supply, both male and female. Such labor is productive and trainable. The overall labor supply in Rabun County and within a reasonable commuting distance is about 1,250 persons.[1/]

Transportation

Railroad. Clayton and Rabun County have no rail service. The nearest railroad service is at Cornelia, 36 miles south, where service is offered by the Southern Railway System.

Highways. U. S. Highway 23 (U. S. 441 and Georgia 15) passes north-south through Tallulah Falls, Clayton, Mountain City, and Dillard, intersecting with U. S. Highway 76 (Georgia 2) at Clayton. The old route of U. S. Highway 23 (U. S. 441 and Georgia 15) passes through Tallulah Falls, Tiger, and Clayton. Georgia Highways 246, 28, and 197 serve the county.

Truck Lines. Both interstate and intrastate motor freight carriers serve Clayton and the county.

Bus Lines. Bus service is provided by Smoky Mountain Trailways, which offers three schedules daily.

1/ In each county of the Georgia Mountains area that will be surveyed, the commuting labor supply and the in-county resident labor supply will be grouped. This will cause some degree of overlapping on the estimated labor supply for each individual county.

Airlines. Rabun County is not served by commercial air transportation. The nearest commercial air service is at Greenville, South Carolina (85 miles), Athens (90 miles), and Atlanta (118 miles). An airport project is now in the planning stage. An airport with a 2,700-foot runway is available at Franklin, North Carolina (23 miles).

Utilities

Water and Sewer. Clayton is supplied water from springs and surface sources. The city has a million-gallon raw-water storage dam and elevated storage for 500,000 gallons of finished water. Maximum consumption is 380,000 gallons per day; filtering capacity is 700,000 gallons per day.

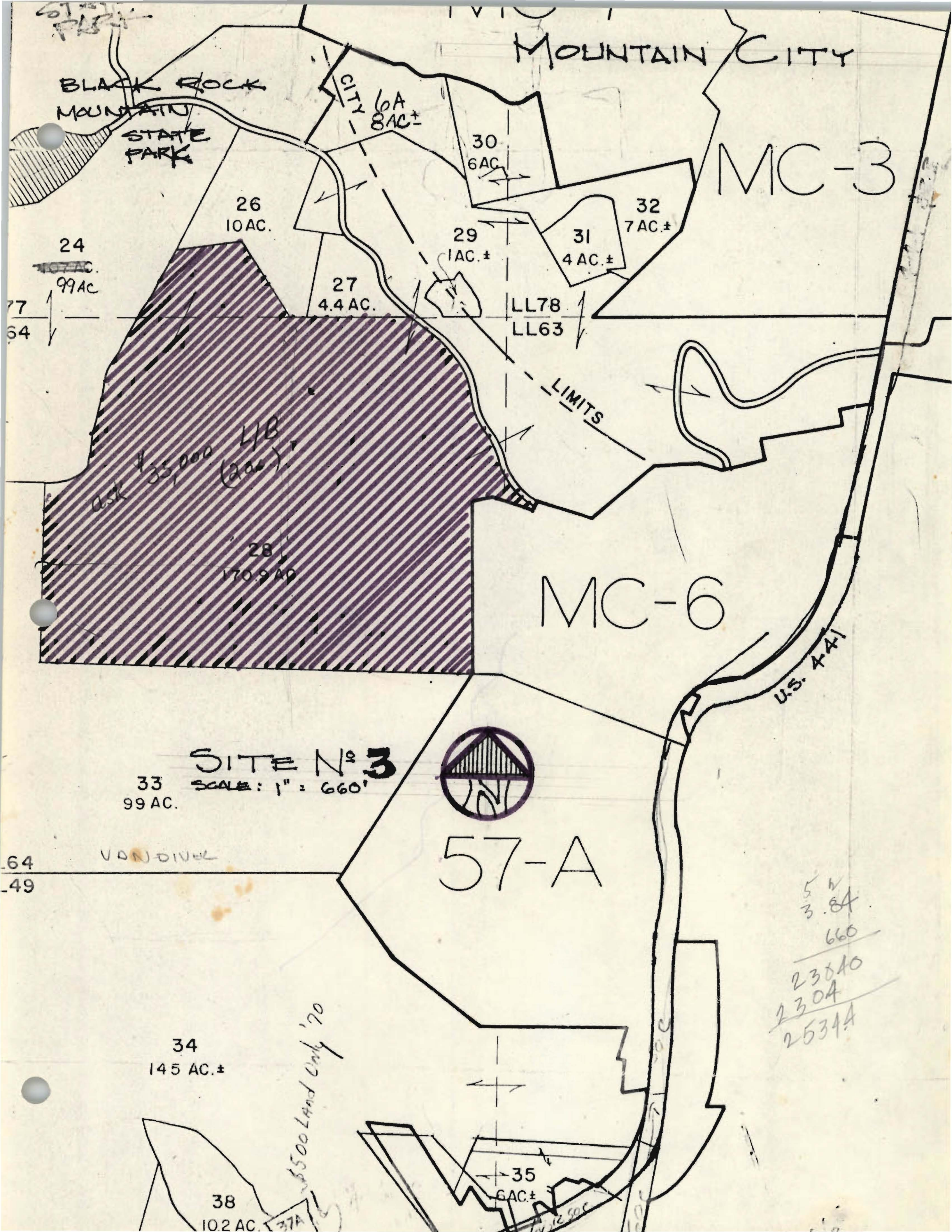
Storm sewers serve 30% of the paved streets of Clayton, and 75% of the water customers inside the city are served by sanitary sewage facilities. Treatment consists of a digestor tank and filters with a capacity of two million gallons per day.

