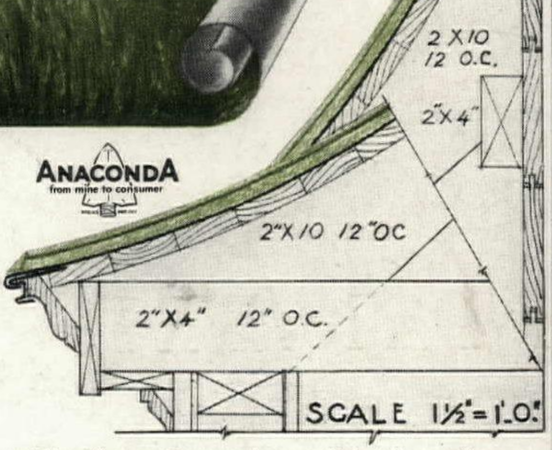
PENCIL POINTS

PTEMBER

1941



*T*YPIFYING the manner in which standing seam sheet copper roofing may be used over bays and entrances to impart both warmth and color, and to accentuate the structure's individuality

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Photos by Samuel H. Gottscho

CHESTNUT STREET ENTRANCE TO COURTROOMS

U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

PHILADELPHIA

AND POST

THE BALLINGER COMPANY AND

Seven years ago, in May, 1934, we were privileged to publish the early drawings for the United States Court House and Post Office at Philadelphia, Pennsylvania, designed by The Ballinger Company and Harry Sternfeld, Associate Architects. In the intervening years the original design, having undergone a certain amount of revision, has been carried out so that it is possible to present herewith a photographic record of the completed structure, which is one of the major items of the Federal public building program.

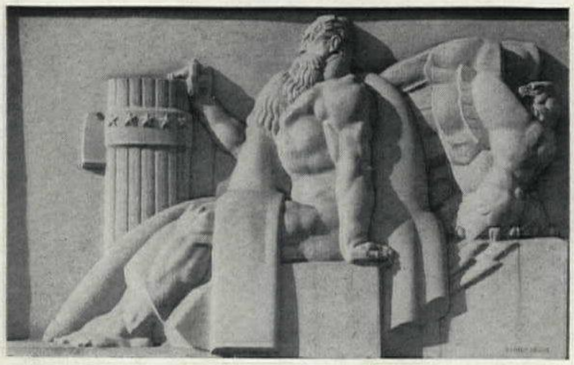
The site is on Ninth Street, extending the full length of the block between Market and Chestnut Streets. Here, in a structure containing six main stories and a basement, are housed the William Penn Annex Post Office sub-station, facilities for the United States Department of Justice, and offices for miscellaneous Federal departments.

The Post Office occupies most of the first floor, all of a mezzanine floor, and a small portion of the second floor. Its public lobby is reached by four entrances on Ninth Street along which it extends the full length of the block. It may also be reached from the main entrance lobbies on Market and Chestnut Streets. The plan on page 562 shows the disposition of the working space. The mailing platform to the west is served from a government-owned alley leading into both Market Street and Tenth Street.

The Department of Justice occupies the entire second floor, which is accessible from elevator lobbies at both ends of the building. The excellent arrangement of its court rooms is worth special mention. The United States District Courts, the Court of Appeals, and the Library are completely insulated by lobbies and corridors from the surrounding office spaces and judges' chambers, which are placed against exterior walls. The courts are thus shielded from any distracting street noises. They are also, incidentally, acoustically treated to insure quietness, so that speech at normal voice may be heard distinctly in any part of the rooms. The wide public corridor gives ample access to all courts through foyers so arranged that entrance cannot be made upon axes, thus preventing those using the judges' rostrum from having their attention distracted by movement in or out. A narrower private corridor, for the use of the judges and their assistants, extends along the west side of the floor between the court rooms and the judges' chambers. Jury rooms, witness rooms, conference rooms, and the offices (on the third floor) of the District Attorney and the Assistant District Attorneys may all be reached through private corridors and stairs, so that those concerned with the proceedings can perform their duties without coming in contact with the public. Prisoners are brought in through a special entrance on the service side of the building and are taken to the U. S. Marshal's office from the basement by means of a special elevator. The well-equipped library with its accessories forms a compact unit easily reached from either public or private corridor.

Additional space for other activities under the Department of Justice are placed on the third and fourth floors. A private mezzanine above the second floor contains filing

COURT HOUSE OFFICE



HARRY STERNFELD, ARCHITECTS

rooms for case records, models, and so on. The remaining space, above the fourth floor, is allotted to other Federal departments, and may be reached by elevators or stairs from the main entrance and service lobbies. Among the departmental activities housed here are Internal Revenue, Labor, Narcotics, and Secret Service.

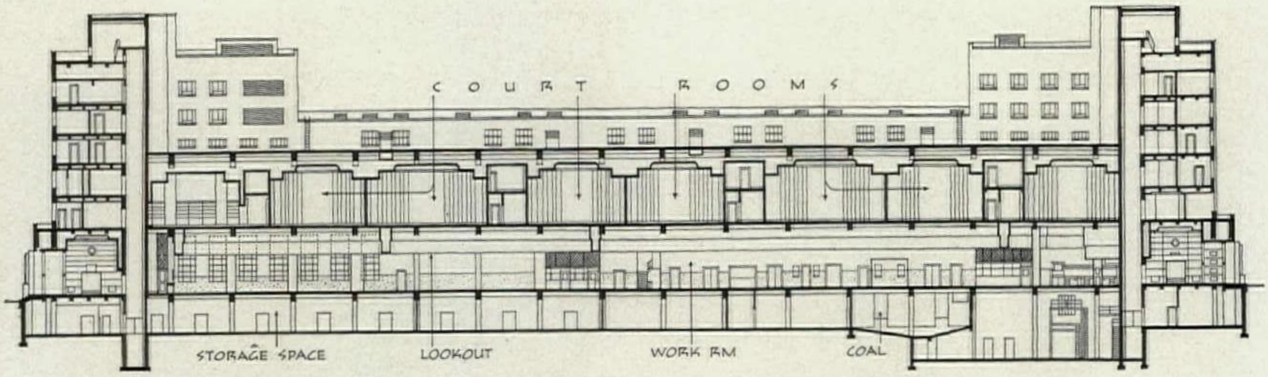
All public lobbies and vestibules are lined or treated with Georgia marble of a warm pinkish color. The ceilings of these spaces are plaster, vaulted or coffered as may be seen in the photographs, and their floors are of two-tone terrazzo, inlaid with wide brass strips, patterns, and inserts. The specially designed ornamental work found in the doors, heating and ventilating grilles, and lighting fixtures is of bronze, aluminum, or white metal. Interiors in the court rooms, law library, and judges' chambers are lined or panelled with Western red cedar and American black walnut. The floors here are of a fine-grade, inlaid, cork tile to insure quiet. Ceilings are of Western red cedar, plaster, and acoustic tile, specially designed to insure proper acoustical results, as well as to reflect and diffuse the light. Materials of the exterior are noted in the captions under the illustrations.

As is appropriate in a building of this kind, carved and sculptured details symbolic of its purposes adorn its exterior. On the Ninth Street façade the seals of the original thirteen States, together with inscriptions concerning the courts and the law are carved in the limestone facing. The crowning frieze is treated with lictor bands (traditional emblems of the Court) and carry simple carved panels symbolizing the three States of Delaware, New Jersey, and Pennsylvania, which comprise this particular court circuit. The important carved sculptures flanking the main entrances on Chestnut and Market Street (illustrated above on these two pages) were the work of Donald De Lue, of New York, while those at the two principal entrances on Ninth Street were by Edmond Amateis, of Brewster, New York. The various State and Departmental seals found at a number of points in and upon the building are by Louis Milione, of Philadelphia.

The limited budget fixed by the appropriation for the project made the inclusion of the many diverse activities called for in the program of requirements a challenge to the planning skill of the designers. In addition to solving the planning problems, the architects endeavored to express these requirements frankly and economically with a recall of the spirit characteristic of our fine traditional examples. They have expressed the hope that as a result of the careful study given to proportions, choice of materials, and the use of sculptural decoration, the building will be found to be an appropriate expression of the monumental power of our great Nation and that it will be independent of changing tastes or styles for some time to come. How far they have succeeded will be determined by the judgment of their contemporaries and of the public. It seems to us fair to say that it merits a place among the finest public buildings produced by this generation of architects in the United States. As such we commend it to you for study and examination.

VIEW ABOVE SHOWS THE NINTH STREET FACADE (LEFT) AND THE MARKET STREET (OR NORTH) FACADE

THE POST OFFICE LOBBY (ABOVE) EXTENDS THE LENGTH OF THE NINTH STREET SIDE OF THE BUILDING AT EITHER END OF THE LOBBY, PASSAGES (DETAIL PHOTO AT RIGHT) LEAD TO THE LOBBIES GIVING ACCESS TO THE COURTROOMS (SEE PAGE 563). THE FOUR ENTRANCES TO THE BUILDING ARE FLANKED BY GRANITE BAS-RELIEFS. THOSE AT EITHER END (SEE DETAILS ON PAGES 558 AND 559) AS WELL AS THE MARBLE BAS-RELIEFS IN THE TWO COURT HOUSE LOBBIES ARE THE WORK OF DONALD DE LUE. OF NEW YORK. THE EXTERIOR SCULPTURES SYMBOLIZE "LAW" AND "JUSTICE." THE SCULPTURE DECORATING EACH LOBBY CONSISTS OF AN EAGLE AND HISTORIC SEALS. THE SCULPTOR OF THE GRANITE BAS-RELIEFS AT THE POST OFFICE ENTRANCES, REPRESENTING "POSTAL ACTIVITIES IN THE VARIOUS REGIONS OF THE UNITED STATES" (DETAIL PHOTO ACROSS-PAGE), WAS EDMOND AMATEIS, OF BREWSTER, NEW YORK. THE OTHER ARCHITECTURAL SCULPTURE—STATE AND DEPARTMENTAL SEALS—IS THE WORK OF LOUIS MILIONE, OF PHILADELPHIA. MATERIALS NATIVE TO AMERICA WERE SELECTED BY THE ARCHITECT FOR THIS FEDERAL BUILDING. THE EXTERIOR IS FACED WITH INDIANA LIMESTONE ABOVE A BASE COURSE OF MILFORD PINK GRANITE AND THE WEST SIDE OF THE BUILDING, ON THE SERVICE ALLEY, IS FACED WITH GRAY BRICK SELECTED TO HARMONIZE WITH THE LIMESTONE. BRONZE FRAMES, SASH, AND DOORS WERE USED. ABOVE EACH OF THE MAIN ENTRANCES IS A LARGE BRONZE PLAQUE BEARING THE GREAT SEAL OF THE UNITED STATES AND FEDERAL DEPARTMENTAL SEALS. WINDOWS ABOVE THE FIRST STORY HAVE SPANDRELS OF ALUMINUM AND STEEL

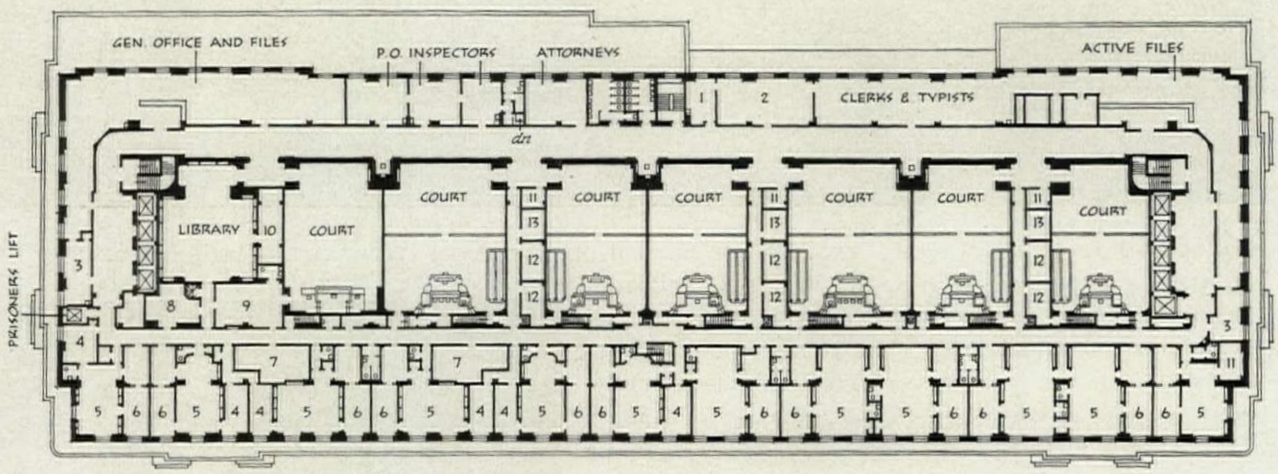


LONGITUDINAL SECTION

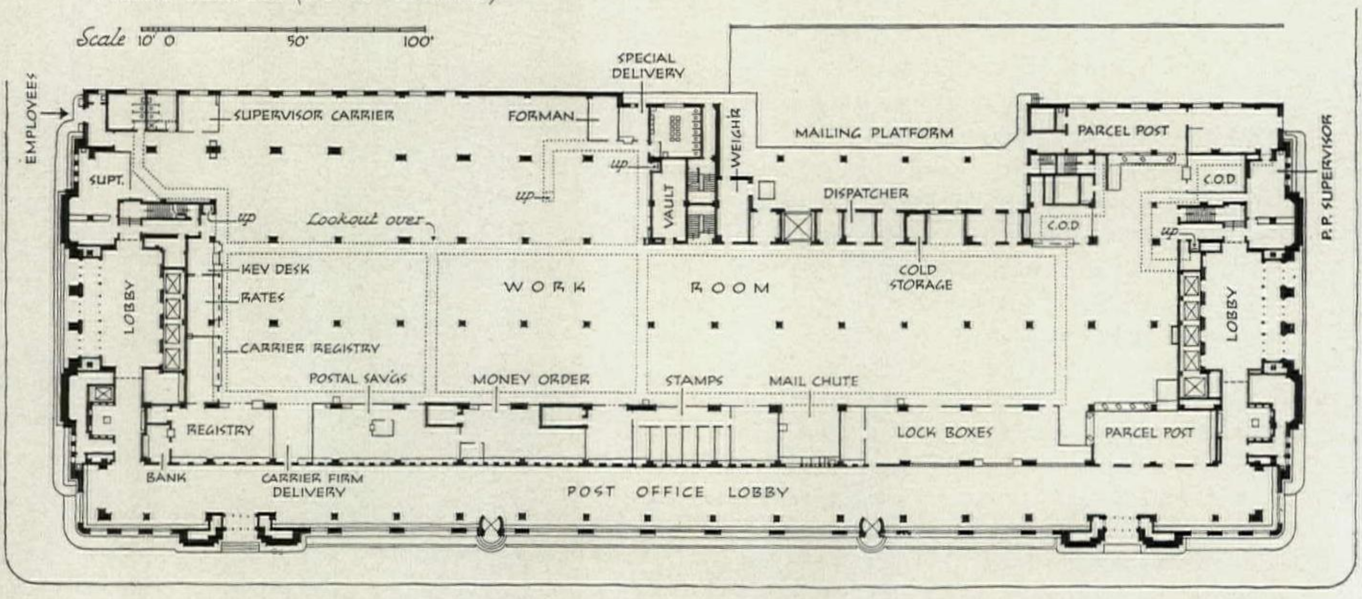
THE SECTION ABOVE CLEARLY INDICATES THE DESIGN SCHEME OF THE BUILDING; COURTROOMS AND LAW LIBRARY GROUPED IN THE CENTER OF THE BUILDING, LEAVING ALL SIDES AVAILABLE FOR OFFICES AND OTHER SERVICES. A COMBINATION OF TOP-LIGHTING AND WINDOW LIGHTING WAS THUS EVOLVED. BY MEANS OF AIR CONDITIONING AND CONTROLLED ILLUMINATION AND TEMPERATURE, WORKING CONDITIONS IN THE COURTROOMS CAN BE KEPT UNIFORM AT ANY SEASON OR ANY HOUR OF DAY

SECOND FLOOR (COURTROOMS)

1 PASSPORT CLERK
2 DUPLICATING & SUPPLIES
3 PRIVATE OFFICE
4 LAW CLERK
5 JUDGE'S CHAMBER
6 SECRETARY
7 FILES
8 LIBRARIAN
9 ROBING RM
10 PACKING RM
11 CONFERENCE RM
12 WITNESS RM
13 REPORTERS

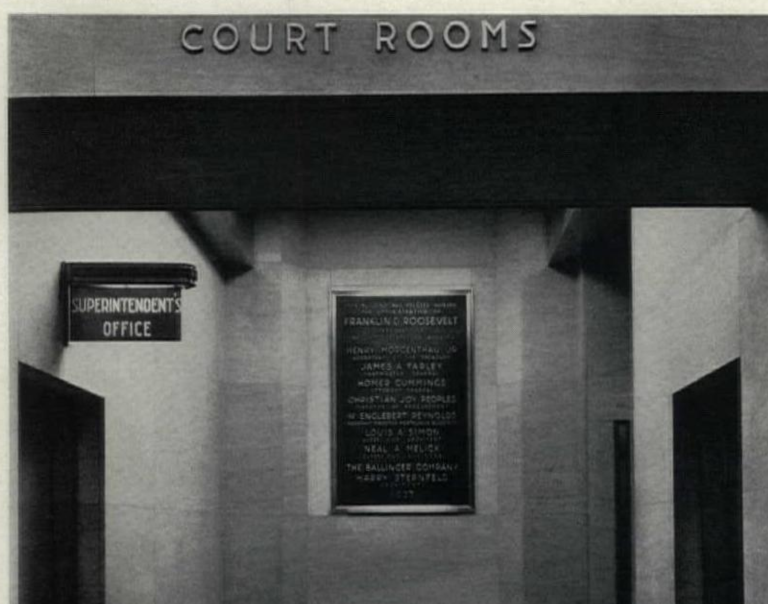


FIRST FLOOR (POST OFFICE)

