



# Lighting a monumental reading room

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*Christianography* has on its title-page the inscription 'Anne Cottons 1734', which suggests that this may be one of the volumes, of which no list appears to exist, acquired from the Harvard Library by the Cottons.<sup>9</sup> The only evidence of the book's subsequent history is the inscription, written in pencil on the blank leaf at the end of the book: 'Francis Edward Parker Portsmouth 1830'. It is quite possible, then, that this is the exemplar acquired by the Library through the gift of Governor Winthrop in 1658.

Library of the Mathers,' *Proc. Am. Ant. Soc.*, L (1941), 20-28.

<sup>9</sup> *Pub. Col. Soc. Mass.*, XVI (1925), 415.

Pagitt's *Christianography* demonstrates the wide spread of Christianity, and, with the usual Protestant bias, shows how small a proportion of all Christians pay allegiance to the Pope. It is, in a sense, a geography of Christianity. It is interesting to contrast this view with that of John Foxe, about sixty years earlier, who lamented that, of all the parts of the world that had once been Christian, 'only a little angle of the West parts remaineth in some profession of Thy holie name.'<sup>10</sup>

LESLIE MAHIN OLIVER

<sup>10</sup> Richard Day, *A Book of Christian Prayer* (London, 1578), p. 27.

## Lighting a Monumental Reading Room

**A** MONUMENTAL reading room can be satisfactorily lighted. This has been conclusively proved during the months following the complete relighting of the Main Reading Room of Baker Library at Harvard's Graduate School of Business Administration in the summer of 1948.

Baker Library's reading room is truly a monumental one, for it is over 240 feet long by 43 feet wide, and has a high (24-foot) slightly arched segmented ceiling. The room is divided into three sections by coupled columns. Each section, before the changes were made, contained large internal 'skylights' covering nearly 30 per cent of the ceiling area, with corresponding external skylights in the roof above. Additional daylight was

furnished through large tall rectangular windows on the north, east, and west sides of the room. The only artificial illumination was provided by two parallel rows of incandescent light fixtures—each row containing seventeen units. Each fixture was 36 inches in diameter, with an annular plaster reflecting surface above the lamp and facing down.

During the day the illumination on the tables might range from a gloomy 5 foot-candles to an overly bright, high-contrast 60. At night, the intensity ranged from 3 to 10 foot-candles on the tables to practically a zero reading at the bookshelves along the walls.

The skylights also created several problems. It was difficult to control the amount of light entering through

them, especially on bright sunny days. More importantly, they were difficult to maintain. The expansion and contraction of the steel frames cracked the glass and created leaks. The University's Department of Buildings and Grounds finally notified the School that the leakage was so great that it might well cause deterioration in the main structural elements of the building.

Naturally such conditions provoked a large number of complaints, and several attempts were made to check the leakage and to improve the lighting. In 1943 the skylights were partially reduced in size (thereby aggravating the lighting problems), and the wattage of the lamps was increased (up to the maximum load that could be safely carried by the existing wiring) — but these steps were patently only temporary expedients. A major alteration would have to wait, for the School was by this time in operation twelve months of the year.

During this emergency period the Reading Room was divided, by temporary partitions, into four sections — three used as classrooms by the Army and Navy units under instruction at the School, and the remaining section used for library purposes. These wartime operations were followed by an accelerated civilian program which continued until the summer of 1948. With the closing of the School in June, an opportunity finally came for removing the partitions and for completely renovating the room.

An exhaustive survey of needs and possibilities had been instituted the preceding February, and the Department of Buildings and Grounds had

been asked to prepare plans. Many demands were made of the Department:

The library staff: 'Give us good lighting of adequate intensity, say 35 foot-candles at the reading plane, without resorting to table lamps. We want fairly even distribution of light with as little glare as possible.'

The maintenance staff: 'Get rid of those leaking skylights.'

The finance officer: 'Keep installation and operating costs at a minimum.'