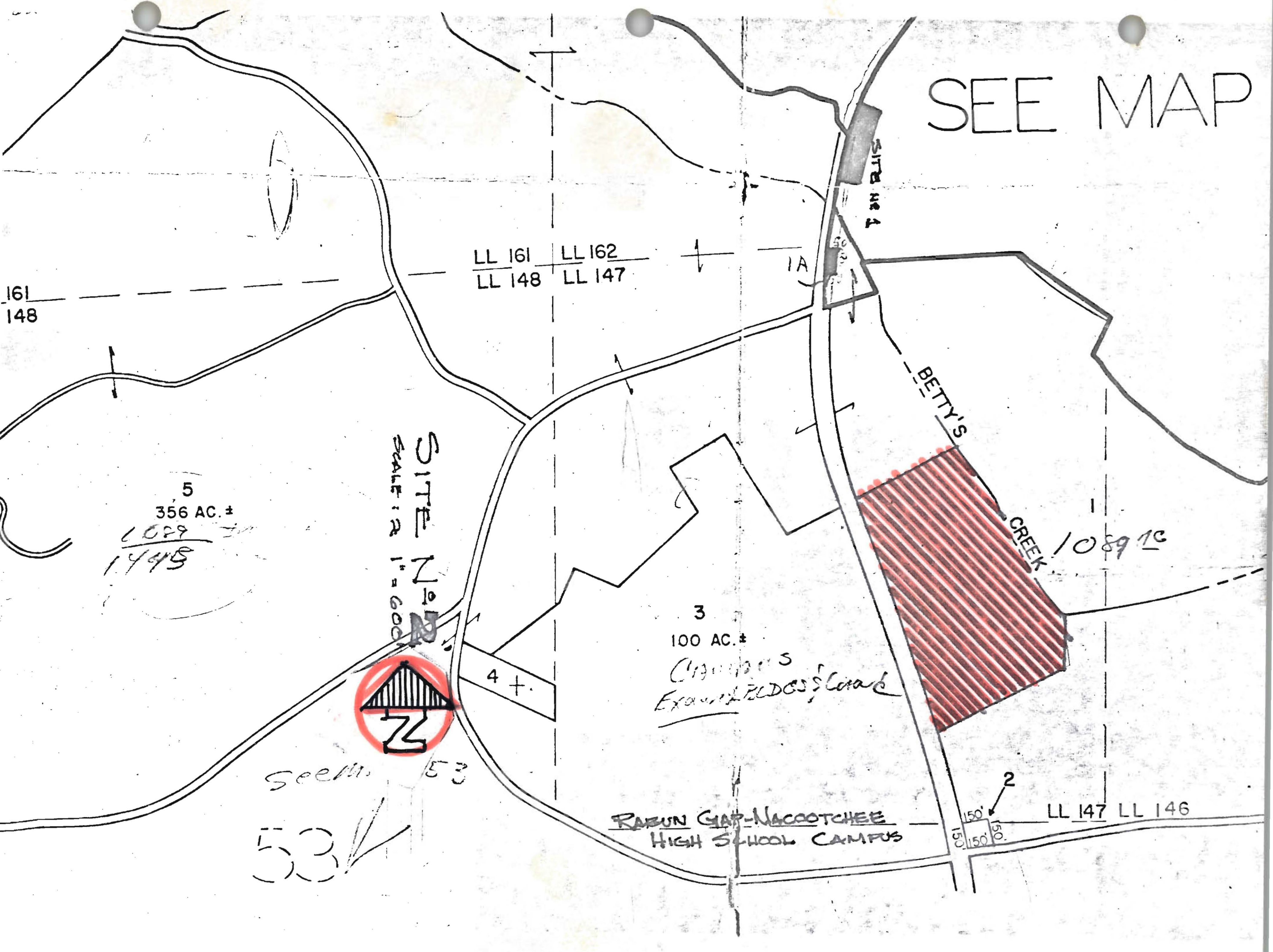
Natural Gas. There are no natural gas transmission lines in Rabun County. However, LP gas is distributed in the county by companies which have offices and storage facilities there.