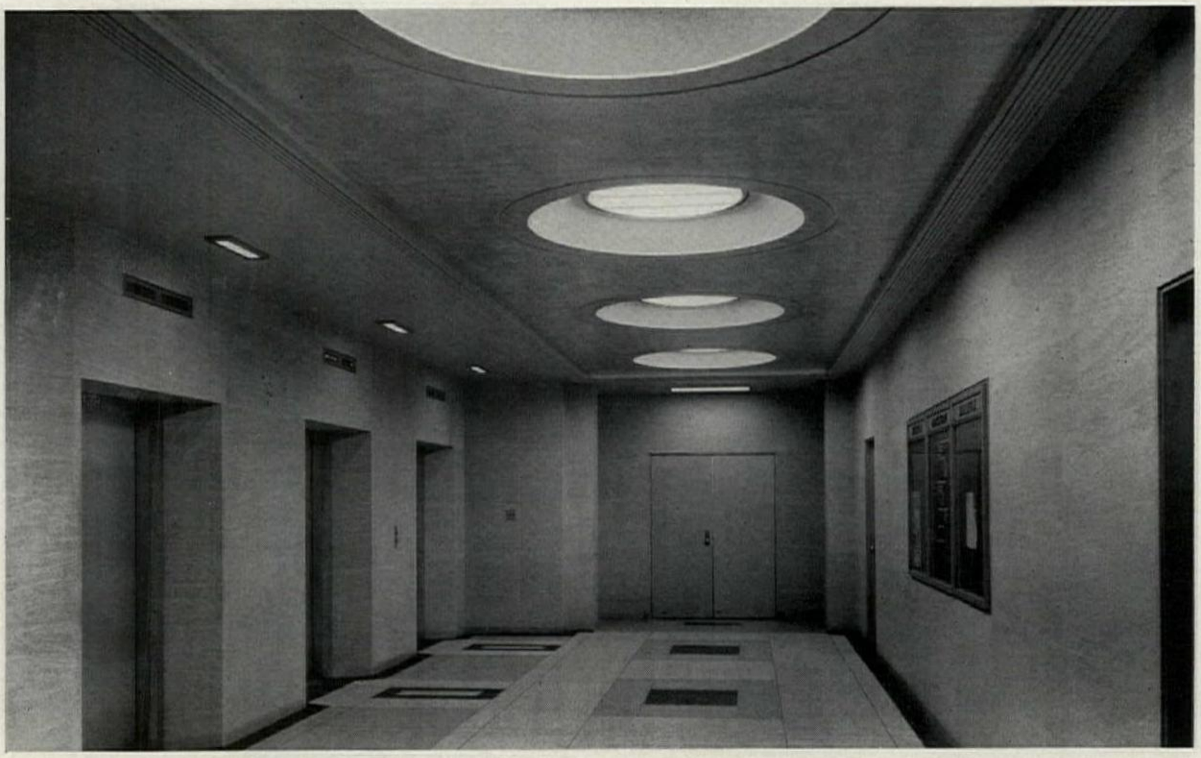


U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

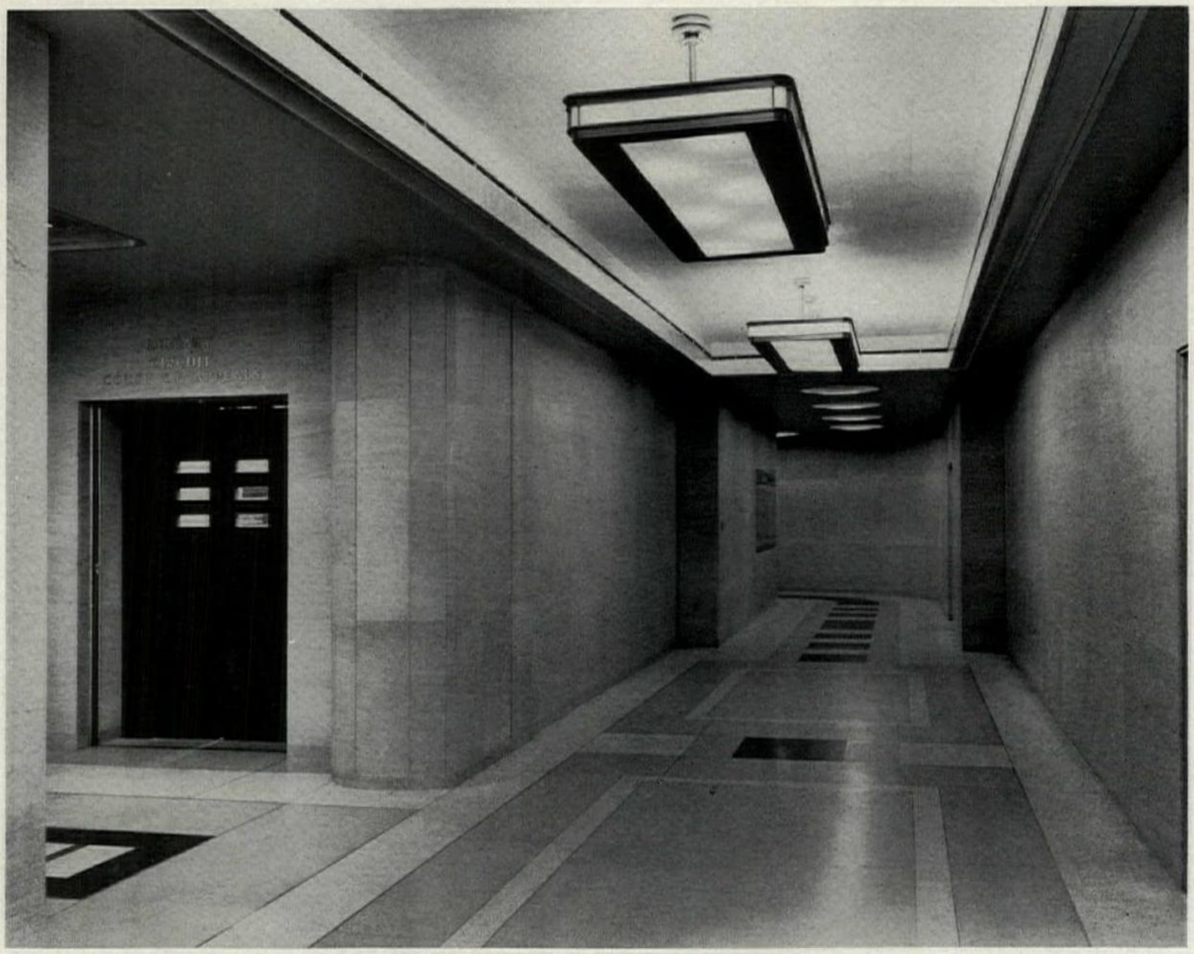
THE MARKET STREET LOBBY GIVING ACCESS TO THE COURTROOMS IS SHOWN ABOVE. NOTE THE TRADITIONAL FASCES IN THE MARBLE FLOOR



U. S. COURT HOUSE AND POST OFFICE BUILDING — PHILADELPHIA



ONE OF THE ELEVATOR LOBBIES ON THE SECOND FLOOR IS SHOWN ABOVE AND THE VIEW BELOW IS IN THE CORRIDOR SERVING THE COURTROOMS, LOOKING TOWARD THE PORTAL OF THE LAW LIBRARY (LEFT) AND THE TURNING OF THE CORRIDOR AT THE ENTRANCE TO THE ELEVATOR LOBBY AT THE SOUTH END OF THE BUILDING. THE LIGHTING FIXTURES ARE OF BRONZE, ALUMINUM, OR WHITE METAL



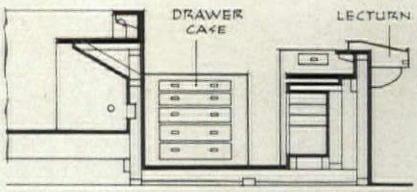
U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

COURTROOMS ARE PANELLED IN WALNUT AND CEDAR

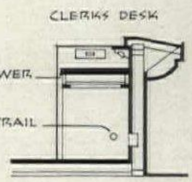
U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

DISTRICT COURT NO. FOUR (ABOVE) AND THE LEGAL LIBRARY (BELOW) ARE ACOUSTICALLY TREATED

U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA



Section AT **3**



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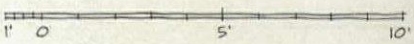
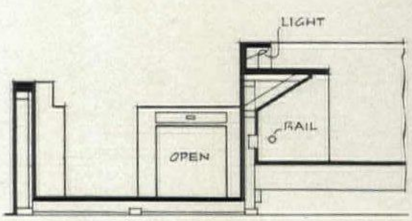
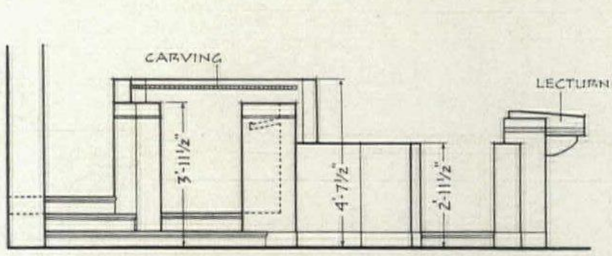


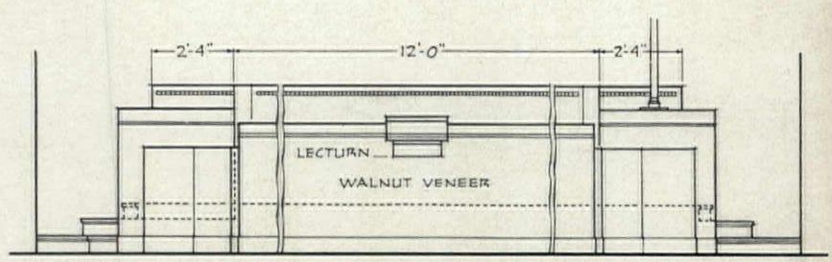


Section AT **5**

SAMUEL H. GOTTSCHO

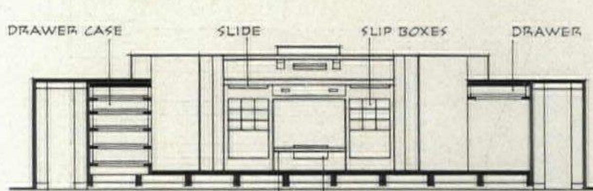


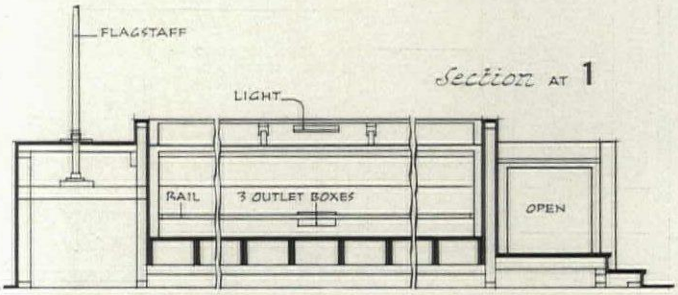
Side Elevation



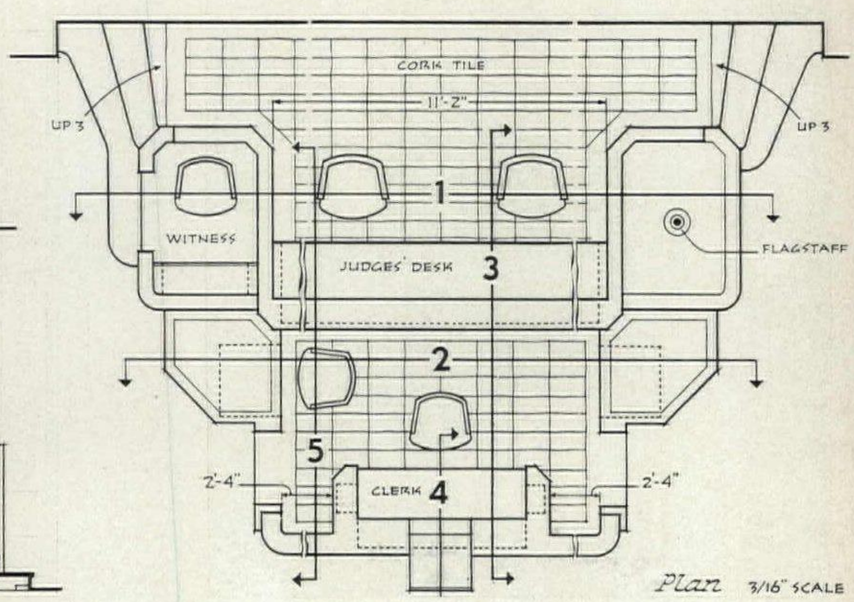
Front Elevation

Section AT **2**



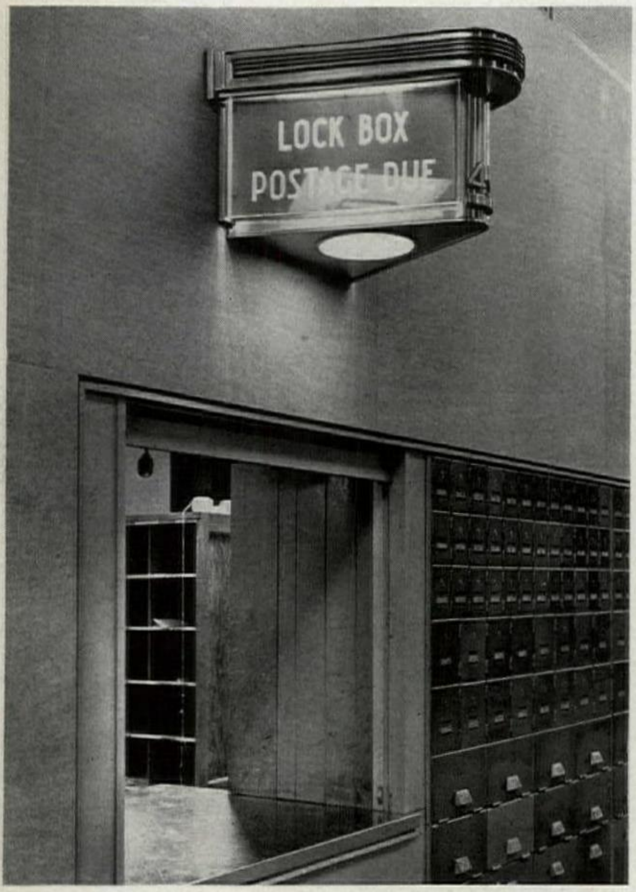


Section AT **1**

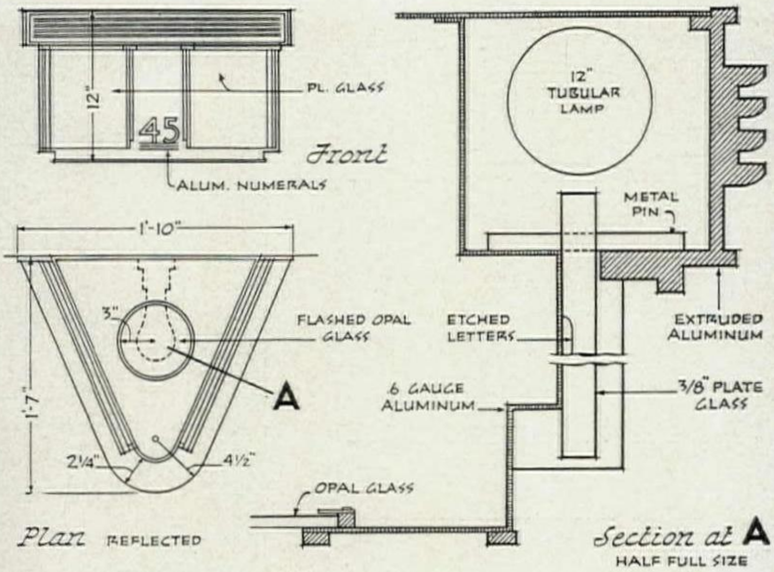


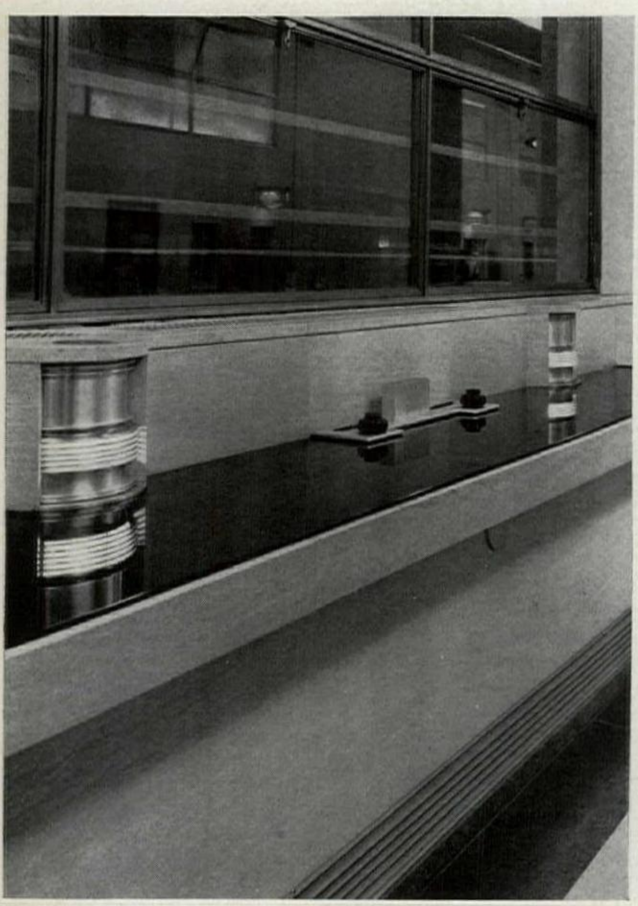
Plan 3/16" SCALE

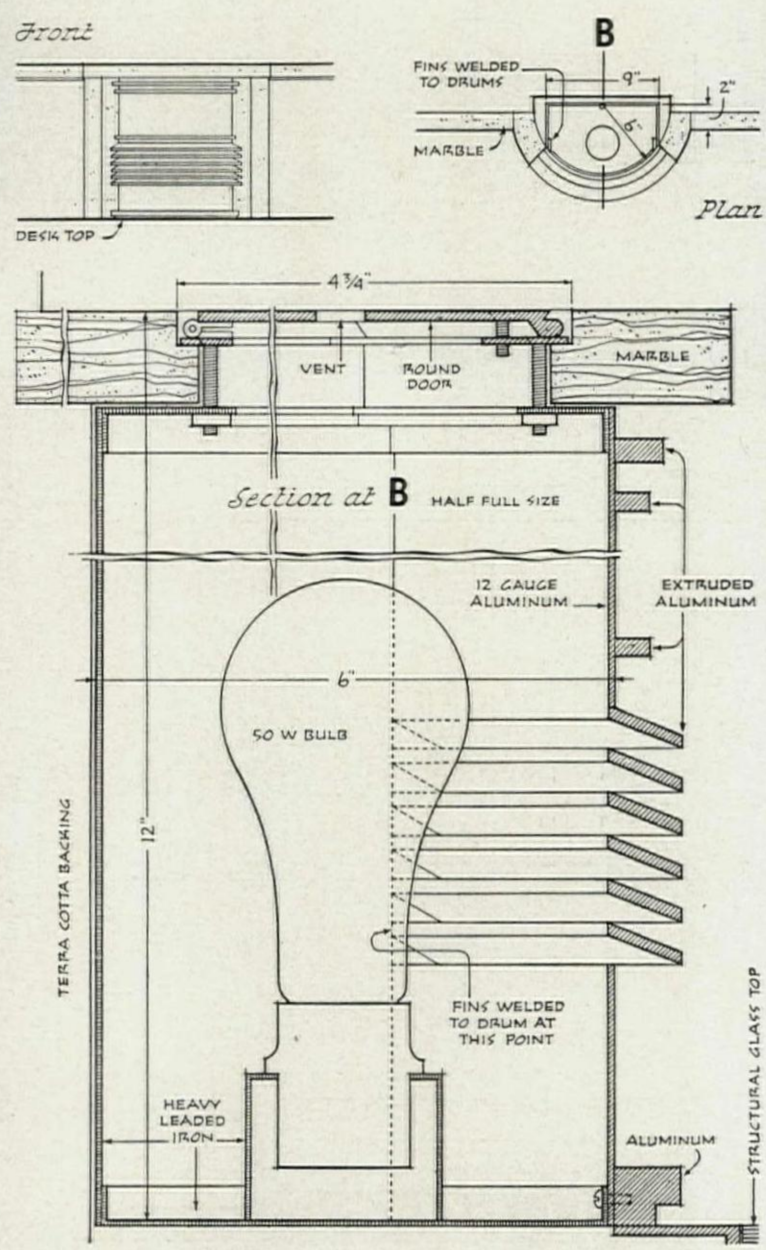
U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA



