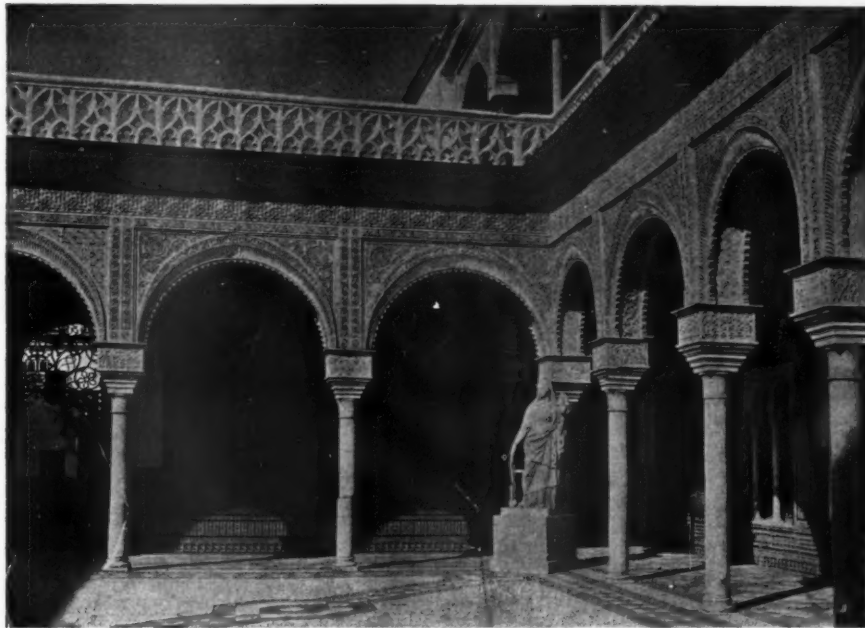


WILMINGTON
INSTITUTE

FEB 10 1919

FREE LIBRARY

The AMERICAN ARCHITECT



PATIO, CASE DE PILATOS, SEVILLE, SPAIN

PUBLISHED WEDNESDAYS IN NEW YORK—FOUNDED 1876
VOLUME CXV FEBRUARY 5, 1919 NUMBER 2250

Entered as second class matter January 6, 1909, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Publication office, 243 West Thirty-ninth Street, New York, N. Y. Subscription price in the United States and Possessions, \$10.

RAYMOND

It is as though a searchlight played upon every step in the making of a Raymond Concrete Pile, so free from doubt does this method render perfect concrete pile construction. An expanded core or mandrel is encased in a spirally reinforced steel shell.

The combination of core and shell is driven to proper refusal. *You can see it.*

The core is collapsed and withdrawn, leaving the shell in the ground. *You can inspect the shell interior.*

The shell is then filled with concrete. The shell remains in the ground. Simple and CERTAIN isn't it?



A Form for
Every Pile

A Pile for
Every Purpose

Raymond Concrete Pile Company

New York: 140 Cedar Street

Chicago: 111 West Monroe Street

Montreal, Canada: Raymond Concrete Pile Co., Ltd.

Branches in Principal Cities



BRAMANTE DA VRBINO ARCHITETTO

J. Vafari T. II.

J. Batt. Lucchi Sc.

THE AMERICAN ARCHITECT

THE AMERICAN ARCHITECT

VOL. CXV

WEDNESDAY, FEBRUARY 5, 1919

NUMBER 2250



House of Allan S. Lehman

Tarrytown-on-the-Hudson, New York

JOHN RUSSELL POPE, *Architect*

JUST what service means in the correct practice of architecture can in no better way be demonstrated than by reference to a work in architecture such as Elmbrook, the house of Allan S. Lehman, at Tarrytown, N. Y., designed by John Russell Pope, and fully illustrated in this issue.

Will a man be known as any less of an artist because, having beautifully designed a stately country house with all its furnishings and many accessories, he has also, through a large and efficient organization of which he is the dominating spirit, brought to successful completion every detail? It is

with considerable satisfaction that THE AMERICAN ARCHITECT has received permission to present this example of domestic architecture to its readers.