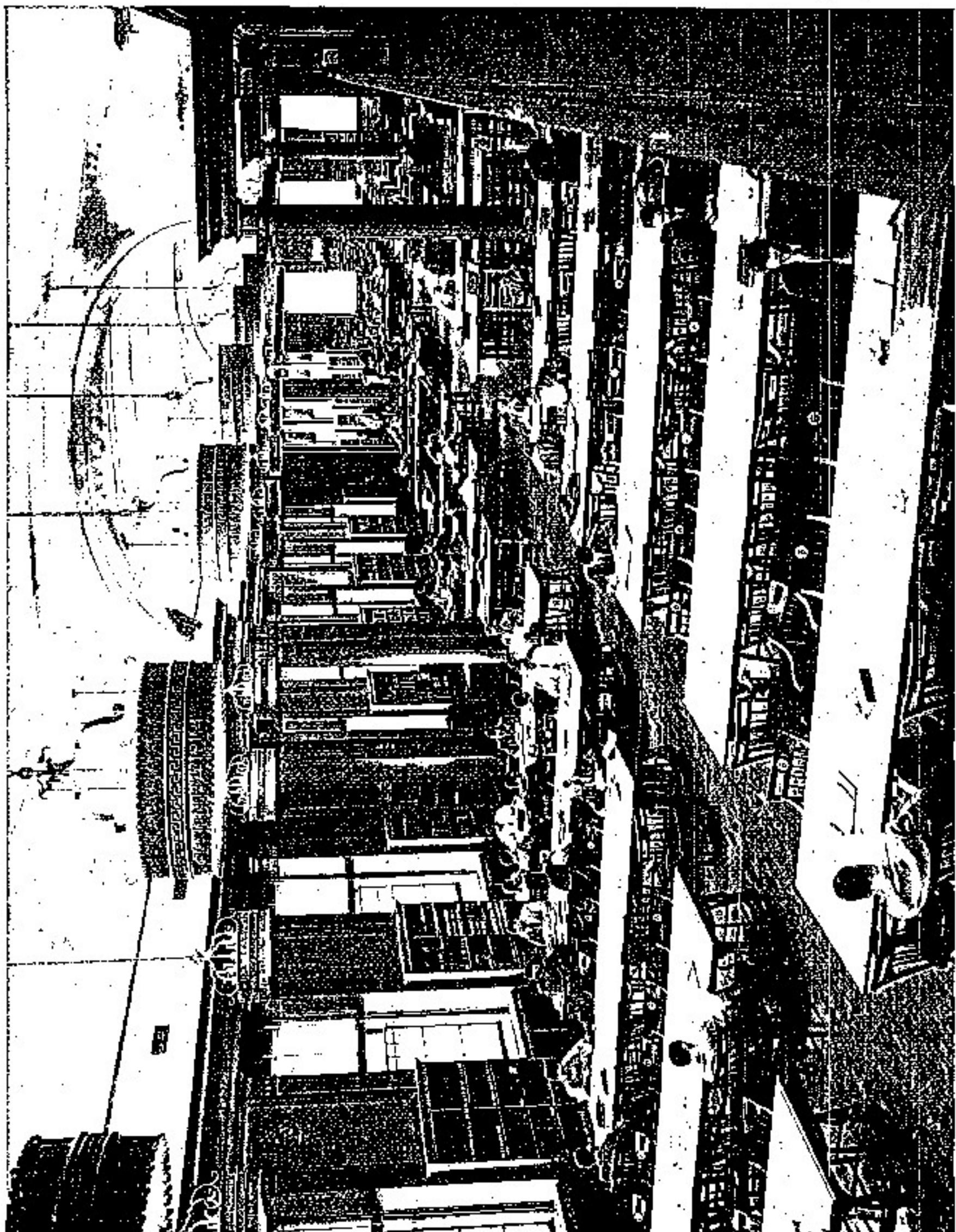
The dean: 'Do all this without spoiling the architectural beauty of the room.'

The students (consciously or unconsciously echoing Goethe): 'More light!'

With the aid of advice from a consulting lighting engineer, an architect, and officials of the School and Library, several alternative plans were submitted. From these, after a series of conferences, a compromise procedure was worked out which, based primarily on provisions for adequate lighting together with preservation of architectural features, also gave due consideration to costs of installation and maintenance. Funds were then made available through a grant from the George F. Baker Trust.

Between the closing of the building in June and its reopening in September the following measures were carried out: the external skylights were replaced by a new slate roof; the internal skylights were replaced by fluorescent fixtures above egg-crate louvets; plaster reflecting walls were removed from the attic; the thirty-four pendent fixtures were taken