Photos by SAMUEL H. GOTTSCHO



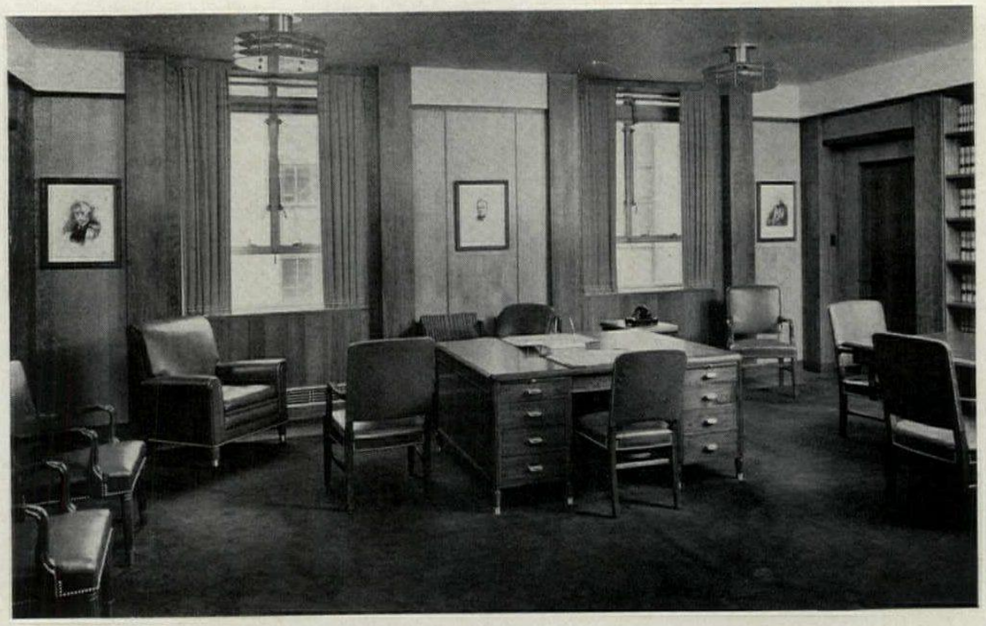


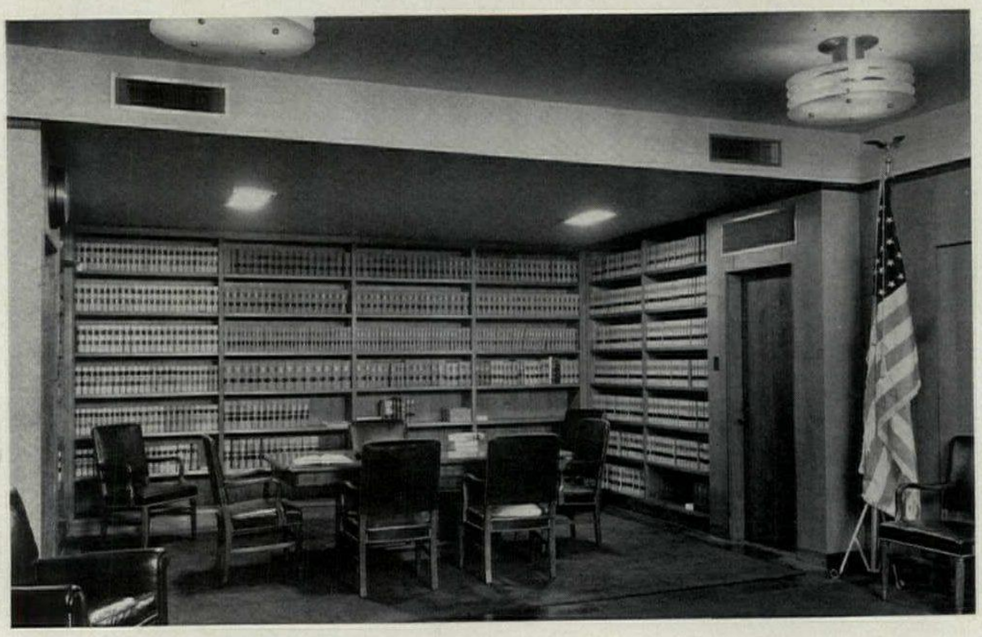


U. S. COURT HOUSE AND POST OFFICE BUILDING — PHILADELPHIA

THE CIRCUIT COURT OF APPEALS (ABOVE) IS ENTERED THROUGH A SMALL RECESSED FOYER (BELOW)

U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

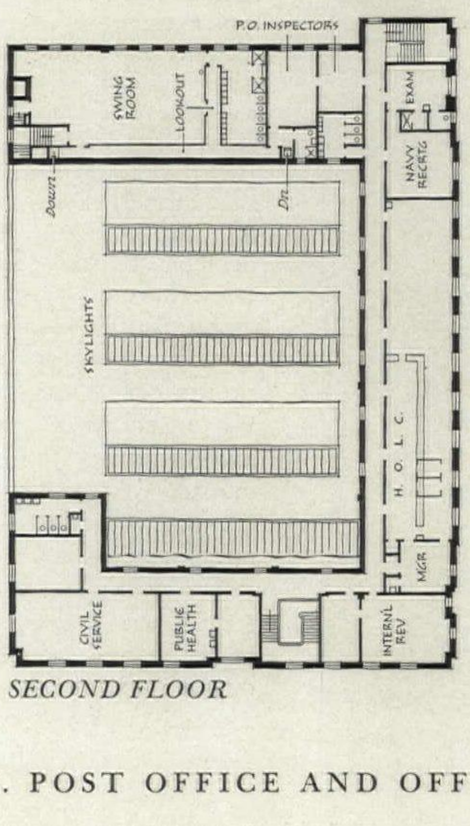




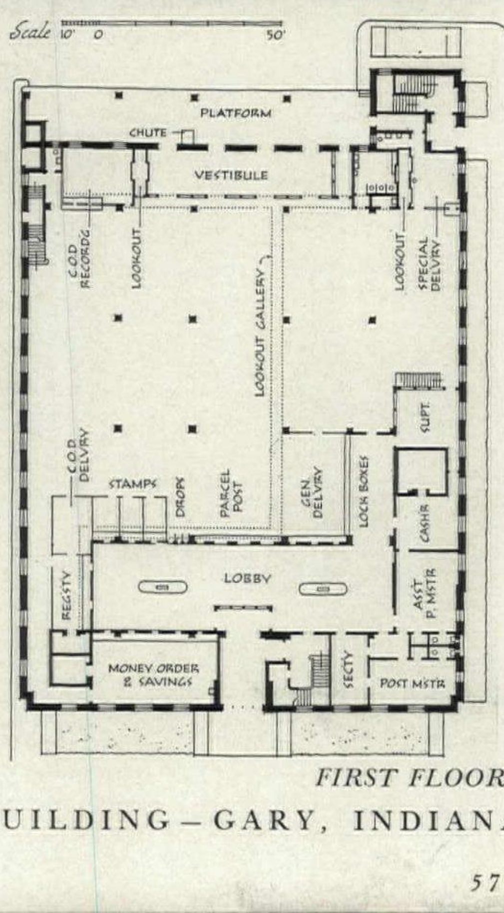
THE JUDGES' CHAMBERS ARE HANDSOMELY FITTED. SOME HAVE READING ALCOVES

U. S. COURT HOUSE AND POST OFFICE BUILDING – PHILADELPHIA

Photos by Hedrich-Blessing Studio



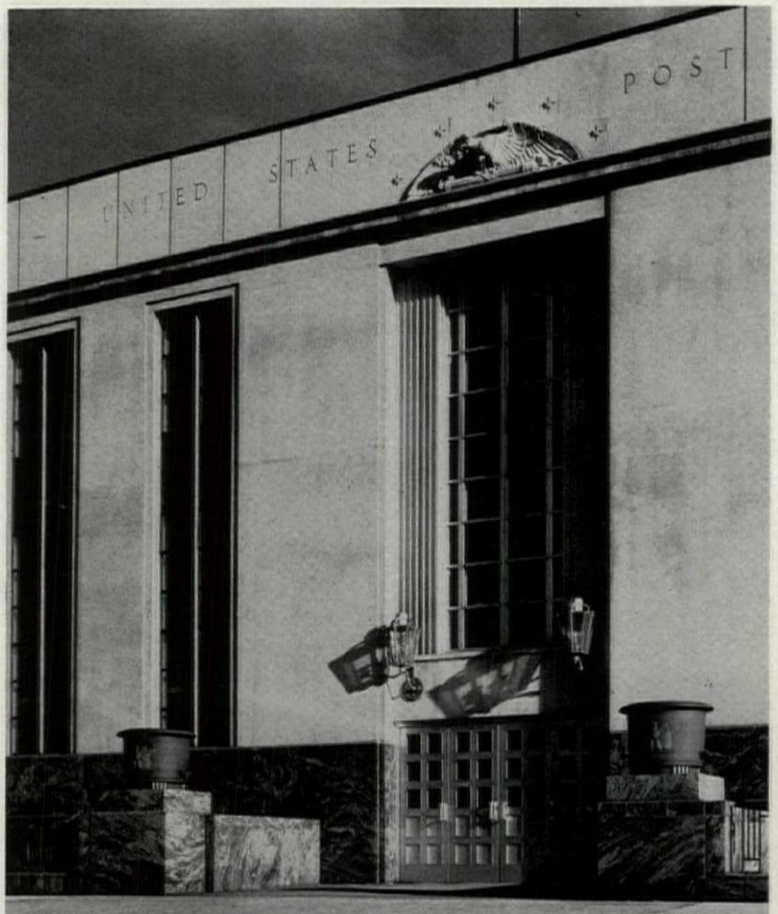
SECOND FLOOR



FIRST FLOOR

U. S. POST OFFICE AND OFFICE BUILDING – GARY, INDIANA

ENTRANCE TO THE POST OFFICE LOBBY IS THROUGH A DEEP VESTIBULE, FROM WHICH THE FEDERAL BUILDING STAIRWELL ALSO OPENS. A GLASS PANEL SCREEN AT THE END ACCENTS THE POST OFFICE APPROACH. THE GARY POST OFFICE BUILDING IS CONSTRUCTED OF ARCHITECTURAL CONCRETE, WITH EXTERIOR ORNAMENT OF CONCRETE AND A BASE COURSE OF MINNESOTA RAINBOW GRANITE. THE EXTERIOR METAL-WORK (DETAIL PHOTO AT LEFT) IS ALUMINUM. SKYLIGHTS FURNISH NATURAL ILLUMINATION FOR THE POST OFFICE LOBBY AND THE WORK SPACE BEYOND. THIS POST OFFICE AND THE ONE ON THE FOLLOWING PAGES WERE DESIGNED IN THE OFFICE OF THE SUPERVISING ARCHITECT WITH HOWARD LOVEWELL CHENEY, OF CHICAGO AND WASHINGTON, AS CONSULTING ARCHITECT. THE PEORIA POST OFFICE AND COURT HOUSE (ACROSS-PAGE) IS ORNAMENTED WITH SCULPTURED PANELS BY FREEMAN SCHOOLCRAFT, OF CHICAGO. THE BASE COURSE AND CARVED PYLONS AT THE ENTRANCE (DETAIL PHOTO) ARE OF DEERE-ISLE, MAINE, GRANITE



Photos by Hedrich-Blessing Studio

BUFF INDIANA LIMESTONE AND GRANITE BASE WERE USED FOR THE PEORIA BUILDING. METALWORK IS BRONZE

THE RICHNESS OF THE INTERIOR OF THE BUILDING AT PEORIA IS INDICATED BY THESE PHOTOGRAPHS SHOWING THE COURTROOM (ABOVE) AND THE MARBLE LOBBY OF THE POST OFFICE (BELOW). THE POST OFFICE LOBBY IS FLOODED WITH DAYLIGHT FROM A ROW OF HIGH WINDOWS ON THE LONGER STREET FACADE. DESIGNED BY OFFICE OF SUPERVISING ARCHITECT. HOWARD LOVEWELL CHENEY, CONSULTING ARCHITECT

U. S. POST OFFICE AND COURT HOUSE – PEORIA, ILLINOIS

GEORGE GRANT ELMSLIE AND THE CHICAGO SCENE

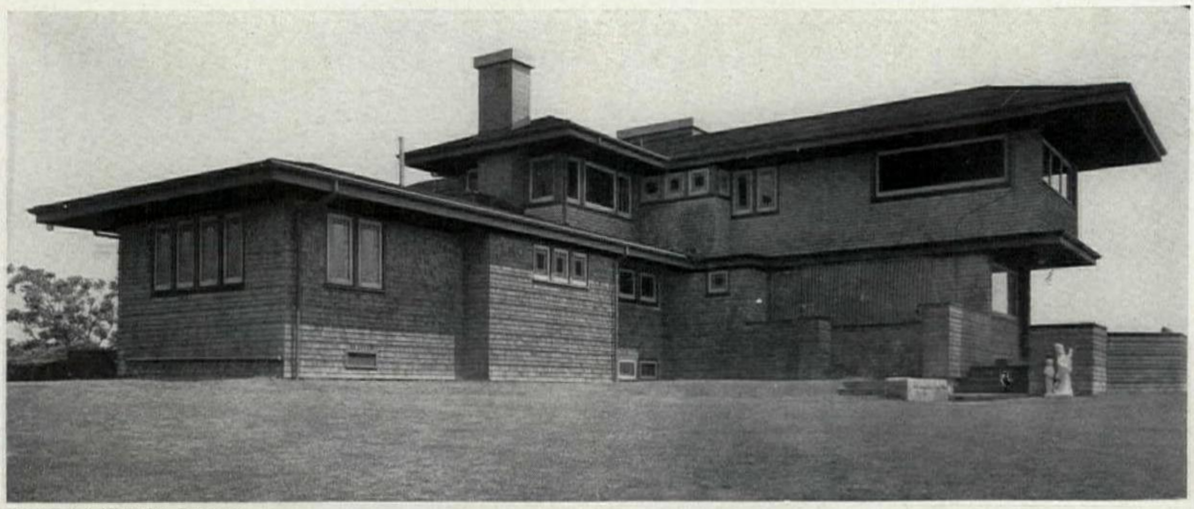
BY TALBOT F. HAMLIN

American architecture was not dead between 1900 and 1930. Here and there creative and revolutionary artists were doing their best to vindicate architecture as a creative art. It was in Chicago that such architects had found their freshest opportunities, and the work done by the various architects of the so-called "Chicago School" was large in amount and surprisingly high in quality. In addition to Purcell and Elmslie there were: Dwight H. Perkins, bringing to many of the Chicago public schools a note which was the one encouraging exception to the current Gothicism of municipal educational facilities; Walter Burley Griffin and his brilliant wife, designing beautiful houses and interesting subdivisions, and going on to win the competition for Canberra in Australia and refertilizing Australian architecture from America; Guenzel and Drummond, with their vivid and perhaps more erratic expressions of the same search for novelty.

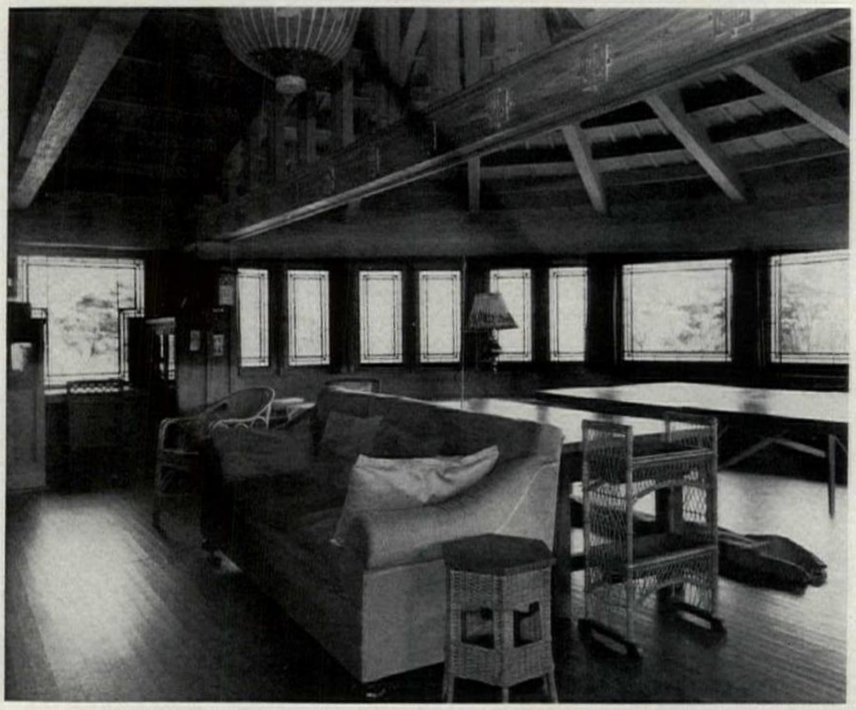
It was no accident that this should be so. Chicago at the turn of the century was perhaps the most forward-looking town in the country, as alive artistically as it was commercially, full of exuberance, full of great dreams, which it did its best to realize. It was in Chicago that the new American poetry achieved some of its earliest individual triumphs under the aegis of Harriet Munro, a sister-in-law of the architect Root. It was in Chicago that American typography began to rise from the depths of 19th Century commercialism into work of surprising vitality, and the publication of Stone and Kimball are still, in their way, models of their own particular kind of typographic form.