The accusation which has been made and patiently borne, that in claiming architecture is a business the profession has been denied the right to the title of artist, could be no better refuted than by reference to Mr. Pope's work. The contention recently stated in an architectural journal that architects could with propriety ignore most of the often monotonous and commonplace phases of the superintendence of their work, contenting themselves with the perfection of

THE AMERICAN ARCHITECT

the design and plan, does not hold good. Taking a job such as this dignified example of the best Tudor traditions, let us analyze just what has taken place—not from a purely suppositional viewpoint, but one that is based on actual investigation. First a perfectly equipped organization takes the client in hand at a time when the only well-defined purpose he has in mind is that he wants to build a house on which he will only expend a determined sum of money. There is a certain mental equipment that the archi-

bies, his temperamental habits, even his daily occupation must be considered.

All these things having been fully learned, then the architect becomes an artist, and with his client as the model, he designs a house to fit him. The artist-architect is now fully in evidence. At last the final conference has been held, the last major change made, and the work goes forward.

Just here enters the business man. Certainly it is a business to co-ordinate all the trades and crafts



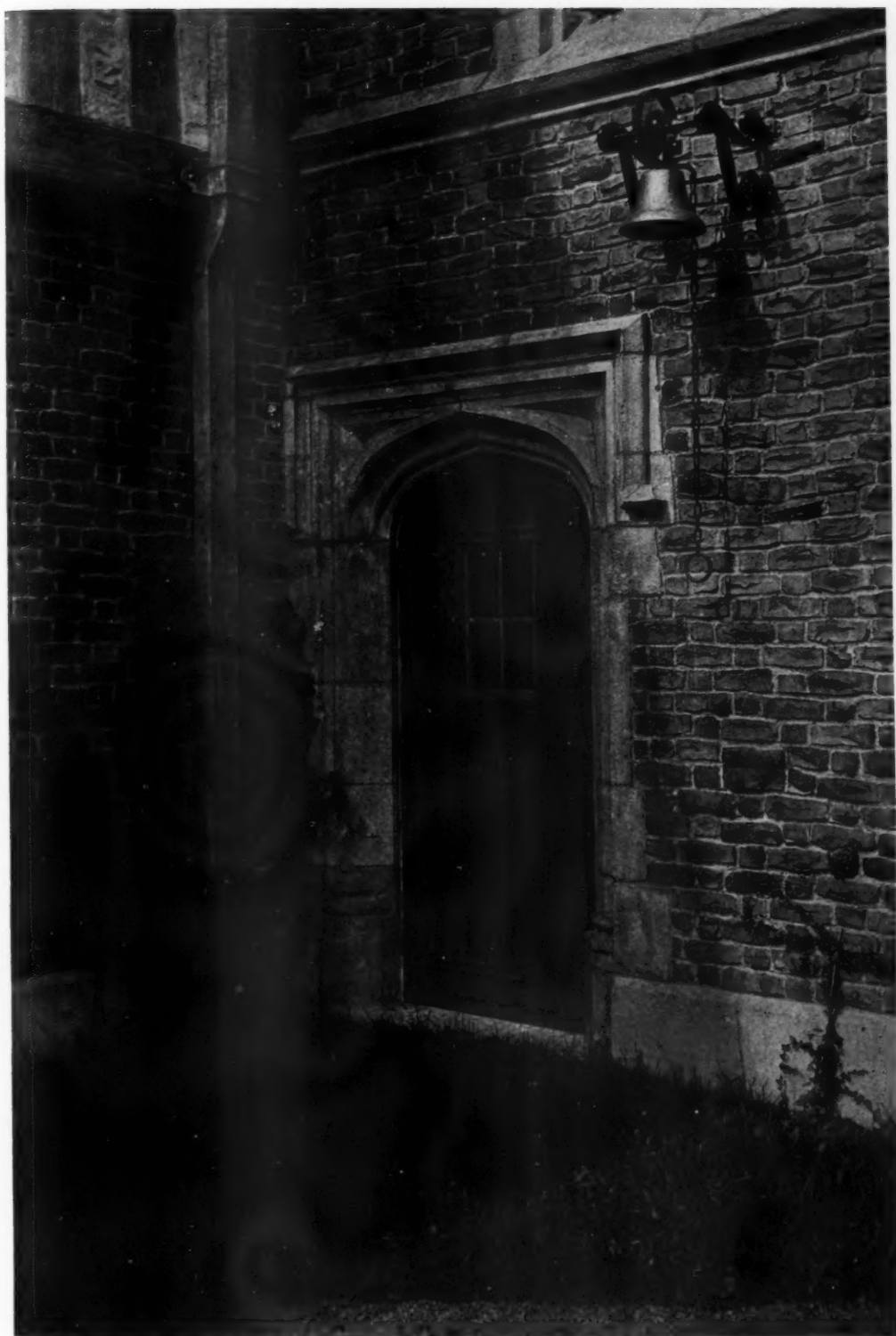
PLOT PLAN

tect must possess in a case like the present one, where an expenditure bordering on a quarter of a million dollars will represent the total investment.