PLATE I  
MAIN READING ROOM, BAKER LIBRARY



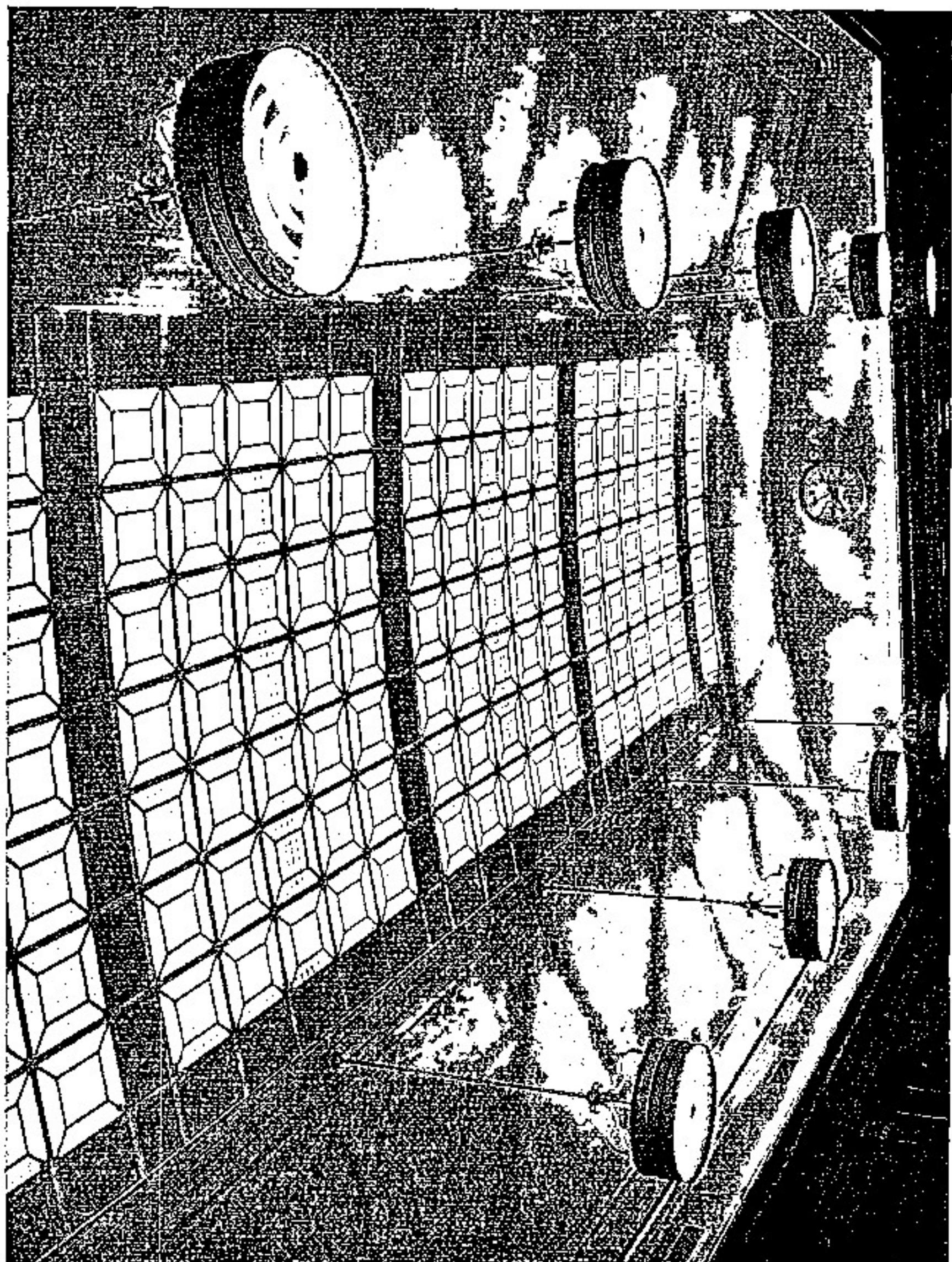


PLATE II  
CEILING ILLUMINATION, MAIN READING ROOM, BAKER LIBRARY

down, remodeled, and rehung; cove lighting was installed; all woodwork, including tables, was cleaned and then refinished in lighter tones; an acoustical material was applied to the plaster portions of the ceiling; and all exposed plaster surfaces were painted.

The result was almost miraculous, so great was the transformation effected. First of all, the room is well lit, by every criterion:

1. The amount of light is excellent, averaging 42 foot-candles after 500 hours of use.

2. The distribution of light is well above average, with 21 foot-candles at the table-edges nearest the walls and 49 at the center of the room.

3. There is relatively little glare: the contrast in brightness has been reduced to a minimum, so that the maximum brightness ratio is only 8.7 to 1, and all other readings are very much lower.

4. Shadows are almost totally absent.

In addition to the excellence of the lighting there are other advantages:

1. The lighting installation is flexible, which means that the amount of illumination may be easily increased. This is discussed more fully below.

2. Maintenance costs are low. An ingenious method of replacing fixtures has been devised, and the reflectors and louvers can be easily removed for cleaning. The entire attic installation has been enclosed, in order to restrict the circulation of air and thereby reduce the incidence of dust upon the units. The removal of the skylights has eliminated the high annual maintenance charges referred to above.