Nor was the architectural creativeness of the region the sole property of any one or two individuals, but as much a part of this exciting, progressive spirit as the poetry or the typography. Sullivan, of course, was its parent, and most of the members of the Chicago School had been, directly or indirectly, under his influence or in his office. Wright began his own domestic work in the 1890's, and many of the later men of the School worked at various times with him. Yet these architects were no mere copyists, no mere imitators, either of Sullivan or of Wright. All sorts of other influences were impinging upon them, for the period was one of much artistic experiment all over the world. The Arts and Craft movement, started in England twenty years earlier chiefly through the work of William Morris, was still vitally alive. The more radical English domestic architecture, such as the work of Voysey and Baillie Scott, was much studied and admired. In this country Gustave Stickley, through his magazine, *The Craftsman,* was stimulating a wide interest in the frank and logical use of materials of all kinds. Moreover, the whole cultural life of Chicago at the time was remarkably sensitive to new ideas, and definitely searching for new methods of artistic expression which should be American.

At some time or other all the members of

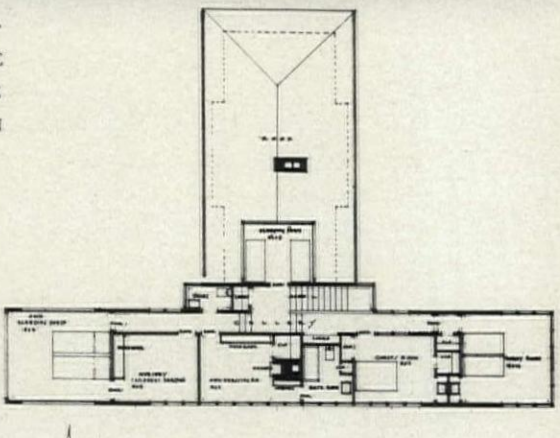


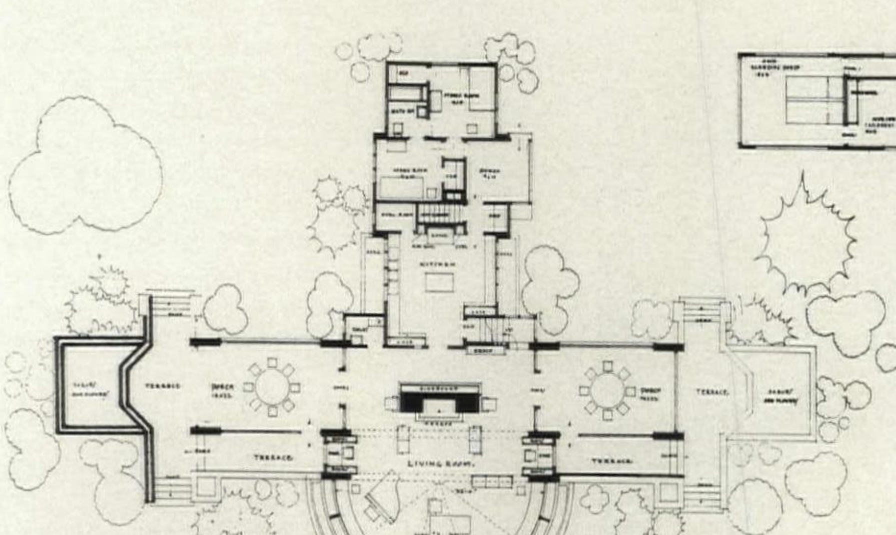
Photos by Nicholas Romano

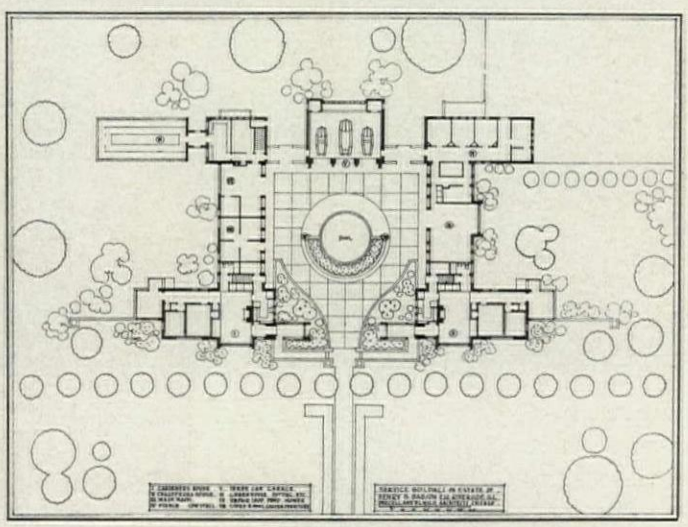


THE SUMMER COTTAGE AT WOOD'S HOLE, MASS., FOR DR. HAROLD C. BRADLEY, WAS BUILT THIRTY YEARS AGO. SINCE 1911 IT HAS CROWNED ITS STEEP WIND-BLOWN KNOLL, SURROUNDED BY THE BLUE SALT TIDES. ITS EXTENDED HORIZONTALS, ITS DARING CANTILEVERS, ITS BOLD TREATMENT OF OPENINGS ARE SURPRISINGLY PROPHETIC. NOTE HOW THE LIVING-ROOM TRUSSES ARE DEVELOPED INTO DECORATIVE FEATURES, AND HOW THE NOOK CABINETS ARE FRANKLY INTEGRATED INTO THE WINDOW SHAPE

IN PLAN, THE BRADLEY HOUSE SHOWS THE KIND OF ARTICULATED, ORGANIC SYMMETRY ITS ARCHITECTS LIKED, AS WELL AS THE FREE FLOWING OF SPACE AROUND THE BROAD CENTRAL HEARTH. VIEWS ARE MAGNIFICENT; A SIMPLE PLAN ASSURES SUN AND CROSS-VENTILATION







THE BABSON ESTATE SERVICE GROUP AT RIVERSIDE, ILLINOIS, 1915, HAS AN ORDERED PLAN, DEVELOPED BY ORGANIC IMAGINATION INTO EXUBERANT FANTASY OF DETAIL AND DECORATION

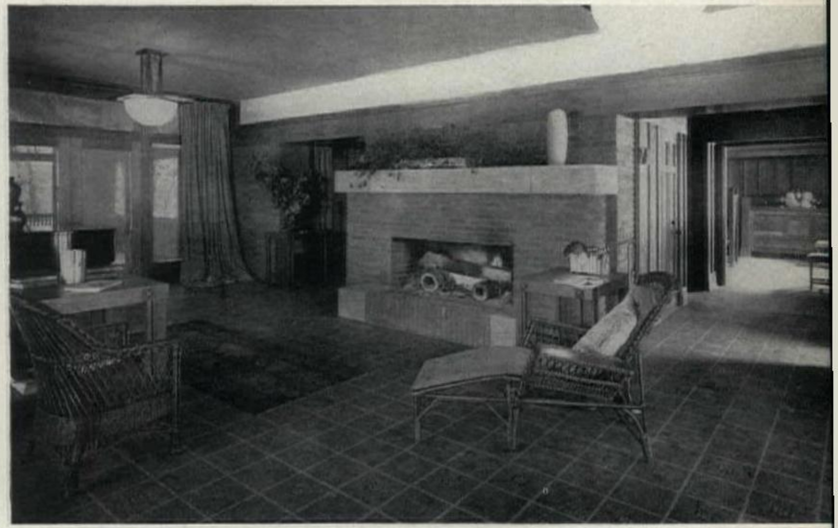
this architectural group in Chicago had probably known each other well, and they all felt they were working in a new vein (an American vein), expressing a vital and enduring tradition, creating an architecture of democracy. They worshiped Sullivan—particularly the earlier Sullivan—as the first great exponent of this tradition. But they felt themselves primarily creators. Generally speaking, with one or two surprising exceptions, they admired each other's work and helped each other with it. Thus, both Mr. and Mrs. Walter Burley Griffin had been employed in the Wright office; and not only had Mrs. Griffin (Marion Mahoney) played a very important part in the Wright organization, but later we find her as associate architect with H. Von Holst for a large and beautiful house. Of all these architects, one of the most important firms —alike in the amount of work produced and in the continuity of it—was that of Purcell and Elmslie, at the beginning Purcell, Feick & Elmslie, and finally, Elmslie alone.

Elmslie had come to this country with his family from Aberdeen, Scotland, sometime in the 1880's, and after a year in business school he obtained a job in the office of Joseph Silsbee, where both Wright and George Maher were then employed. In 1890 Wright, who had moved on to Adler and Sullivan's, suggested that Elmslie be brought over as well. Elmslie rapidly became one of the most important draftsmen in the Adler and Sullivan office, and stayed on with Sullivan after the partnership had been broken up, in 1895, until he formed his own partnership with Purcell in 1909. During this later period he was Sullivan's chief designer and had complete charge of all the ornamental work, in the design of which he was given the greatest freedom. Thus he established early that special love and facility in ornament which has characterized his work ever since and which has always made him feel, as Sullivan felt, that no building was complete in which the structure did not flower as nature does. Naturally, too, the ornament which he has always used is, like Sullivan's, based on the harmonious contrast of geometrical form and vivid seminaturalistic foliage, the continual marriage of the static and the dynamic.

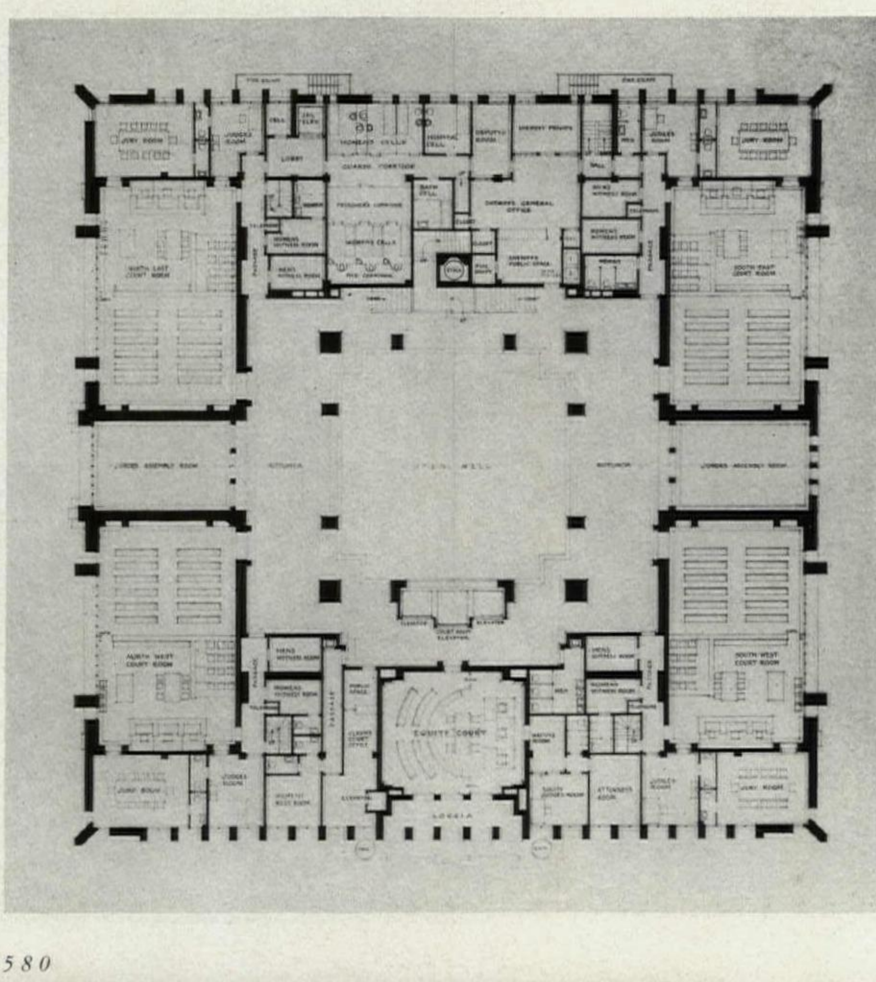
In the meantime, Elmslie had met William Gray Purcell, who had worked briefly in the Sullivan office in 1903. Purcell was a graduate of the Cornell School of Architecture and with a classmate of his, Feick, had formed a small firm in Minneapolis, and the new firm invited Elmslie to join it as a partner in 1909. Feick, who was primarily the engineer, withdrew in 1913 to return to the building business in Sandusky, his home town. Elmslie was pre-eminently the designer and draftsman; Purcell the man who understood materials as few people of his time understood them, and through his sensitive feeling for them and their use played an important part in the development of the ideas. The association between Elmslie and Purcell was of the closest—"osmotic, in a sense," said Mr. Elmslie at one time—so that despite separation in function the design of the firm was a harmonic effort. Since Mr. Purcell's departure for California in 1920, Elmslie has gone on, either by himself or sometimes as associate architect with others, keeping alive with unusual integrity the creative enthusiasm of the earlier Chicago School, and giving it continual new expression as conditions and ways of building and tastes have changed. It is a remarkable history of a continuing integrity always refusing to compromise with the current fashions in eclecticism and apparently equally unimpressed with the starknesses of the International Style.

With such a history it is natural that the power of the Sullivan influence should be obvious in much of Elmslie's work. It is natural to find, particularly in some of the houses, those elements—broad horizontal lines, rows of windows close together, projecting eaves, and open plans—which were typical of the Chicago School in general, although famous chiefly today because of their personal interpretation in the work of Wright. Yet there are marked differences between the Elmslie work and the work of Sullivan and of Wright. There is a certain characteristic simplicity of plan—as, for instance, in that of the Bradley cottage on the Crane estate at Wood's Hole—and a love of direct and unforced symmetry, accented here and there by delicate balanced off-center elements. There is a most prophetic love of glass, and it is interesting to find again and again that in these early houses between 1911 and 1915 broad unbroken sheets of plate glass used often in ways that are quite contemporary today—as, for example, in the Sexton house overlooking Lake Minnetonka, or the great curved living-room of the Bradley cottage. There is also a strain of pure imaginative fantasy, running through all of the work, which is personal and engaging. It appears in its most delectable manifestations in the service buildings of 1915 on the Babson estate at Riverside, Illinois, and in the interior of the Westminster

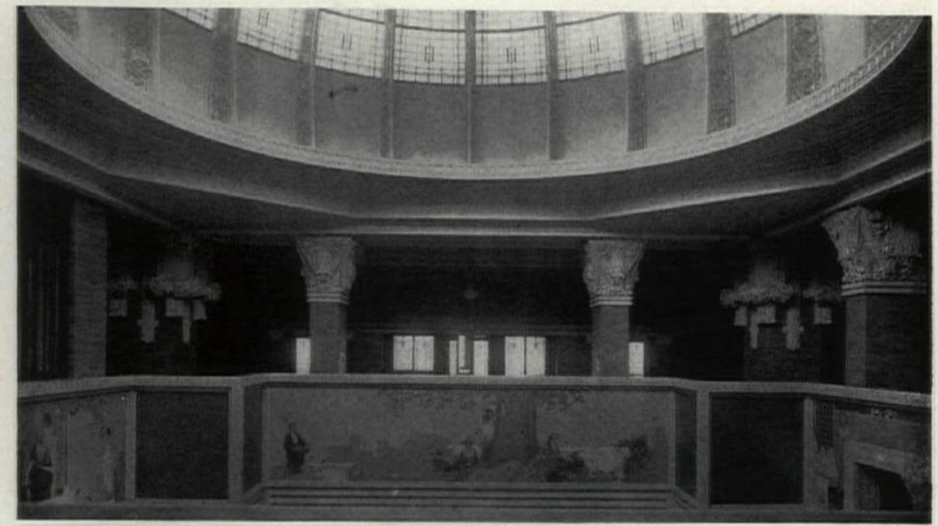
THE DECKER HOUSE, OVERLOOKING LAKE MINNETONKA, 1913, HAS A BASIC PLAN TYPE SIMILAR TO THAT USED FIRST AT WOOD'S HOLE, BUT WITH MANY VARIATIONS DUE TO DIFFERENCES IN SIZE AND GEOGRAPHICAL LOCATION



THE BOLD BREADTH OF THE DECKER HOUSE MANTEL, LIKE THE DELIGHTFUL PORTE COCHÈRE AND THE PASSAGE TO THE GARAGE, EVIDENCES THE CREATIVE QUALITY AND FREEDOM FROM TRADITION OF PURCELL AND ELMSLIE'S DESIGNS