Before he places in evidence his ability as an artist he must prove his competency as a student of character. The architect must study his client in the same way that he will next have to study his plan. Ready-made houses, like ready-made clothes, seldom perfectly fit. So, then, the architect must study all the "mental contours" of his client so as to give him a most accurate fit. His fads and hob-

bies, his temperamental habits, even his daily occupation must be considered. Let no one contend that at this point the architect may turn over to a well-drilled organization all the many and complex things, any one of which means, as it is handled, either waste or saving to his client. He may, of course, delegate to others certain details and routine, but he must be constantly in touch with every phase, quick to detect error of business acumen, in order to direct and control every phase of the work.

Personally will he give service, standing before



STAIRHALL ENTRANCE

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK
JOHN RUSSELL POPE, ARCHITECT

THE AMERICAN ARCHITECT

the structure at each critical period. Visualizing the thing as he created it in his mind's eye, he makes it grow in harmony with his artistic perception. These things can, of course, be turned completed over subordinates. When they are, the difference is as between the *average* house and one like this.

Clients differ. Some will not quietly stand hitched. When the building is completed, they may therefore discharge their architect and deliberately proceed to mar his work by atrocious decoration and poorly selected furniture. But as we had occa-

sion, to divorce his artistic activities from his well-trained business abilities. Now, knowing as in this instance, that a house has been built within the limits of the original appropriation, here again the business man appears. All the wonderful refinement which has been displayed in this building, all the many contingencies which may at any time appear, have all been foreseen and met. This is simply the practice of architecture in this twentieth century. Can it be successfully denied?

Perhaps some will point to an organization of skilled assistants of keen estimators and specifica-



SOUTHWEST VIEW

sion to remark when we previously illustrated a house by Mr. Pope, he is able so to impress upon his client the need of consistency to the last detail, that in this house, as in many others, he has selected or designed every important element that constitutes its interior fitting.

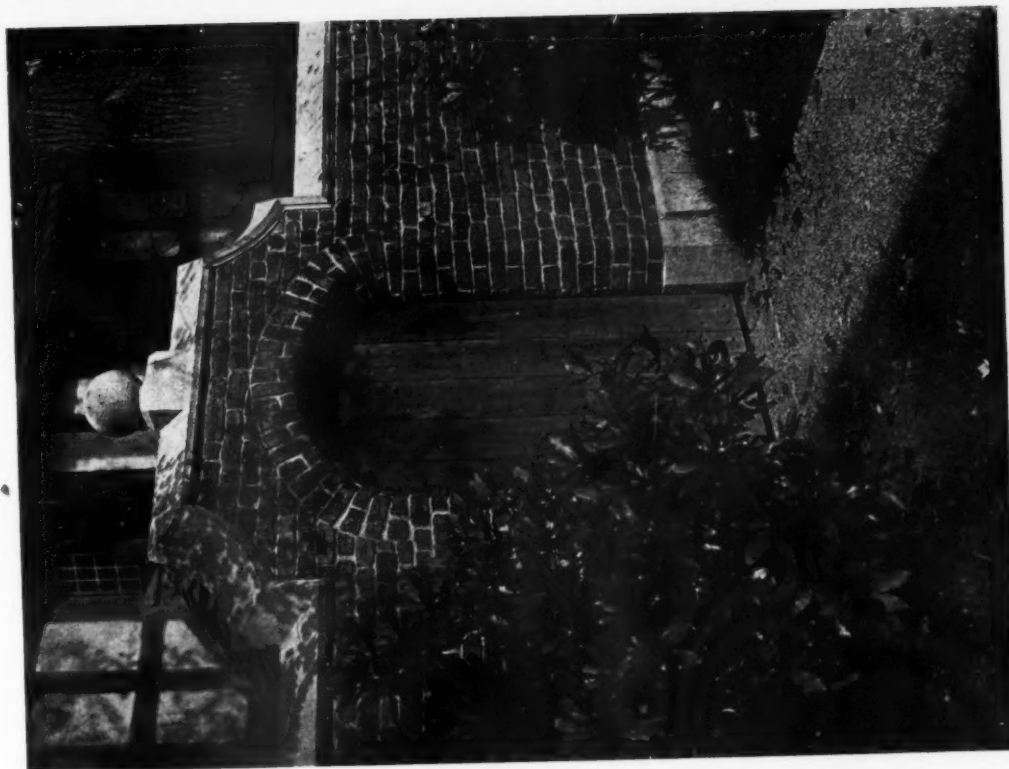
Here we have another phase of the architect's many-sided activities, and here again, starting with the most correctly trained artistic ideals, he becomes the man of business. In fact, it does not seem possible in following an architect in the progress of an important job from its inception to its comple-