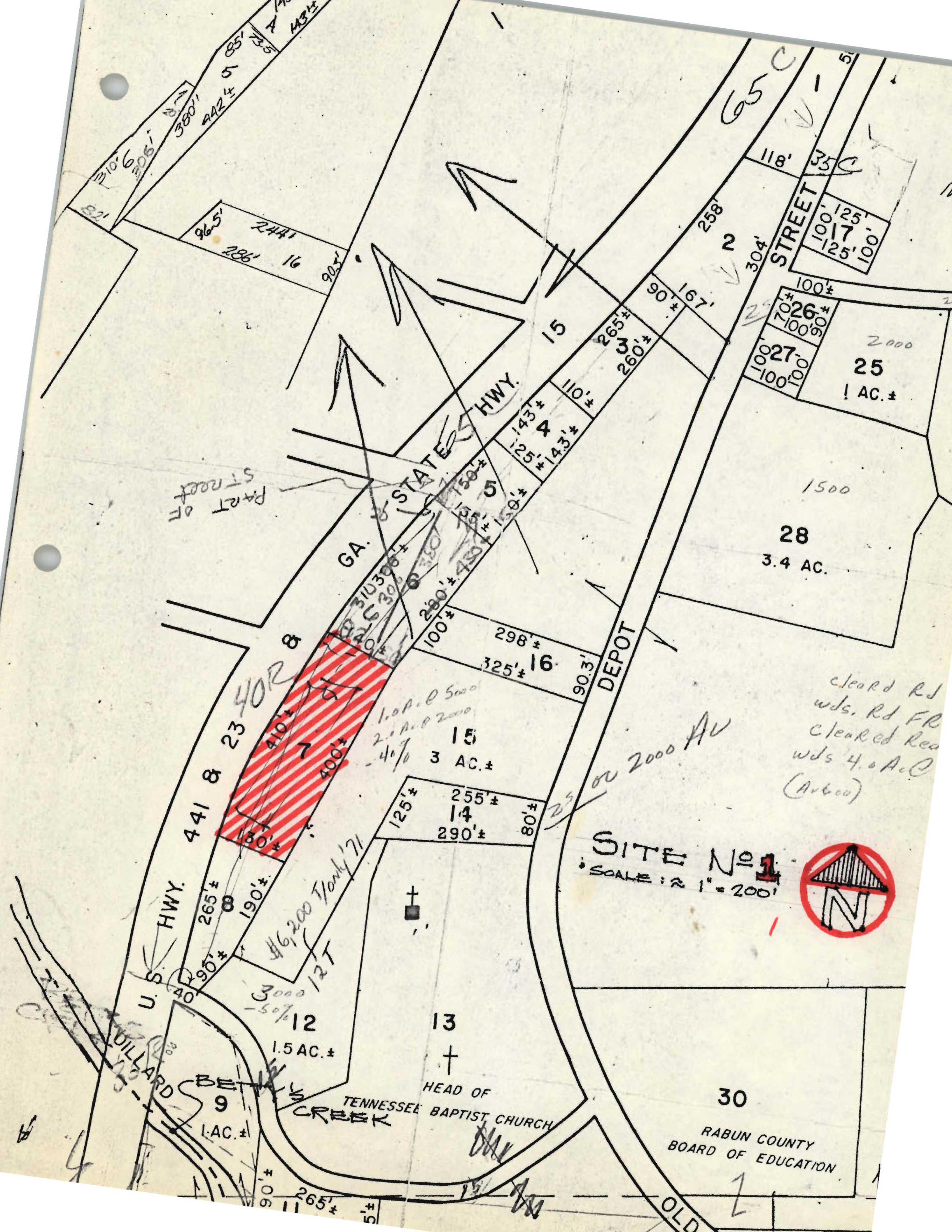
Electric Power. Electric power is supplied and distributed in Clayton and Rabun County by the Georgia Power Company.