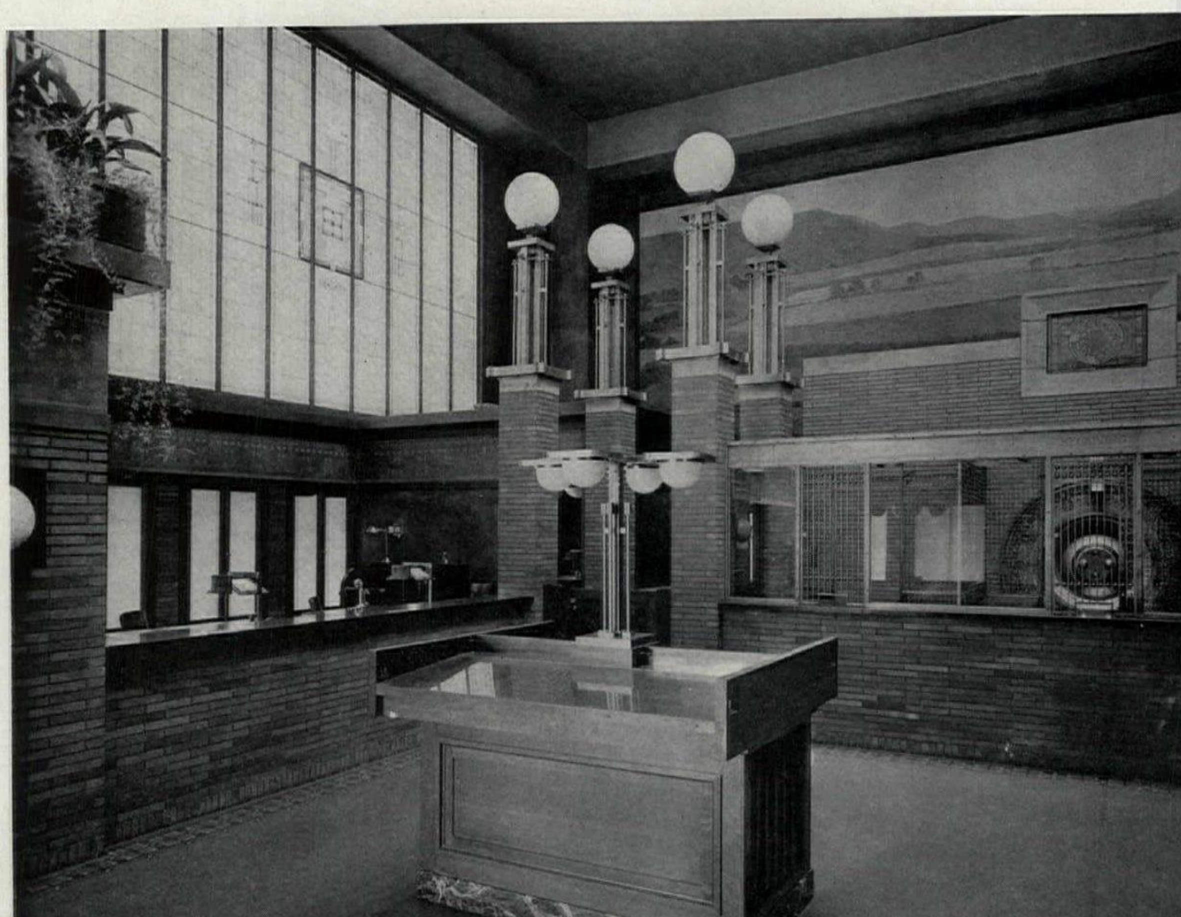
THE INTERIORS AND THE ARRANGEMENT OF THE SIOUX CITY COURTHOUSE, OF WHICH WILLIAM H. STEELE AND PURCELL AND ELMSLIE WERE ASSOCIATE ARCHITECTS, ARE AS DARINGLY ORIGINAL AS THE EXTERIOR. THE ARTICULATION OF THE COURTROOM FLOOR PLAN, WITH ITS INGENIOUS SERVICE ARRANGEMENT, IS CLEAR AND SIMPLE



IN THE ROTUNDA, OF WHICH THE UPPER PART IS SHOWN, THE EXTERIOR COLOR SCHEME IS PRESERVED. THE COURTROOMS, FLOODED WITH DAYLIGHT, HAVE AN UNUSUAL SENSE OF QUIET AND OF APPROPRIATELY DEMOCRATIC DIGNITY

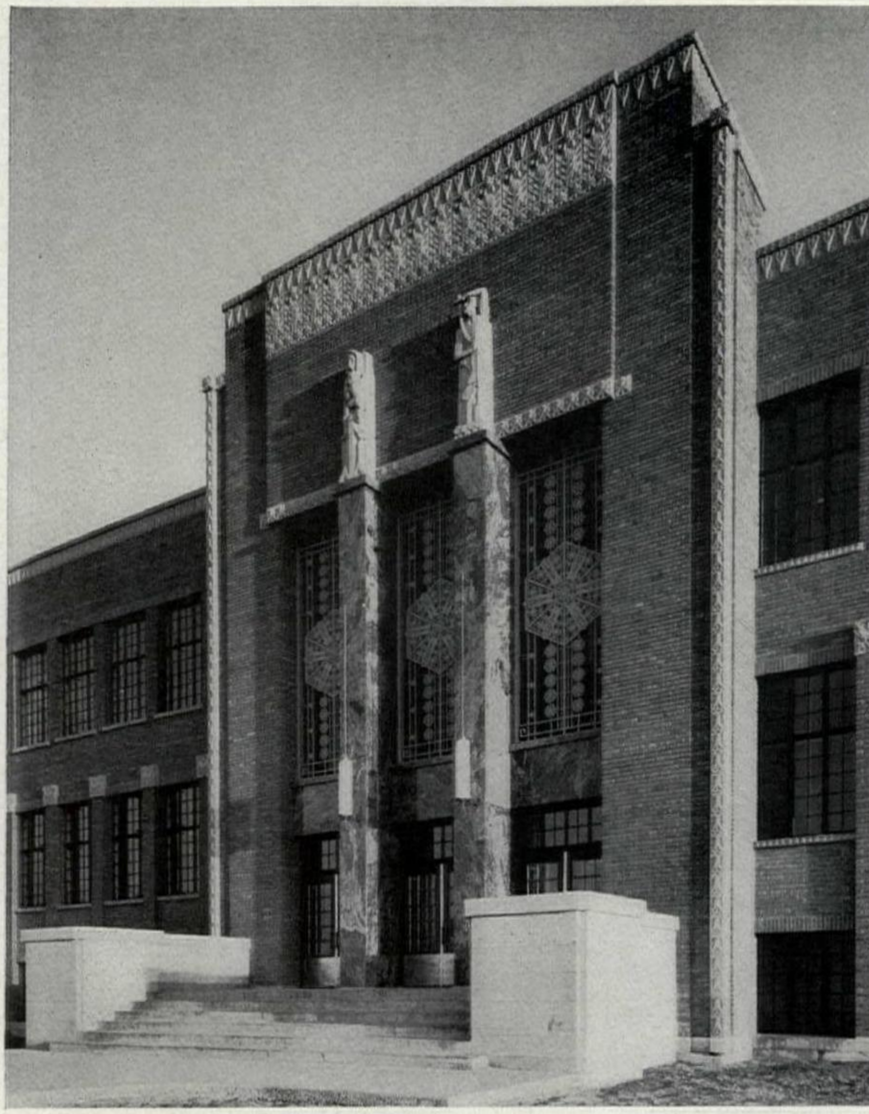
THE BOLD GEOMETRIC MASSES OF THE SIOUX CITY COURTHOUSE WERE IN 1917 UNIQUE, AS WERE THE REGULAR RHYTHMS, THE CONTRASTS OF HORIZONTAL AND VERTICAL, THE EMPHASIZED COURTROOM BAYS ON THE SIDE, AND THE DARING AND MEANINGFUL DECORATION OF THE PORTAL SHOWN ACROSS PAGE

THE WINONA, MINNESOTA, MERCHANTS' BANK, 1912, IS TYPICAL OF MANY PURCELL, FEICK, AND ELMSLIE BANKS IN ITS AIRY OPENNESS AND A UNIFYING USE OF SIMILAR COLORS AND MATERIALS OUTSIDE AND IN



THE ENTRANCE OF THE TOPEKA, KANSAS, CAPITOL BUILDING AND LOAN BUILDING, 1922, CONVINCINGLY COMBINES STRUCTURE AND DECORATION, GEOMETRY AND IMAGINATION

THIS PHOTOGRAPH SHOWS THE OLD SECOND NATIONAL BANK, AURORA, ILLINOIS, DONE IN 1924. BOTH OF THESE BUILDINGS WERE BY GEORGE G. ELMSLIE, WITH NO ASSOCIATES

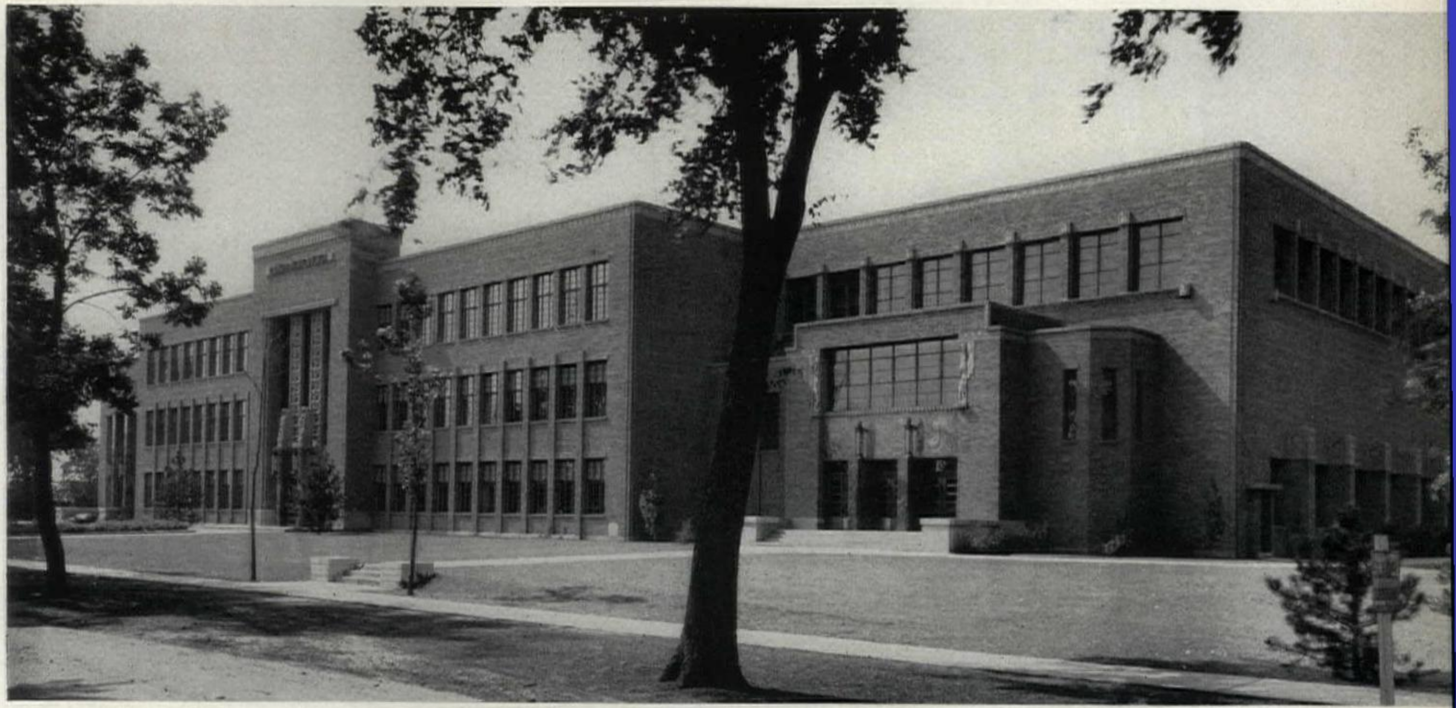


Bodie

THE THORNTON TOWNSHIP HIGH SCHOOL AT CALUMET CITY, ILLINOIS, MAIN ENTRANCE, WILLIAM S. HUTTON AND GEORGE G. ELMSLIE, ASSOCIATE ARCHITECTS. HERE A GREAT RICHNESS IN DECORATION AND MATERIAL DO NOT CONFUSE THE ESSENTIAL SIMPLICITY OF THE GEOMETRIC PATTERN BENEATH IT. EMIL ZETTLER WAS THE SCULPTOR OF TWO TERRA COTTA FIGURES

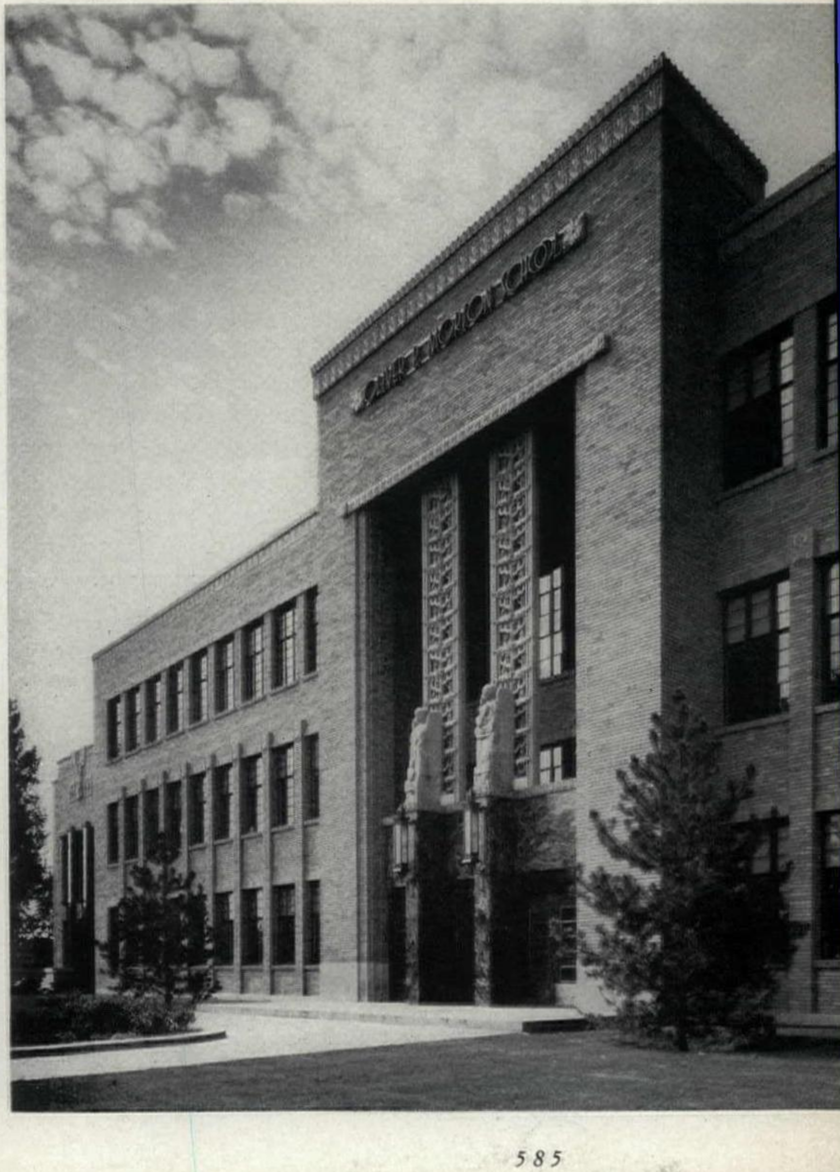
School Kindergarten of the Westminster Church in Minneapolis. At times, as in parts of the Sioux City Courthouse, in the design of which Purcell and Elmslie were associated with William Steele, this quality seems almost to run away with the design, producing what appears to this reviewer occasional overlavish and overheavy decoration and a too great breaking up of form; but when it is schooled by a tightly composed geometry of design, as in the entrance motif of the Capital and Loan Building at Topeka or in the courtroom interiors at Sioux City, there results a note of rich and human beauty which is unique.

In much of this ornamental work, Mr. Elmslie has been associated with the sculptor, Alfonso Iannelli. Some of it has that strange quality of wistfulness that we are tempted today to call sentimental, which runs through a great deal of the decorative art at the beginning of the century; yet, as it is used by Elmslie, the purpose is so sincere, the idealism expressed so honest, that to call it sentimental is impossible. It is rather that, through all his work, Elmslie has been designing for people, for human beings, who like richness, who like sculpture, who are not or should not be afraid of their own emotions; and his daring in the continued use of this rich organic decoration might well be considered perhaps a challenge to us and our times and ideals, rather than a mark of retrogression on his own part. For the recent work is quite different in character from that done earlier. The two schools in Hammond and Calumet City, one in association with William S. Hutton within the last five years, show this to a surprising degree, for in them Elmslie has adopted, where these seemed most to fit, many of the current idioms of contemporary design—its basic rectangularity, its dependence upon materials and proportion—and then gone that one step further which present-day architects so seldom take, the step of letting the forms flower into richness of carved and modeled ornament. The effect is again remarkable. It shows how naturally the two ideals of simple regularity and of concen-



THE OLIVER MORTON SCHOOL, AT HAMMOND, INDIANA, LIKE THAT AT CALUMET CITY, WAS DESIGNED IN ASSOCIATION WITH WILLIAM S. HUTTON. ESPECIALLY INTERESTING IS THE AUDITORIUM WING WITH ITS INVITING ENTRANCE. IN THE TERRA-COTTA ORNAMENT, AS IN ALL THE ELMSLIE DECORATION, THERE IS A CONTINUAL SEARCH FOR EQUILIBRIUM BETWEEN THE STATIC AND DYNAMIC. THE ORNAMENTAL BANDS THAT BEGIN AND END THIS PRESENTATION WERE ALSO DESIGNED BY MR. ELMSLIE FOR USE AS STENCILS. ALFONSO IANNELLI DID THE FIGURE SCULPTURE

Photos by Bodie



trated richness can be combined—again another expression of the static and the dynamic out of the interweaving of which life arises.

And Purcell and Elmslie always considered color as vital a part of architecture as form. They not only studied most carefully the colors of materials themselves—brick, various stones or marbles, wood, and so forth—but also sought in the interrelation of these to obtain a rich, warm color harmony which would carry through from exterior to interior. Thus they liked to use the same colored brick both inside and out, as in the Sioux City Courthouse and many of their banks, and they were not afraid to use colored ornament and even glass mosaic to enrich and accent their basic color harmonies. Much of the exterior ornament shown in the illustrations is in colored terra cotta, so that its effect is but dimly conferred by the illustrations, and the rich symphonies of browns and reds and subtle greens is as much a part of the design as the richness of line or plane. In this handling of color Mr. Elmslie went far beyond Sullivan's customary monochromatic schemes; and his buildings have a human appeal, through this sensitive use of color, which is quite rare in American design. It is another unfortunate concomitant of the dominance of photographs today that there is so little current appreciation, and even less use, of the potentialities of integral and organic color in architectural design.