tion writers, of a routine business organization that is a model. All of these things are conceded, but must it not also be conceded that they have been assembled, organized, drilled and perfected in every detail by the controlling mind of the artist whose work they are carrying forward, by the architect who of necessity is a business man and the head of an organization whose watchword is Service?

These things, it would seem, can be logically claimed as the correct attitude of the modern architect toward his work. If it is necessary, as it seems to be to many, to assume a "pose" toward profes-



MAIN ENTRANCE



SERVICE GATE

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK
JOHN RUSSELL POPE, ARCHITECT

THE AMERICAN ARCHITECT

sional practice, how much more to the material advantage will it be, not omitting the result toward one's own self-respect, to affect a pose of absolute practical competency, than that of an ultra aestheticism where every studio gesture and affected mannerism suggests a cloak to hide the lack of ability.

The end crowns the work. The completed house, as herein illustrated, needs little, if any, description to enable the technical observer to realize its dominating style, its features of design, or the many

ture and successful planning. Can any profession seek a higher reward?

Less than a quarter of a century ago the houses of our rich men shouted aloud in the garishness of their new paint and gilding, inside and out, to every beholder. All of this is now changed. Here we have a modern house with all the outward aspect of a venerable, well-spent number of years. It commands respect, and to every intelligent onlooker there is a deep-seated admiration for a result



LIBRARY

attractive accessories that have been selected and installed by the architect. This house is one of a constantly increasing number which are being erected by men of wealth, wherein they may find opportunities far from the scenes of commercial activity for domestic relaxation and the pleasing company of chosen associates. Amidst such surroundings, shorn by the artistic skill of the architect of all the elements of the vulgarity of recent construction, a man may carry on his life, rear his children and find growing contentment. And all of these things are the direct result of good architect-

that, founded on the most thoroughly trained artistic knowledge, has, by a perfectly co-ordinated organization, created a thing of beauty and a joy as long as it shall exist.

To the technical man there is a certain dramatic appeal to this house, and it lies in the selection of the brick, stone and slate used, and its treatment to simulate the weathering effects of time. These effects are accented by the grey timbered gables, the quaintly patterned brick with its wonderful textures and the towering chimneys. Naturally a structure so correctly designed in form would also have

THE AMERICAN ARCHITECT



GREAT HALL

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK
JOHN RUSSELL POPE, ARCHITECT

THE AMERICAN ARCHITECT

equally well placed color. This effect cannot, of course, be shown in the illustration so as to give the reader an approximate idea; it may be set down that the color ranges from a greyed burnt Sienna and brown-grey timbering to a yellow-grey stone with the added effect of warm-toned stucco. The advantage that has been taken of a most favorable natural setting is apparent. The location on the site of timber of many years' growth has contributed very largely to the effect of age in the general ensemble.

The plan is so simple and direct as to require but brief allusion. Following the precedent of the Tudor mansion, the Great Hall is the point or place about which are grouped the various rooms which constitute the entire plan. The early usage of the Great Hall as a place of circulation and assembly is retained, and it is here that centers the domestic life of the household. The magnificent proportions of this hall are well shown in the illustrations, as is also the Great



BOUDOIR



DINING ROOM



DINING ROOM
HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK
JOHN RUSSELL POPE, ARCHITECT

THE AMERICAN ARCHITECT

Hall window, which faces the west. This window is fourteen feet wide and extends to nineteen feet above the floor. Opposite the window, and in what is in a certain sense an angle-nook, is the large stone mantelpiece.