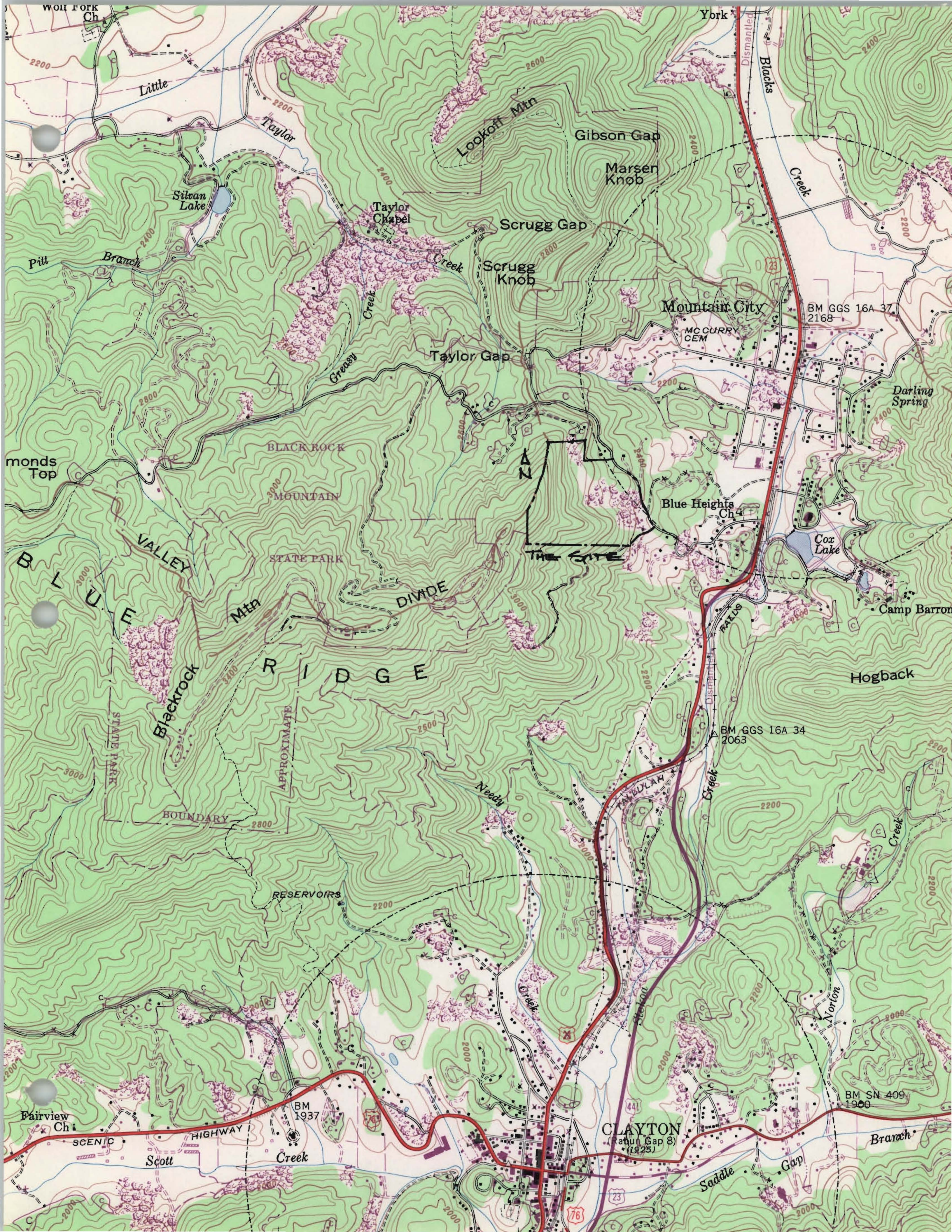
Industrial Financing

Rabun County has two groups which are organized to help obtain industries in the area, the Rabun County Redevelopment Corporation and the Rabun Industrial Board.