Another element which is noticeable in the work from 1910 on is a fastidious feeling for material. Here the influence of Mr. Purcell is perhaps especially strong, for Purcell has written over and over again of the necessity of allowing materials to be themselves. For him a building is not a mere dictated coordination of unfelt and unfeeling materials, but rather the organic building together of many elements each of which has, and seems in the finished building to continue to have, its own special life. This special feeling for materials is, they both claim, merely a carrying on further of the Sullivan doctrines of democracy: that just as ultimate respect is due to all men everywhere, both the greatest and the least, so in architecture ultimate respect is due to all materials from the cheapest to the most expensive, from the meanest to the most rare.

There is one more quality obvious in the work of Purcell and Elmslie and the later work of Elmslie himself, as it is apparent in that of many other individuals of the Chicago School, which I think we should today do well to ponder. It is deep faith that architecture is more than a technique, and designing more than a geometric puzzle, but rather that buildings are truly a flowering of mankind's deepest as well as commonest emotions in the same way that music and poetry are. Architecture thereby becomes essentially lyric, and these designers were not afraid to be lyrical even to the point of extravagance. They knew that architecture grew out of the same soil as the other arts, and that the great architect should know the thoughts and the literature and the art of his time just as well as he knows its industry and its economics. In the second number of the *Western Architect* devoted to their work in 1915, the greater part of the text consists of quotations from various authors who seemed to them significant: Romain Rolland, Edward Carpenter, Richard Wagner, Oscar Wilde, Gerald Stanley Lee, and Otto Wagner (the only architect). The Romain Rolland quotation from *Jean Christophe* is especially interesting because it perhaps more than anything else expresses what these two men are and what they have tried and are trying to do:

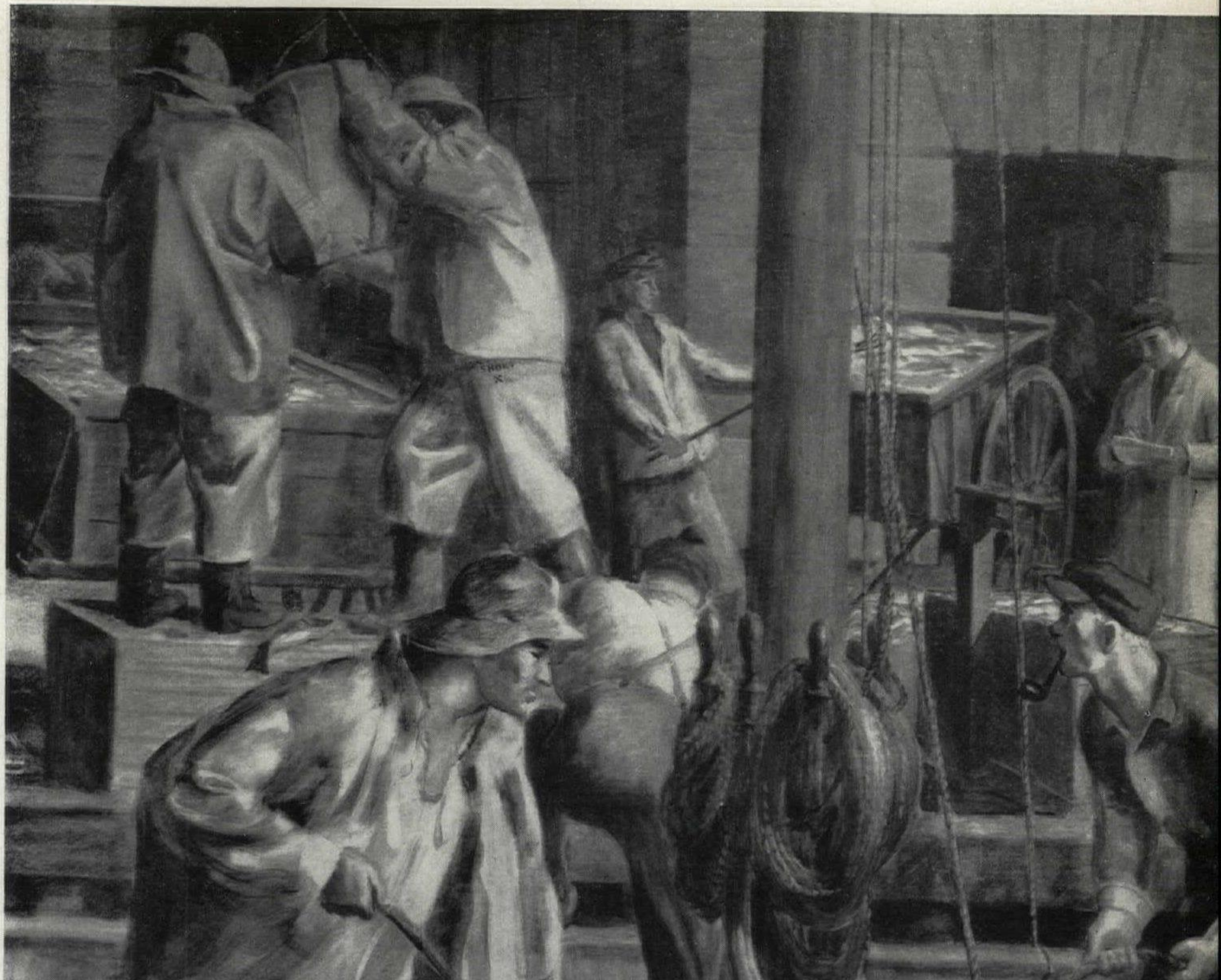
"He wished his music to be an art of communion with other men. There is not a vital art save that which is linked with the rest of humanity.

". . . . . You are addressing men; use the language of men. . . .

". . . . . There are no words noble or vulgar; there is no style chaste or impure, there are only words and style which say or do not say exactly what you have to say. Be sound through and through in all you do; think just what you think and feel just what you feel, let the rhythm of your heart be in your writings. The style is the soul.

". . . . . Let us avoid like the plague any artistic language that belongs to a caste like that of so many writers and especially of so many French musicians of today. We must have the courage to speak like men, not artists."

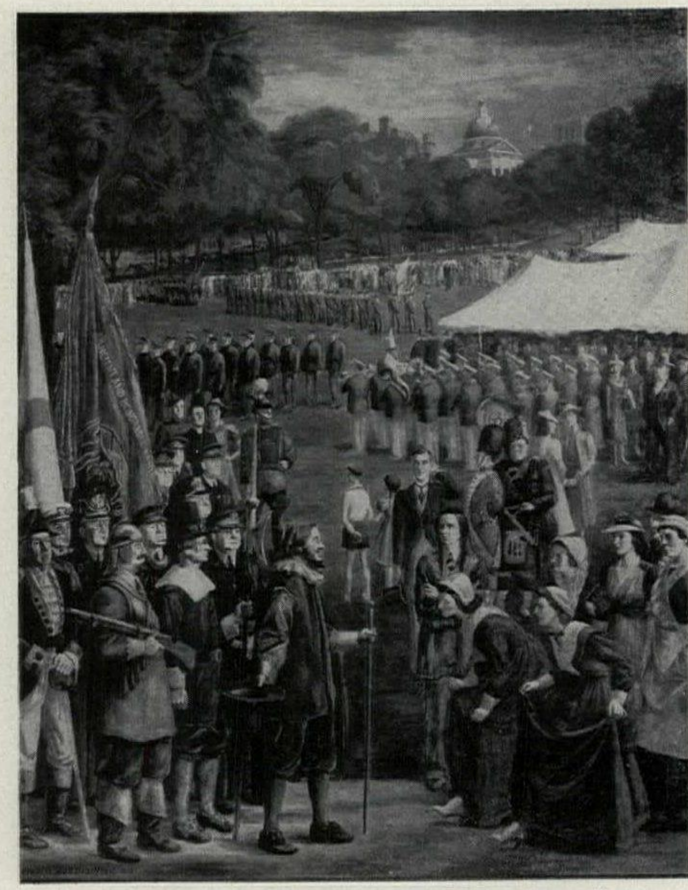
Perhaps we today may somehow through the inspiration of these creative artists and the Chicago School find our own new lyricism, as necessarily personal as our own integrity, as necessarily contemporary as our own materials and the problems we face.



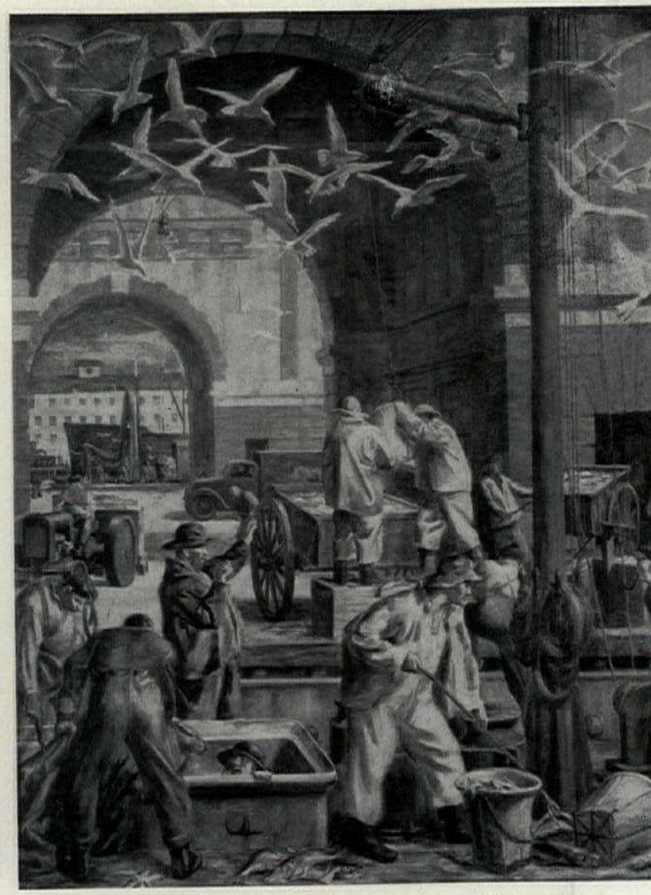
Photos by Peter A. Juley & Son

DETAIL OF "THE MUNICIPAL FISH PIER"

SIX MURALS OF BOSTON TODAY – BY FRANCIS SCOTT BRADFORD



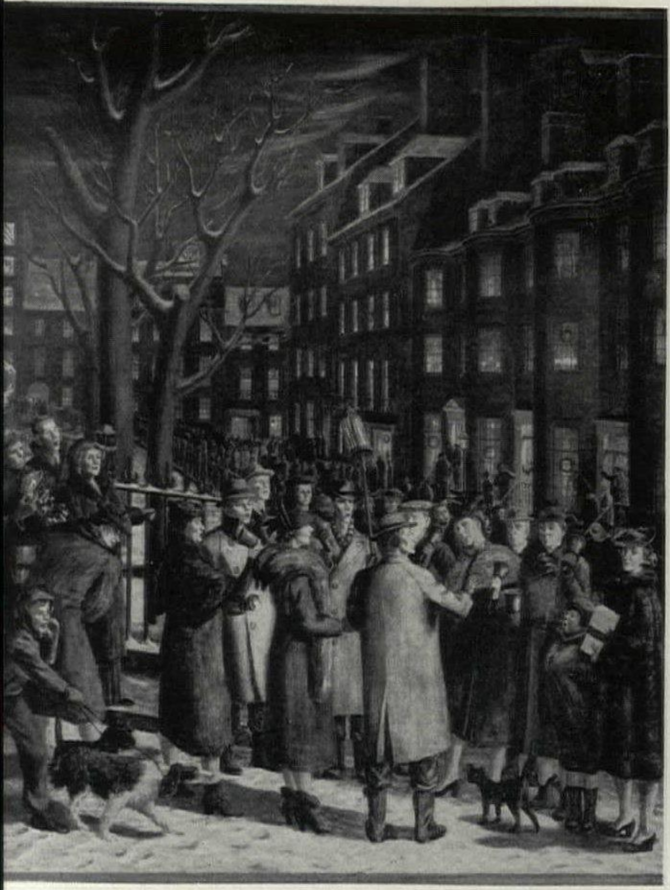
"ANCIENT AND HONORABLE ARTILLERY FETE"



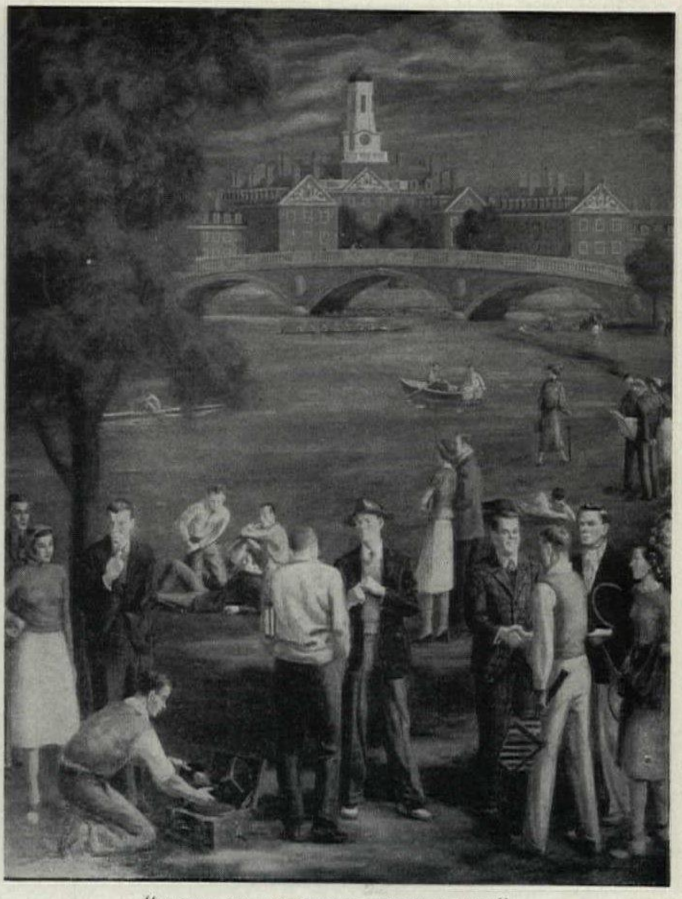
"THE MUNICIPAL FISH PIER"

"MUSIC SHELL ON RIVER ESPLANADE"

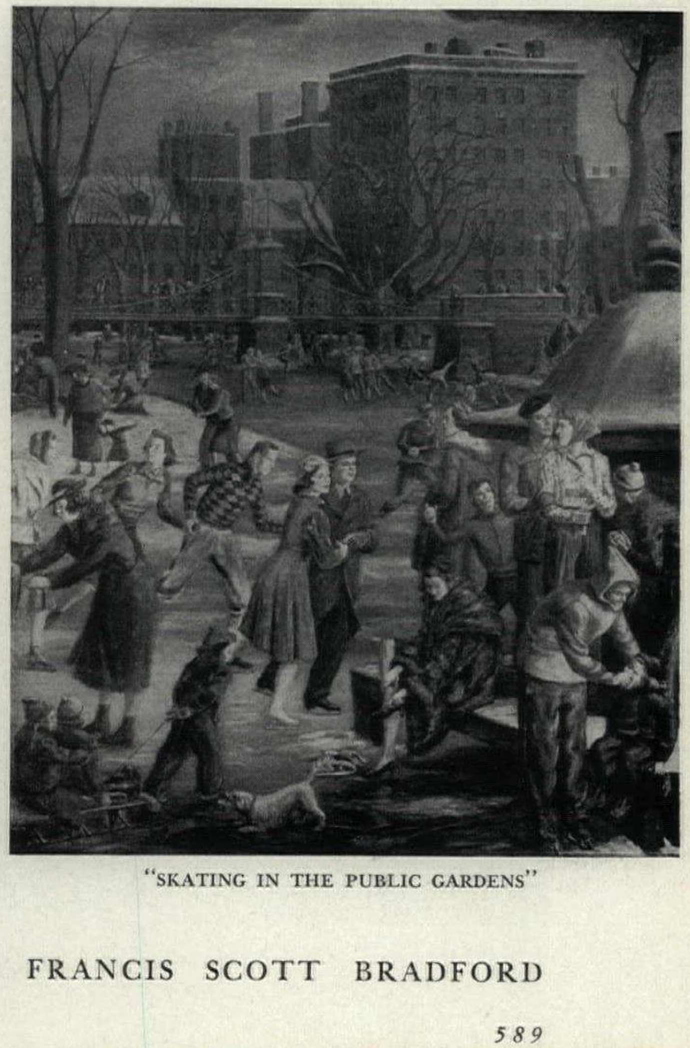
SIX MURALS OF BOSTON TODAY FOR LEVER BROTHERS COMPANY



"CHRISTMAS EVE: LOUISBURG SQUARE"



"VIEW OF HARVARD UNIVERSITY"



"SKATING IN THE PUBLIC GARDENS"

BUILDING, CAMBRIDGE, MASS. – BY FRANCIS SCOTT BRADFORD

THE MURALS ARE IN THE LOBBY OF LEVER BROTHERS COMPANY ADMINISTRATION BUILDING IN CAMBRIDGE, DESIGNED BY DONALD DES GRANGES, OF BOSTON, AND SHREVE, LAMB & HARMON, ARCHITECTS, OF NEW YORK. THE LOBBY WALLS ARE OF TEAKWOOD AND THE TEMPERA PAINTINGS ARE VARNISHED. BRADFORD INCLUDED ONE HUNDRED AND TEN PORTRAITS OF CONTEMPORARY BOSTONIANS IN THIS SERIES

SIX MURALS OF BOSTON TODAY – BY FRANCIS SCOTT BRADFORD

THE ABC'S OF FLUORESCENT LIGHTING

BY JOHN T. BAILEY

No one will maintain that fluorescent lighting is not new and different. In fact, some have said that it is too new and so different from present lighting that a period of adjustment must be endured while its merits are substantiated and its disadvantages are uncovered. Such a period of adolescence for the lamps is producing some growing pains. But if the demand for fluorescent lamps and the many creditable installations in operation today are any indication that the new light source is becoming of age, then now is the time to review fluorescent lighting.

The purpose of this article is not to prophesy or predict future trends but merely to present an unprejudiced, non-commercial compilation of facts and comparisons of fluorescent light sources so that an anaylsis of a particular fluorescent lighting problem can be made quickly and confidently.