The living room, next to the hall in importance, is marked by austere simplicity and the refinement of good taste. The stair hall, extending through two stories, is open and well lighted. It conserves all the dignities of the major subdivisions of the plan and has been so placed as to solve successfully

the problems in planning on the second floor that a feature of this sort always presents.

It is scarcely necessary to refer further in description to a house that is herein so fully illustrated. It undoubtedly presents in all its various aspects the most valuable opportunity to study the evolution in this country of a dignified and fitting country residence of large cost, and at the same time it affords an opportunity to observe by a concrete example the many-sided aspects of successful modern architectural practice.



DETAIL OF GABLE OVER ENTRANCE

THE AMERICAN ARCHITECT

THE AMERICAN ARCHITECT

Founded 1876

PUBLISHED EVERY WEDNESDAY BY

THE ARCHITECTURAL AND BUILDING
PRESS, INC.

No. 243 West Thirty-ninth Street, New York

E. J. ROSENCRANS, PRESIDENT AND TREASURER

WILLARD C. HOWE, VICE-PRESIDENT

WILLIAM H. CROCKER, Editor

ARTHUR T. NORTH, Engineering Editor

Subscriptions in the United States and Possessions,
Mexico and Cuba, TEN DOLLARS. Other Countries,
TWELVE DOLLARS.

SINGLE COPIES (Regular Issue) 25 CENTS

CHICAGO OFFICE, Mallery Building

PAGE A. ROBINSON, Western Manager

ST. LOUIS OFFICE, Wright Building

CLEVELAND OFFICE, Guardian Building

SAN FRANCISCO OFFICE, 320 Market Street

Owned by United Publishers Corporation—H. M. Swetland, President;
Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer;
A. C. Pearson, Secretary. Entered as second-class matter January
6, 1909, at the Post Office at New York, New York, under the Act of
March 3, 1879.

VOL. CXV FEBRUARY 5, 1919 No. 2250

Psychological Test in Student Examinations

"H^AVING conquered the army," says the New York Sun, "the psychologist now storms the University." This remark is suggested by the statement from the authorities of Columbia University that it believes there is large waste in the use of its expensive plant and operating force on great numbers of students who are incapable of profiting seriously by higher education.

It will therefore be the policy of this University to weed out its students by a psychological and physiological inquiry. The customary entrance examinations will not be dispensed with but candidates for admission who are able to present the usual certificates that they have done the required preliminary work may elect to take the new test instead of the examinations. "In this action," comments the New York Times, "there seems to lie a weakness, for the student of subnormal mentality who might be coached to pass the entrance examinations but would be of no use thereafter, is likely to elect the test which he can pass by cramming rather than the psychological inquiry which would reveal his unfitness. But whatever the defects of the plan, its

very adoption is an indication of the tendency of educational authorities to revolt at the hampering of able and willing students, and the waste of the teacher's time, which comes from the prevalence in past years of the notion that college was a convenient, if temporary, asylum for harmless morons."

This blunt statement of a past condition accents the necessity for a reform in the selection or rejection of students who apply in the future for admission to all of our colleges and universities. It is not fair to that class of able men who conscientiously pursue work in our universities that they should be hampered in their progress by students whose right to enter classes may be very properly questioned.

There is also danger that in the effort to secure just the type of student who will be best fitted to receive the benefits of university courses, the system may be carried by too academic measures to a point where there would be set up an aristocracy of education. If the college is to be regarded as of service to the nation, it becomes a debatable question whether such service will best be rendered by the intensive cultivation of a carefully selected few or by the present open method that admits without question any candidate who may successfully qualify for admission.

The point is well presented in the article in the *Times* above referred to, wherein it is stated:

"In the newer parts of the country the universities, and even more, the small colleges, perform a very considerable service by their effect upon men who may never graduate, but who still leave college better equipped for life than when they entered. Students from rural or semi-rural environment who leave college without a degree but with better standards of taste or deportment, with business experience such as might come from managing the football team or the glee club, with ability to talk, to 'mix,' to reason on problems for practical decision—even with such minor bits of knowledge as what fork to use—they may not have got all that college has to offer, but they have got a good deal that will be useful in their future life."