MOUNTAIN CITY
BLACK ROCK MOUNTAIN STATE PARK
CITY LIMITS
6A
8AC±
30
6AC
MC-3
26
10AC.
32
7AC.±
24
99AC
29
1AC.±
31
4 AC.±
27
4.4 AC.
LL78
LL63
77
64
ask $35,000 L/B (2ac.)
28
170.9 AC.
MC-6
U.S. 441
SITE No 3
SCALE: 1" = 660'
33
99 AC.
57-A
VANDIVER
64
49
3.84
660
23040
2304
25344
34
145 AC.±
$500 Land Only '70
35
6AC.±
38
10.2 AC.
37A


SEE MAP
LL 161
LL 148
LL 162
LL 147
161
148
1A
SITE No 1
BETTY'S
CREEK
1
1089 AC
5
356 AC. ±
SITE No 2
SCALE 1" = 600'
3
100 AC. ±
4 ±
2
150'
LL 147 LL 146
RABUN GAP-NACOOTCHEE
HIGH SCHOOL CAMPUS
53


SITE No 1
SCALE : ≈ 1" = 200'
N
GA. STATE HWY. 15
U. S. HWY. 441 & 23
DEPOT STREET
DILLARD ROAD
BETTYS CREEK
OLD
HEAD OF TENNESSEE BAPTIST CHURCH
RABUN COUNTY BOARD OF EDUCATION
28
3.4 AC.
25
1 AC. ±
15
3 AC. ±
12
1.5 AC. ±
9
1 AC. ±
13
30
14
16
17
26
27
2000
1500
Cleared Rd
wds. Rd FR
Cleared Rea
wds 4.0 A.C
(Av 600)
1.0 A.C @ 5000
2.0 A.C @ 2000
-40%
25 or 2000 AV
$6,200 T/only '71
3000
-50%
Part of Street
65 C
35 C



Wolf Fork Ch
York
Dismantled
Blacks Creek
Little Taylor
Lookoff Mtn
Gibson Gap
Marsen Knob
Silvan Lake
Taylor Chapel
Scrugg Gap
Scrugg Knob
Pill Branch
Greasy Creek
Taylor Gap
Mountain City
BM GGS 16A 37 2168
MC CURRY CEM
Darling Spring
monds Top
BLACK ROCK
MOUNTAIN
STATE PARK
Blue Heights Ch
Cox Lake
THE SITE
VALLEY
DIVIDE
BLUE RIDGE
Mtn
Blackrock
Camp Barron
Hogback
BM GGS 16A 34 2063
STATE PARK
APPROXIMATE
BOUNDARY
Needy
TALLULAH
Creek
RESERVOIRS
Norton
Fairview Ch
SCENIC HIGHWAY
BM 1937
Scott Creek
CLAYTON
(Rabun Gap 8)
(1925)
BM SN 409 1900
Saddle Gap
Branch

Section E: APPENDICES

I. Books

E.I.a. Display by George Nelson, copyright 1953, Whitney Publications, Inc., New York, N.Y.

E.I.b Museum Buildings by Lawrence Vail Coleman, copyright 1965, American Association of Museums, Washington, D.C.

E.I.c. The New Museum by Michael Brawne, copyright 1965, Verlag Gerd Hatje, Stuttgart, Germany.

II. Periodicals

E.II.a. AIA Journal, "Natural Light and the Museum of the Future", p. 60-64, Jan. '65.

E.II.b. A.D., "Cultural Museum, Le Havre", vol. 32, p. 201-205, Apr. '62.

E.II.c. Architectural Forum
E.II.c.1 "Austrienalle", vol. 129, p. 40-43, Sept. 68.
E.II.c.2 "The Perfect Professional Museum", vol. 113, p. 90-95, Dec. '60.

E.II.d. Architectural Record
E.II.d.1 "A Lesson in Unity", vol. 133, p. 169-172, Apr. '63.
E.II.d.2 "Spatial Variety in Two Museums", vol. 138, p. 129-134, Dec. '65.
E.II.d.3 "Museum Lighting Studied in Laboratory", vol. 104, p. 137-142, Dec. '48.

E.II.e. Architectural Review
E.II.e.1 "Object on View", by Michael Brawne, vol. 126, p. 242-253, Nov. '59.
E.II.e.2 "The Picture Wall", by Michael Brawne, vol. 125, p. 314-325, May '59.

E.II.f. Architectural and Engineering News
E.II.f.1 "Dimming", vol. 10, p. 34-35, Sept. '68.
E.II.f.2 "Exhibitry", vol. 11, p. 30-39, Mar. '69.