FLUORESCENT LIGHT SOURCES

An incandescent type of lamp produces visible light directly by heating of the filament to incandescence at a temperature near the melting point of the metal, usually tungsten. In the fluorescent types of light sources an arc between electrodes at opposite ends of the lamp produces invisible ultraviolet energy which is transformed into visible light by phosphors with which the inside of the lamp glass is coated. By the selection or mixture of the proper phosphors almost any color of light can be obtained. There are two general classifications of fluorescent light sources available—fluorescent *lamps* and fluorescent *tubing*.

FLUORESCENT LAMP DATA

	Lamp Wattage								
1. DIMENSIONS	6	8	14	15	20	30	40	65	100
a. Bulb diameter	5/8″	5/8″	1½″	1″	1½″	1″	1½″	2⅛″	2⅛″
b. Length, includ. sockets	9″	12″	15″	18″	24″	36″	48″	36″	60″
c. Base*	Min.	Min.	Med.	Med.	Med.	Med.	Med.	Mog.	Mog.
2. APPROX. INITIAL LUMENS at 100 hrs.									
a. 3500° white	180	300	460	615	900	1450	2100	2100	4200
b. Daylight	155	250	370	495	730	1200	1700	1800	3350
c. Soft white			325	435	640	1050	1500		
d. Blue				315	460	780			
e. Green				900	1300	2250			
f. Pink				300	440	750			
g. Gold				375	540	930			
h. Red				45	60	120			
3. APPROX. BRIGHTNESS in foot-lamberts									
a. 3500° white	2450	2440	1300	2150	1650	2475	1750	1530	2180
b. Daylight	2100	2030	1050	1750	1350	2050	1400	1310	1750
c. Soft white			920	1550	1200	1800	1250		
d. Blue				1125	850	1350			
e. Green				3200	2400	3900			
f. Pink				1050	800	1300			
g. Gold				1650	1000	1600			
h. Red				160	110	210			
4. OTHER DATA									
a. Lamp current—amperes	0.15	0.18	0.37	0.30	0.35	0.34	0.41	1.35	1.45
b. Lamp volts	45	54	41	56	62	103	108	50	72
c. Rated av. life in hours	750	750	1500	2500	2500	2500	2500	2000	2000

* *Min. = Miniature Bipin. Med. = Medium Bipin. Mog. = Mogul Bipin.*

Fluorescent lamps may be broadly classified as hot-cathode, low voltage sources—as contrasted to the cold-cathode, high voltage fluorescent tubing.

FLUORESCENT LAMPS are individual standardized light sources ranging in size from 5/8″ to 2 1/8″ in diameter and 9″ to 60″ long, equipped with a two-pin base on each end, burning in any position. These lamps have been used mainly for general illumination and high-level supplementary lighting installations.

FLUORESCENT TUBING is the familiar "neon sign" tubing with fluorescent phosphors coated on the inside of the glass. It has been used chiefly for electrical advertising but is now entering the field as a competitor to fluorescent lamps in applications where its characteristics are considered more advantageous than those of fluorescent lamps.

The following discussion of the operating characteristics of fluorescent light sources will be helpful in comparing the merits, and disadvantages too, of fluorescent lamps and tubing.

VOLTAGE—Fluorescent lamps and tubing are not offered in standard voltage ratings of 110, 115 and 120 volts as are incandescent lamps, because within their normal operating ranges they are not so sensitive to voltage variations as are the incandescent lamps. In order to use fluorescent lamps on higher voltages, such as the 199-216 or 220-250 volt ranges sometimes encountered in industrial plants, the same lamps are used but the proper control equipment must be selected to match line voltage.

FREQUENCY—Fluorescent lamps and tubing may be operated on any of the usual supply line frequencies, such as 50 or 60 cycles per second, provided that the control equipment is designed for the particular frequency used.

D. C. OPERATION—Fluorescent tubing cannot be operated on direct current. Fluorescent lamps are designed for operation on alternating current but the 15 and 20 watt lamps may be operated on direct current, at reduced efficiency, by using a resistance of proper size connected in series with each ballast. A thermal type starter should be used. This equipment is discussed further under *Control Equipment*. Operation of the 30, 40, 65 and 100 watt lamps is not recommended on d.c.

AMBIENT TEMPERATURE (*Ambient* means "Surrounding")—Fluorescent lamps and tubing are designed to give best performance when the surrounding temperature is within the range of 60° to 90° F. The protection offered by a reflector is often sufficient to eliminate draft effects and to trap enough heat around the lamp to assure satisfactory operation in cold weather. The manufacturers of fluorescent lamps, generally, do not recommend their use in weather below 50° F. but advise that with proper precautions, such as thermal type starters and enclosed fixtures and a line voltage in the upper half of the control rating, satisfactory starting and operating may be obtained down to 32° F. For temperatures below freezing the results are unpredictable. Fluorescent tubing, when designed for outdoor operation, is not so sensitive to cold weather as are the fluorescent lamps.

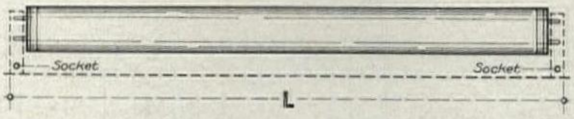
COLOR—Most fluorescent lamps and tubing are white when not lighted. When operated they produce a color of light which is determined by the particular phosphors used within the lamp. These light sources are exceptionally efficient in the production of colored light as compared to incandescent sources. With incandescent lamps the desired color is obtained by filters. Colored light from fluorescent sources is produced directly—sometimes at greater efficiencies than the "white" lights.

MERCURY TUBING DATA

Color	Tubing dia.	Lumens per foot 30 Ma.	45 Ma.	60 Ma.
Warm white	10 mm.	174	—	—
	12	158	222	275
	15	139	203	260
	18	—	—	251
	24	—	—	230
White	10	167	—	—
	12	152	214	265
	15	134	196	250
	18	—	—	244
	24	—	—	220
Daylight	10	142	—	—
	12	129	181	224
	15	113	165	211
	18	—	—	200
	24	—	—	183
Green	10	289	—	—
	12	263	370	458
	15	231	338	432
Deep green	10	168	—	—
	12	154	214	264
	15	145	202	248
Gold	10	130	—	—
	12	124	176	219
	15	117	164	202
Cream white	10	212	—	—
	12	184	269	321
	15	162	246	303
Blue	10	88	—	—
	12	80	112	139
	15	70	102	131

NEON TUBING DATA

Color	Tubing	Lumens per foot 30 Ma.	45 Ma	60 Ma
Old gold	10 mm.	99	—	—
	12	93	123	144
	15	70	96	114
Rose	10	107	—	—
	12	79	105	125
	15	67	94	115
Orange	10	102	—	—
	12	73	99	106
	15	45	66	80
Ruby rose	10	16	—	—
	12	11	14	17
	15	10	13	16



Lamp Wattage ➡	6	8	14	15	20	30	40	65	100
Nominal Length L	9"	12"	1'-3"	1'-6"	2'-0"	3'-0"	4'-0"	3'-0"	5'-0"
Diameter	5/8"	5/8"	1½"	1"	1½"	1"	1½"	2⅛"	2⅛"
WHITE	●	●	●	●	●	●	●	●	●
DAYLIGHT	●	●	●	●	●	●	●	●	●
SOFT WHITE			●	●	●	●	●		
PINK				●	●	●			
GOLD				●	●	●			
GREEN				●	●	●			
BLUE				●	●	●			
RED				●	●	●			

COLORS, WATTAGES OF FLUORESCENT LAMPS

Of the many colored lights available with fluorescent sources, the whites (if white may be called a color) represent the greatest demand for the usual applications. Since red light has not been satisfactorily produced by fluorescent phosphors as yet the "white" lights are deficient in this part of the visible spectrum and noticeable color discrepancies in the appearance of merchandise, interior furnishings, human complexions and food are to be expected. A small amount of mercury light also filters through the phosphors and creates undesirable emphasis of certain colors.

These color short-comings of fluorescent light sources make it imperative that the selection of color schemes be given careful consideration.

Fluorescent lamps are offered in two whites (3500° Kelvin white, and soft white) and a daylight. None of these or any combination of them is a good match for the mellow, yellowish-red spectrum of incandescent lamps to which the public has become accustomed.

The color of light of fluorescent lamps does not change throughout lamp life nor does it change with variations in line voltage.

Efficiency—Fluorescent lamps produce about 3½ times as much light for their wattage as incandescent lamps. However, the wattage consumed by the control equipment must be included in the over-all efficiency calculations and will reduce this figure to around 3. This means that theoretically a given light bill can be reduced to about 33% of its former value. In practice, a reduction to only about 50% can be obtained. Both fluorescent and incandescent lamps increase in efficiency with an increase in wattage. Since low wattage fluorescent lamps usually replace high wattage incandescent lamps, the difference in efficiencies reduces the apparent savings.

Coolness—The efficiency of light generation by fluorescent lamps is about double that of incandescent lamps and the radiated (not convected or conducted) heat is about one-half that of incandescent lamps. As a result, fluorescent lamps produce a heat sensation only one-fourth as great as incandescent lamps for the same amount of illumination. However, when figuring air-conditioning loads the actual wattage of the lamps plus the power lost in the control equipment must be used. This figure will be about one-half that for incandescent lamps for the same amount of illumination. The fluorescent lamp or tubing itself operates at a comparatively low temperature which never exceeds a heat that is uncomfortable to the touch.

Brightness—Fluorescent lamps have a greater surface area through which the light is emitted than do equivalent sizes of incandescent lamps and therefore the brightness per square inch of surface is smaller and reduces glare. In the same way, the one-inch diameter lamps are brighter per unit of area than the 1½" diameter lamps.

Life—The rated life of fluorescent lamps is based on the average obtained from a large number operated under specified conditions. In addition to the number of hours burned, the life of a lamp is determined by the number of times it is turned on and off. For this reason, a fluorescent lamp will give unsatisfactory life if operated on a flasher for sign service. Approximately four hours' burning for every time the lamp is turned on is considered the minimum starting-burning cycle to assure an average rated life.

Sooner or later fluorescent lamps blacken at the ends of the glass directly adjacent to the base. When this normal discoloring is objectionable from an appearance standpoint, the ends or the entire lamp should be concealed from view by a diffusing glass or plastic shield.

Fluorescent tubing is not affected by frequent starting and stopping and therefore may be flashed if desired. Fluorescent tubing has an exceptionally long life, somewhere within the limits of 10,000 and 20,000 hours. While the average life values are not available, some manufacturers guarantee individual lamp lives at various values ranging from 5,000 to 10,000 hours.

Lumen Maintenance—The rated "initial" lumen values for fluorescent lamps are given by the manufacturers as applying after 100 hours of service. The actual initial lumen values are as much as 10% higher during this "stabilizing" period. At the end of the rated life, the light output will drop to around 85% of the lamp's output at 100 hours of life. Throughout the lamp's life the average light output is approximately 90% of its rated initial efficiency.

Stroboscopic Effect—The flicker encountered in using fluorescent lamps and tubing is inherent in the operation of all light sources, including incandescent lamps, when working on alternating current, but not when direct current is used. When minimized by the use of two-lamp ballasts, flicker with fluorescent lamps is reduced to a negligible factor.

Radio Interference—Electrical disturbances may be picked up by a radio within a radius of eight or ten feet of a fluorescent lamp despite the usual precautions included in the control equipment to minimize this trouble. There is little the architect can do to assure his client of interference-free radio reception except to write into the electrical specifications that the contractor shall be responsible for the elimina-

STARTERS

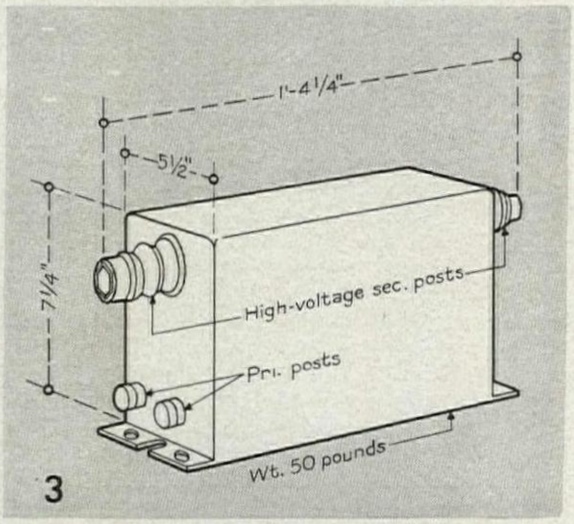
Designation	*For Lamp Sizes*	*No. of Contacts*	*Approx. Dimensions*
FS-2	15 and 20 watt	2	13/16″ D x 1½″ L
FS-4	30 and 40 watt	2	13/16″ D x 1½″ L
FS-5	6 and 8 watt	2	13/16″ D x 1½″ L
FS-6	100 watt	2	1″ D x 2″ L
FS-64	100 watt	4	1″ D x 2″ L
FS-7	65 watt	2	1″ D x 2″ L
FS-74	65 watt	4	1″ D x 2″ L
Manual type	14 watt	—	———

tion of interference, if any, produced by either the fluorescent lamps or their control equipment. It might be well to include such a clause in the specifications to cover fluorescent tubing installations too, although interference from tubing is not common and usually can be traced to defective equipment. In either case, when trouble is encountered, a competent radio service-man can solve the problem.

DIMMING—Fluorescent tubing but not fluorescent lamps can be dimmed with the usual equipment for this purpose when special effects are desired. Dimming to only about 25% of normal light output is possible with an accompanying shift in color as the illumination is reduced.

LIGHT MEASUREMENT—Light meters are available now equipped with filters to correct the readings for the various colors encountered with fluorescent light sources. If a filter is not used, correction factors should be applied as recommended by the meter manufacturer.

MECHANICAL NOISE—The slight normal "hum" inherent in all reactors and transformers may be noticeable and objectionable unless attention is given to the mounting and location of the fluorescent lamp control equipment. In applications involving many lamps where individual hums may become cumulative—as in quiet interiors, libraries, hospitals or residences or where hum may be amplified due to resonance—special cushioned mounting of the ballasts may be required or possibly the location of this equipment outside the quiet area may be the simpler solution. Transformers used with fluorescent tubing are comparatively quiet.



TYPICAL TRANSFORMER FOR FLUORESCENT TUBING

CONTROL EQUIPMENT

For fluorescent tubing one special type high voltage transformer is required for approximately every 70 feet of tubing, the exact number of lineal feet of fluorescent tubing served by one transformer being determined by the diameter of tubing, the gas used within the tubing, the number of pairs of electrodes involved, the voltage of the transformer and the current drain of the tubing. No preheating operation is necessary to start the fluorescent tubing.

Each fluorescent lamp requires control or auxiliary equipment especially designed for its operation. The control equipment for each fluorescent lamp consists of two devices, a *ballast* and a *starter*. This equipment serves three important functions, in order of sequence: 1. Preheats the cathodes to make available a large supply of free electrons; 2. Provides a surge of relatively high voltage to start the arc discharge; 3. Prevents the arc current from increasing beyond the limit for each size lamp.

STARTER—The starter is an essential part of the control equipment for each fluorescent lamp but is not required for fluorescent tubing. Essentially, it is a time-delay switch which causes the cathodes to be heated prior to the establishment of the arc within the lamp. Several different types of starters have been developed since the advent of the fluorescent lamps but the type in general use now is the glow-switch.

A new type of starter having 4 contacts is now available for 65 and 100 watt lamps. This unit gives promise of more reliable starting and insures better lamp life than with the 2-contact starters. It requires a 4-contact socket which will accommodate either the 2 or 4-contact starters.

One manufacturer features a line of starters similar to those listed above except that they are designed to facilitate quicker restarting and to work satisfactorily on direct current.

Sockets to hold the starters are made in a number of styles. The most common type is one which connects to one of the lamp holders under one end of the lamp where it is readily accessible for replacement. The FS-2, FS-4 and FS-5 fit the same socket. The FS-6 fits the same socket as the FS-7. The FS-64 fits the same socket as the FS-74.

Included in the starter case is the bypass condenser used to minimize radio interference from the lamp as well as from the starter contacting.

Most stock fluorescent lamp fixtures available at the present time are furnished with the proper starter installed so that only when lighting effects using fluorescent lamps built into the architectural treatment of the interior are used will it be necessary for the designer to select the starter type and allow sufficient accessible space for its mounting. When conditions require that the control equipment be remotely located it will be found more satisfactory to mount the starters at their respective lamps and to locate the ballasts wherever convenient since the space required by the starters is not great and the wiring will be simplified by the procedure.

The glow-switch type starters consume no power while the lamps are operating and the thermal type, recommended for certain applications such as cold weather and direct current operation, consume a very small, usually negligible, amount of power.

Ballasts—The ballast, serving the second and third functional steps in the operation of the lamps as listed above, usually consists of a choke coil or a combination of a choke and condenser. Therefore, compared to the starter, the ballast is a relatively bulky and heavy piece of equipment. Many circuits, devices and compromises have been developed to minimize the inconveniences which the ballasts bring about but no encouraging results are evident yet. In fact, the large number of ballasts available to serve even the commonly used sizes of fluorescent lamps is confusing to the designer. Fortunately, nearly all stock fluorescent lamp fixtures are equipped with the proper ballasts to comply with electrical codes, utility company requirements and to serve the interests of the owner most economically. But when special equipment is designed, as is frequently the case in an architect's office, a working knowledge of ballast equipment and starters is required.

A two-lamp ballast should be used for each pair of same size fluorescent lamps which are always operated and located together—as in the same fixture or end to end in a cove. For single lamps removed from each other or lamps on separate switches, high power-factor single-lamp ballasts should be used. Without getting involved in a complicated discussion of what power-factor is, there is now no important disadvantage in using high power-factor equipment but there are many advantages.

Two-lamp ballasts consist essentially of two single-lamp ballasts in one housing and therefore the statement that each fluorescent lamp requires a separate ballast is not refuted. There is no saving in size or weight by this procedure but of considerable importance is the correction of low power-factor, the reduction in stroboscopic effect and a small saving in wattage lost in the ballast equipment.

Ballasts are made in various sizes of cross-section to permit their installation in wireways and fixtures.