A very valuable service that could be given by a university psychologically administered as is proposed at Columbia, would be in the determination along what lines each student might most advantageously pursue his studies.

The present method wherein the student may personally select the course of study he desires to follow, leads to many errors. The world is full today of these "misfits" and no profession suffers more from their presence than does architecture.

If the student cannot be denied a college training once he has passed the necessary entrance examinations, he might be denied the privilege of self-determination as to the exact course he will pursue. He should go in right and continue right, else he should not go in at all.

American Academy of Arts and Letters, and the Matter of Memorials

IT is reassuring to learn that the American Academy of Arts and Letters, of which the venerable William Dean Howells is president, has issued a public statement and appeal that all memorials to the valor of American soldiers, sailors and marines in the great war be of the highest artistic merit.

Action of this nature by a leading art society has become imperative, for, judging by the hysterical and ill-advised letters published in the daily press, there is grave danger of the commission of many artistic errors. In its statement the Academy endeavors to impress the fact that these memorials should express the best in art that we have in this country, and that the best is none too good for even the smallest village. Reference is further made by the Academy to the National Commission of Fine Arts created by act of Congress, and the admirable effect that this commission has had upon the character of the national memorials.

Similar commissions in states and municipalities have been doing good work, but it is necessary that the supervision of the memorials to be erected everywhere be undertaken by equally artistically competent authority.

THE suggestion that trees when well planted would serve as fitting memorials in small communities where the question of expense must be carefully considered, is one to be highly commended.

A cluster of oaks or elms, surrounded by a well-designed fence with stone seats and appropriate tablets would beautifully commemorate the valor of a town's heroes. It would be impossible in the future to divert the significance of such a memorial, and the trees would necessarily receive the care that would result in their well developed growth.

The Washington Elm, on Cambridge Common, is an example of what the tree as a memorial means. This historic spot, marking the place where Washington assumed command of the American Colonial Army, is visited annually by thousands of people, and as a memorial to a great American is no less im-

pressive than the many hundreds throughout the country, erected at great expense, in honor of our first president and distinguished soldier.

A Movement to License the Engineering Profession

AT the recent meeting of the Ohio Engineering Society held in Columbus, the principle of licensing engineers was approved by a unanimous vote and a plan outlined for a study of the subject by all engineering organizations in the State of Ohio, in order that a generally acceptable bill might be drafted. This action on the part of Ohio engineers was taken as the result of an address by Mr. C. E. Drayer, secretary of the American Association of Engineers.

There is undoubtedly a necessity for the licensing of the engineering professions for the reasons that it would provide additional safety to the general public, that it would insure an increased efficiency and thus would effect a very considerable saving.

An interesting feature of Mr. Drayer's remarks before the meeting was his insistence that any licensing law should not only include civil engineers and surveyors, but all branches of the engineering profession, civil, mechanical, electrical, and mining. This inclusion of all branches would seem to be logical, as the line dividing them in almost every phase of professional work is more imaginary than real.

Reasoning from analogy, one may ask the proponents of licensing all branches of the profession, why are not doctors examined only on the basis of the branch of the profession they practice instead of in medicine and anatomy, or why are not lawyers who will practice corporation law alone examined only in that branch instead of all the principles of the practice of law? It is but common sense to urge the examination of all engineers in the fundamental elements common to all branches particularly with reference to actual practice. This covering of the entire profession would very much simplify the drafting of a law that would receive general acceptance. In any event, the movement is one of particular importance and its progress will be watched with considerable interest not only by engineers but by architects as well.



Criticism and Comment

Federating State Societies

The Editors, THE AMERICAN ARCHITECT:

Your editorial on State Societies in the issue of January 8 reminds me of an altogether unintentional remissness on my part toward certain communications which have come to me during this past season from your sanctum. These letters, bearing upon architectural practice, possible post-war conditions surrounding the building industry, and certain internal policies of your own, came to me while my mind was engaged on problems as remote as possible from the contemplation of such subjects.