E.II.g. Arts and Architecture
E,II.g.1 "A Small Museum", vol. 82, p. 12-18, Nov'65
E.II.g.2 "Cultural Museum", vol 67, p. 20-27, Mar.50

E.II.h. d'Aujourdhui, "New Elements of Museum Presentation", vol. 39, p. 82-85, Dec. '67-Jan. '68.

E.II.i. Building
E.II.i.1 "Guildhall Precincts Reconstruction", vol. 217, no. 34, p. 75-76, 22Aug. '69.
E.II.i.2 "Civic Museum for Padua", vol. 216, no.2 p. 67-72, 10 Jan. '69.

E.II.j. Domus, "A Place for Sculpture and People", no. 460, p. 2-9, Mar. '68.

E.II.k. House and Garden, "New Chapter in Americana", vol. 103, p. 120-125, Mar. '53.

E.II.l. Industrial Design,
E.II.l.1 "Exhibits", vol. 15, p. 20-31, Nov '68.
E.II.l.2 "Exhibits: Seven Solve the Problem", vol. 12, p. 34-49, Nov. '65.
E.II.l.3 "The Designer in the Museum", vol. 6, p. 27-41, May '59.

E.II.m. Interiors, "Thonet", vol. 27, no. 6, p. 14, Jan. '68.

E.II.n. The Japan Architect
E.II.n.1 "Exhibition Hall for Taroemon Ceramic Wares", vol. 43, p. 65-72, Dec. '68.
E.II.n.2 "The Yamaguchi Prefectual Museum", vol.43 p. 85-91, Jan-Feb. '68.
E.II.n.3 "Kurashiki Museum", vol. 36, p. 48-53, Dec. '61.
E.II.n.4 "Okayama Art Museum", vol. 34, P. 33-35, Jul. '59.

E.II,o. Museum: A Quarterly Journal by UNESCO
E.II.o.1 "Museum Showcases", vol. 19, no. 3-4, p. 1-57, 1967.
E.II.o.2 "Scandanavian Museums", vol. 13, no.1, p. 1-35, 1960
E.II.o.3 "Aesthetic Appeal in Archaeological and Ethnological Museums", vol. 6, no. 1, p. 17-24. 1953.
E.II.o.4 "Museums and Architecture", vol. 4, no. 3, p. 179-183, 1951.

E.II.p. Museum Journal
E.II.p.1 "Scandanavian Folk Museums", vol. 57, p. 253-257, Feb. '58.
E.II.p.2 "The Display of Folk Material", vol. 54, p. 4-6, Apr. '54.
E.II.p.3 "The Folk Museum", vol. 49, p. 67-70 Jun. '49

E.II.p.4 "Swedish Folk Museums", vol. 46, p. 201-202, Jan.'47.

E.II.q Pencil Points, "The Lighting of Museums", by Olindo Grossi, vol. 19, p. 569-582, Sept. 38.

E.II.r Progressive Architecture

E.II.r.1 "Museum Hangs Natures Grim Tale From a Space Frame", vol. 50, p. 112-113, Jul. '69.

E.II.r.2 "Exhibit Design: The Example of the Triennale", vol. 49, p. 214-217, Oct. '68.

E.II.r.3 "Mini-Museum", vol. 49, p. 171, May '68.

E.II.r.4 "What Makes 'The Best Museum in the World'?", vol. 48, p. 98-106, Feb '67.

E.II.r.5 "Whitney Opens", vol. 47, p. 238-241, Oct. '66.

E.II.r.6 "Spaces for Art Exhibitions", vol. 45, p. 161-165, July. '64.

E.II.r.7 "Museum of Art", vol. 43, p. 126-131, Nov. '62.

E.II.r.8 "Environment for Art", vol. 41, p. 122-127, Dec. '60.

E.II.r.9 "Museum by Muller and Sachs", vol. 39, p. 180-181, Aug. '58.

E.II.r.10 "Experimental Museum", vol. 37, p. 87-91, Dec. '56.

III. Technical Publications

E.III.a. The Technical Requirements of Small Museums, by Raymond O. Harrison, Canadian Museums Association, Ottawa, Ontario, Canada, 1969.

E.III.b. Gallery and Case Exhibit Design, by Arminta Neal, Technical leaflet No. 52, History News, vol. 24, No. 8, Aug. '69.

IV. Interviews

E.IV.a. B.Elliot Wigginton, Director of the Foxfire group and originator of this proposa.

E.IV.b. Harry Jack Segedy, Director of the Appalachian Museum, Berea, Kentucky.