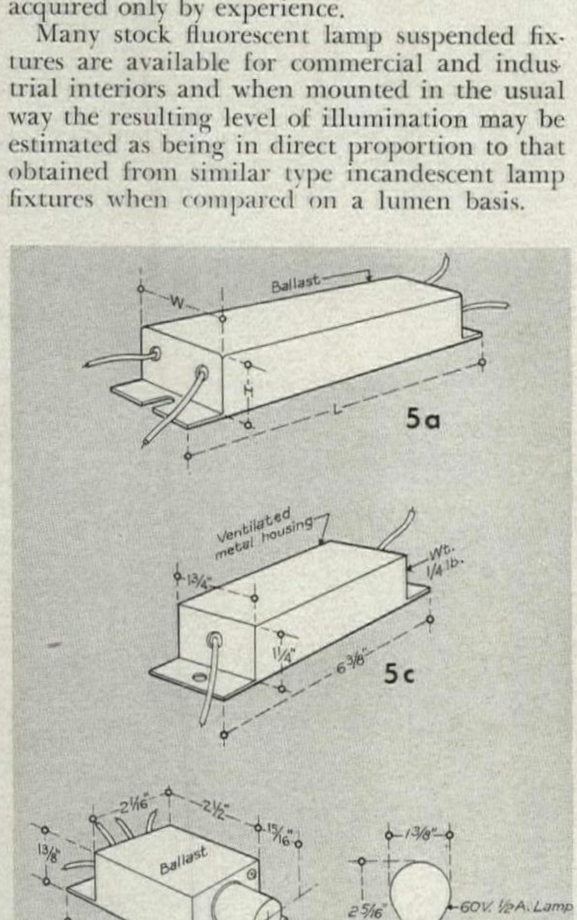
Lamp Holders—Two lamp holders, sometimes referred to as sockets, are required for each lamp. The small, compact lamp holders designed for restricted locations, as in showcases and small coves, will accommodate only the 1″ diameter lamps and the starter cannot be mounted under one end of the lamp. A lamp holder is available to permit mounting the starter at the end of the lamp or between lamps when they are used end to end. When using these compact lamp holders in a reflector of restricted section, finger holes in the reflector or special ejector type lamp holders must be employed for removing the lamps.

All lamp holders are designed so that the over-all length from the back of one lamp holder to the back of the other is equal to the nominal lamp length of 9″, 12″, 15″, 18″, 24″, 36″, 48″ or 60″. This spacing must be accurate to insure satisfactory mechanical and electrical connections.

FLUORESCENT TRENDS

Because fluorescent light sources are versatile media for producing architecturally appropriate effects, many installations are specially built to suit the conditions. The question that confronts the designer is how to calculate the number and size of lamps required. It should be obvious from the foregoing discussion that it is not an easy problem to increase or decrease the illumination once the equipment is installed since socket spacing and control equipment must be changed to change the wattage of lamps. Therefore, although the principles of lighting design remain unchanged, it is necessary to be more exact in the illumination calculations. Such accuracy, unfortunately, is acquired only by experience.

Many stock fluorescent lamp suspended fixtures are available for commercial and industrial interiors and when mounted in the usual way the resulting level of illumination may be estimated as being in direct proportion to that obtained from similar type incandescent lamp fixtures when compared on a lumen basis.



BALLAST EQUIPMENT. SEE SCHEDULE FOR DATA

The chart across-page illustrates most of the usual combinations of fluorescent lamps and the ratio to incandescent lamps.

Forty-watt white fluorescent lamps mounted end to end as in a cove are equivalent to, in generated light, 25 watt incandescent lamps on 6" centers, 40 watts on 11" centers, 50 watts on 15" centers or 60 watts on 19" centers. These figures are offered as a guide to the approximate amounts of illumination to be expected from fluorescent versus incandescent lighting when all other conditions are equal. Inasmuch as the other conditions may not be equal nor may it be desirable to create the same illumination, each lighting problem should be given individual attention.

The present trend in the use of lamp colors seems to indicate a preference for the 3500 degree white for stores, offices, and similar commercial interiors, the soft white for restaurants, theaters, meat cases, nightclubs and the daylight for industrial plants, some showcases and a few stores selling colored merchandise exclusively.

Taking advantage of the tubular form of the fluorescent light sources and their adaptability to higher levels of comfortable illumination there is developing a trend toward the use of continuous fixtures applied to or recessed flush in the ceiling. This method is particularly suited to combinations of fluorescent lighting and suspended acoustical ceilings.

BALLAST SCHEDULE

TWO-LAMP BALLASTS

For 110-120 volts, 60 cycles A.C. High power factor (95-100%)

Lamps	Approx. size inches	Approx. weight pounds	Approx. watts loss	Circuit diagram
Two 14 watt	See Fig. 5D	——	17	6a
Two 15 "	1¼ x 2¼ x 14¼	3½	9	6b
Two 20 "	1¼ x 2¼ x 14¼	3½	9	6b
Two 30 "	2½ x 3¼ x 9½	7	12½	6c
Two 30 "	1¼ x 2¼ x 23	7½	18	6c
Two 40 "	2½ x 3¼ x 9½	7	15½	6c
Two 40 "	1¼ x 2¼ x 23	7½	24½	6c
Two 65 "	2½ x 3¼ x 14¼	10¼	24	6b
Two 100 "	2½ x 3¼ x 19¼	14½	35	6c

SINGLE LAMP BALLASTS

For 110-120 volts, 60 cycles A.C. High power factor (90% or more)

Lamps	Approx. size inches	Approx. weight pounds	Approx. watts loss	Circuit diagram
One 15 watt	1¼ x 2¼ x 8¾	1½	4½	6d
One 20 "	1¼ x 2¼ x 8¾	1½	4½	6d
One 30 "	1¼ x 2¼ x 14¼	3½	11	6e
One 40 "	1¼ x 2¼ x 14¼	3½	11½	6e
One 65 "	2½ x 3¼ x 14¼	9½	24	6e
One 100 "	2½ x 3¼ x 14¼	10¼	24	6e

SINGLE LAMP BALLASTS

For 110-120 volts, 60 cycles A.C. Low power factor (50-60%)*

Lamps	Approx. size inches	Approx. weight pounds	Approx. watts loss	Circuit diagram
One 6 watt	See Fig. 5B	1	2	6f
One 8 "	1 1/16 x 1¾ x 4¼ See Fig. 5B	1	2.8	6f
One 15 "	1¼ x 1¾ x 4¼	¾	4½	6f
One 20 "	1¼ x 1¾ x 4¼	¾	4½	6f
One 30 "	1¼ x 2¼ x 8¾	2¼	8	6g
One 40 "	1¼ x 2¼ x 8¾	2¼	12	6g
One 65 "	1¼ x 2¼ x 14¼	3¾	15	6f

SINGLE LAMP BALLASTS

For 110-120 volts, Direct Current

Lamps	Ballast		Circuit diagram	Resistor			
	Approx. size inches	Approx. weight pounds		110 volts		120 volts	
				Ohms	Watts▲	Ohms	Watts▲
One 15 watt	1¼ x 1¾ x 7¼	1¼	6h	165	18	198	21
One 20 "	1¼ x 1¾ x 7¼	1¼	6h	112	14	144	17

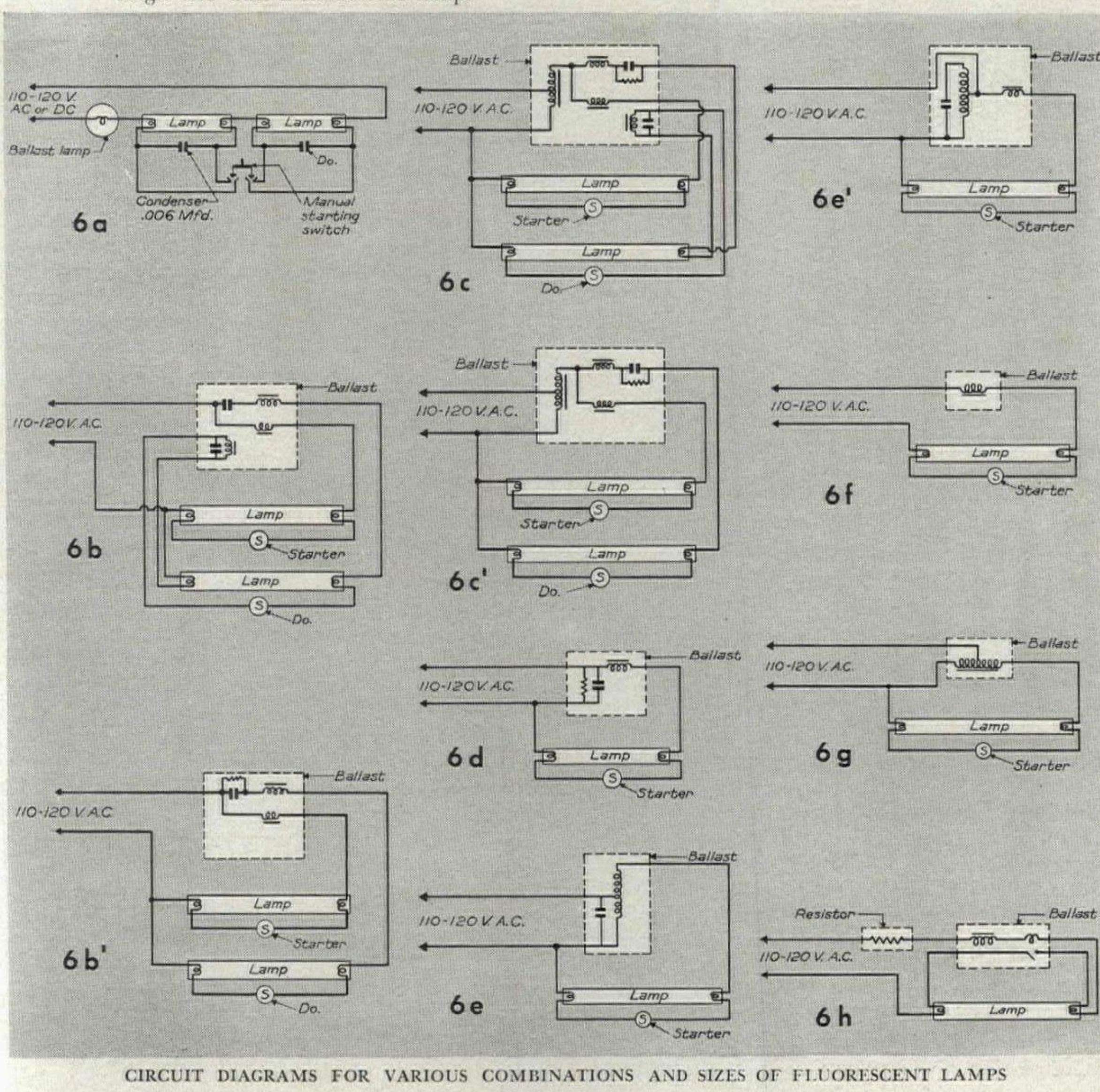
Ballasts are available for 50 cycle systems and for 199-216 and 220-250 volt circuits

* *Capacitors are available for correcting low power factor ballasts.* ▲ *Includes watts loss in ballast.*

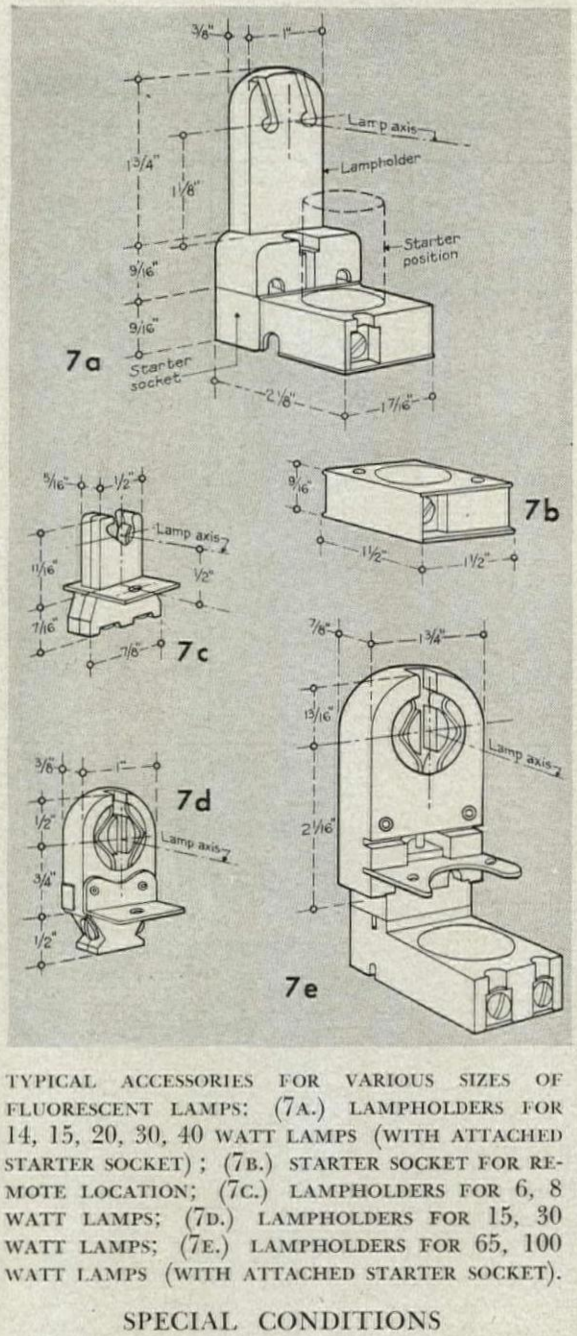
TABLE GIVING RATIO OF $\frac{\text{FLUORESCENT}}{\text{INCANDESCENT}}$ *on a Generated Light Basis*

White Fluorescent Lamp Wattage	Incandescent Lamp Wattage							
	40	60	75	100	150	200	300	500
1-15	125	71						
1-20	...	108	82					
2-15	...	141	106	73				
1-30	...	173	132	91				
3-15	...	...	160	110	67			
2-20	...	...	164	112	69			
1-40	...	...	...	131	81			
1-65	...	...	...	131	81			
4-15	...	...	...	146	90			
3-20	...	...	...	169	104	73		
2-30	...	...	...	181	112	78		
4-20	...	...	...	...	139	97	62	
2-40	...	...	...	...	162	113	72	
2-65	...	...	...	...	162	113	72	
1-100	...	...	...	...	162	113	72	
3-30	...	...	...	...	167	117	74	
3-40	...	...	...	...	...	170	108	63
3-65	...	...	...	...	...	170	108	63
2-100	...	...	...	...	...	...	145	84
4-40	...	...	...	...	...	...	145	84
4-65	...	...	...	...	...	...	145	84

Example: This table indicates that 4-20 watt white fluorescent lamp will generate 97% as much light as a single 200 watt incandescent lamp.



CIRCUIT DIAGRAMS FOR VARIOUS COMBINATIONS AND SIZES OF FLUORESCENT LAMPS



TYPICAL ACCESSORIES FOR VARIOUS SIZES OF FLUORESCENT LAMPS: (7A.) LAMPHOLDERS FOR 14, 15, 20, 30, 40 WATT LAMPS (WITH ATTACHED STARTER SOCKET); (7B.) STARTER SOCKET FOR REMOTE LOCATION; (7C.) LAMPHOLDERS FOR 6, 8 WATT LAMPS; (7D.) LAMPHOLDERS FOR 15, 30 WATT LAMPS; (7E.) LAMPHOLDERS FOR 65, 100 WATT LAMPS (WITH ATTACHED STARTER SOCKET).

SPECIAL CONDITIONS

If it happens that lighting is a major factor in a proposed "new and different" design, the architect may, after reading this discussion of the characteristics of fluorescent light sources, be confronted with a seemingly impossible problem brought about by some one of the several limitations of these lamps. In fact, he may be advised by "authorities" that it just can't be done with fluorescent lamps. Such a statement should not be accepted without investigation because there are very few conditions that cannot somehow be solved. A competent lighting consultant, experienced in the theory of fluorescent lamp circuits, one who has an electrical engineering background, can offer the solution to such "impossible" conditions as the complete elimination of stroboscopic effect, operation of all sizes of lamps and fluorescent tubing on direct current, operation on any frequency or voltage, including private farm lighting systems, yachts, trailers, etc., operation on dimmer and in cold weather, elimination of radio interference, operation of several lamps on a single control, several lamps on a single starter or even no starter, immediate starting without the usual preheating period, perfectly quiet ballast equipment. In fact, almost any condition has a solution. It should not be inferred that these problems can be solved without sacrificing something such as lamp life, efficiency or a moderate initial cost for equipment.

The following suggestions will emphasize in summary style some of the advantages and limitations of the fluorescent light sources:

DON'T connect, even momentarily, a fluorescent lamp with alternating current equipment to a direct current supply—the lamp or ballast will burn out.

Even though a fluorescent lamp is more than twice as efficient as an incandescent lamp, *DON'T* expect the electric bill to be cut in half. Usually, lighting represents only a part of the load connected to the meter, motors, heaters, business machines, refrigerators, radios, oil-burners, elevators, appliances, etc., also being measured for billing by the same meter. Furthermore when the power consumed is decreased substantially the power rate will increase slightly which tends to partially offset a reduction in the billing.

DO provide adequate mounting facilities. Fluorescent lamp fixtures are heavy, weighing as much as 45 pounds for a unit holding four 40 watt lamps.

DO check city ordinances and electrical codes regarding fluorescent lamps and particularly fluorescent tubing.

DO specify high power-factor equipment. Many states and utility companies require it.

DON'T try to concentrate light from fluorescent lamps or tubing as for instance in show window or spot lighting service. Compared to incandescent lamp practice only moderate concentration can be achieved.

DO include the wattage consumed by the control equipment when calculating the connected load.

DO select interior color schemes under the color of fluorescent lamps to be used. Generally, choose warm colors but avoid strong yellow or yellow-green.

DO inspect and let your staff inspect as many examples as possible of fluorescent lighting in colorful interiors.

DON'T use fluorescent lamps which are uncorrected for flicker in areas where rotating or moving mechanisms are an important factor. Experiment first.

DON'T measure the illumination level until the end of 100 hours of operation. A drop of around 10% will occur during this period of stabilization.

DO apply the proper correction factors to the illumination readings when measuring fluorescent lighting.

KEEP posted on the latest developments.

The author wishes to express his appreciation to the General Electric Company, the Westinghouse Lamp Division, the Hygrade Sylvania Company, and the Claude Neon Company for their cooperation in supplying data on their products.