3. The acoustical treatment of the

ceiling has made the room much quieter.

4. Many of the architectural details embodied in the room from the beginning but previously unnoticed are now evident and the full beauty of the room is realized for the first time.

How were all these benefits achieved? How was the architectural integrity of the room maintained at the same time that the amount and quality of light were improved? Basically, this successful renovation was accomplished through the careful combination of three types of artificial illumination.

#### *Fluorescent*

In the attic space just above the existing ceiling openings a number of fluorescent reflectors were installed. The majority of these reflectors contain a single tube, but those in the outer rank have two tubes, in order to attain the desired amount of light in the edges of the room. The tubes are instant-starting 200 MA slim-line 3500° white fluorescent lamps. This type was chosen because of its relative efficiency and longer useful life; because the wattage can be increased if desired without material changes in the fixtures;<sup>1</sup> and finally because it is relatively noiseless. The tubes are of three lengths: 64-inch, 72-inch, and 96-inch.

Downlighting egg-crate louvers, placed just below the reflectors, rest upon the sash frames originally designed to carry the glass panes of the internal skylights. Thus there is still the effect of a natural skylight, and

<sup>1</sup>Since each reflector is designed to carry three lamps, an additional increase factor is provided.

the original architectural scheme is preserved.

#### *Cold Cathode*

As already indicated, the original skylight area, now to be filled by louvers, occupied less than one third of the total ceiling space. It seemed desirable to provide supplementary ceiling illumination to reduce the contrast between the louvered and non-louvered sections. An obviously convenient location for the source of this supplementary light was the existing cove in the cornice, located 4 feet below the spring line of the ceiling. Here were placed two rows of 120 MA 3500° white high-voltage cold cathode lamps. The lampholders were staggered, in order to avoid shadows on the walls.

#### *Incandescent*

The old hanging incandescent lighting fixtures, facing down, were remodeled for indirect light. The original ornamental shells were retained, but the white plaster reflecting surfaces were removed. Each fixture is now a hollow band housing a 750-watt silver bowl lamp shielded by a four-ring louver.

In addition to added intensity, each fixture supplies warmth of color. The incandescent lamps serve to counter-

act the so-called drawbacks of fluorescent lighting: its antiseptic appearance and possible effect of coldness in a room of this size.

Fluorescent, cold cathode, and incandescent—to be blended together in a harmonious whole. Surely the electricians who rewired the building, the crew which installed the new fixtures, the roofers, carpenters, painters, and welders—all would agree that the job was a complicated one. The simplicity of the result is deceptive. But of its success there can be no doubt. No longer will the local student newspaper feature cartoons of students on their way to the Library armed with miners' lamps. No longer will we hear the cries: 'Give us more light!' Beyond the large number of favorable comments and the absence of complaints there is the tangible and decisive evidence of a much wider and more intensive use of the Reading Room than ever before. This success may well stand as a symbol of effective group action—the concerted action of architect, buildings superintendent, electrical engineer, business manager, finance officer, dean, and librarian—each contributing his own special talents and a willingness to benefit from the experience of others.

DONALD T. CLARK

### News of the Libraries

#### THE DEDICATION OF THE LAMONT LIBRARY

DEDICATION ceremonies for the Lamont Library were held in the Forum Room of the Library at 2:30 p.m. on 10 Janu-

ary 1949. Present were the Fellows and Overseers of Harvard College, members of the Library Committee of the Faculty of Arts and Sciences and of the Committee of the Overseers to Visit the Library, administrative officers of the University, mem-

## List of Contributors

ERWIN PANOFSKY, Professor, Institute for Advanced Study

KEYES D. METCALF, Professor of Bibliography, Director of the Harvard University Library, and Librarian of Harvard College

WALTER E. KNOTT, Graduate School of Arts and Sciences, Harvard University

ROBERT B. SHAFFER, Washington, D. C.

MABEL A. E. STEELE, Custodian of the Keats Memorial Collection, Harvard College Library

HARRY LEVIN, Professor of English, Harvard University

MERTON M. SEALTS, Jr., Assistant Professor of English, Lawrence College

FREDSON BOWERS, Associate Professor of English Literature, University of Virginia

ROBERT W. LOVETT, Head of the Manuscript Division, Baker Library, Harvard University

EDGAR WIND, Professor of Philosophy and of Art, Smith College

MORRISON C. HAVILAND, Assistant in Charge of Reference Work in the Lamont Library, Harvard University

LESLIE MAHIN OLIVER, Assistant to the Librarian in the Houghton Library, Harvard University

DONALD T. CLARK, Associate Librarian of the Baker Library, Harvard University