For six months beginning in May, 1918, I was engaged as "Assistant Examiner" for the District of the Great Lakes in smoothing labor conditions in the shipyards and in interpreting and administering the award of "The United States Shipbuilding Labor Adjustment Board." You may easily imagine that this strenuous work, involving travel, conferences and judicial hearings, left little time or inclination for architecture, at that time a dormant issue to which I am but now free to turn. Of one thing I have been certain, and of which my recent experience has made me more certain: that the war has not changed human nature; certainly not in this country, where the lessons have been but superficially impressed upon us. There will still be ethical and unethical, dignified and undignified, practitioners in all the professions, including architecture. The nature of democracy will continue slowly and painfully to reveal itself, and with that revelation will come a fuller understanding of the value and necessity of high leadership; an appreciation of the function of leadership in leavening the mass. As I review the immediate past it seems to me that there has been present too potent an element of hysteria and confusion; hysteria as to the outcome of conditions, confusion as to leadership and the mass. Personally, though, I refuse to be one of the mass, that is, to sink my ideals to the level of the mass; I am content to let the mass move in its own way, trusting that sooner or later it will yield to the influence of high leadership. As one of the paths toward the higher plane, I regard State Societies of professional bodies; and as ministering to the general unification of ideals I welcome an affiliation of such societies.

But to be specific, when all has been accomplished in the way of forming and amalgamating State So-

cieties of Architects, there will always be an idealism a little in advance; there will always be a need of the leader, the one to whom all must look for the expression and interpretation of the finer professionalism. The American Institute of Architects holds that place to-day and will continue to hold it if it does not yield to clamor from without and debasing elements within. An amalgamation of State Societies has its place and the Institute has its, and the place of the Institute is that of professional leadership which can be abandoned only at the expense of the highest good. It is only as a moralist that I am concerned with the ethics and antics of architectural practitioners outside the Institute. They will "compete" all they please and as they please; they will "advertise" all they please and as they please; they will many of them "graft" all they can, but let them not force the Institute to formulate a code of their unprofessionalism.

The Institute has never directly interfered with the outsider's practice, has never assumed to dictate to the outsider or to those who employ him; and if the outsider thinks it has it is but the stirring of his own guilty conscience. If the Institute has any standing before the public and in the profession, it is because a loyal, far-sighted, ethical body of men have sought to uphold its standard—to set its standard—and the public and the profession recognize the validity of that standard, whether they follow it or not. Let the State Societies organize and let the Institute join in the good work, not as a camp follower, but as a leader; not lowering its own standard, but helping to raise the standard of the others. Let not the Institute, nor any organization of architects outside, conceive that it is its function to build up the profession as a profession at the expense of the public. Let architects recognize the value and service of engineers and contractors and their rights and obligations, and differentiate only as to how far the architect may be of higher service and fulfill deeper obligations. In the end the differentiation will come from the outside; for eventually an enlightened public—enlightened by high leadership—will determine who shall build its buildings and furnish the material covering and expression of its social and industrial spirit. That leadership today, in the elements of culture, ethics, force and economic penetration and spiritual illumination, will fall to the architect—naturally to the Institute as fostering the architect's ideals—but the architect should make good, demonstrate his

THE AMERICAN ARCHITECT

capacity for leadership, and cease the whinings in the architectural press which of late have arisen almost as a chorus.

IRVING K. POND.

Chicago, Ill.

The Editors, THE AMERICAN ARCHITECT:

The articles by Mr. Daniel Paul Higgins in the Jan. 1 and Jan. 8 issues on Architectural Office Organization indicate that Mr. Higgins has no place for the Quantity Surveyor, although he recognizes that the Quantity Survey methods followed in England do protect a building owner's financial interest. This is necessary there, Mr. Higgins would seem to have us believe, because of the English architect's lack of structural or business knowledge.

I am not competent to draw comparisons between the architects of various countries, but I know that the architects of England and other European countries who use the Quantity Survey methods do thereby exhibit sound business sense and appreciation of the interests of the building public. They use methods to keep down cost, to supply a basis upon which true competition can flourish, as compared with the speculative bidding in this country, and thereby protect both the owner and contractor by a contract based on known requirements.

Mr. Higgins approves of efficient methods, but some prejudice apparently founded on fear that Quantity Surveyors would take away some of the architect's prestige or dignity obscures for him the fact that the Quantity System is the most efficient way of doing one of the necessary parts of the routine work of a building project. Speaking for my company as representing American Quantity Surveyors, we do not seek any of the architect's prerogatives, either architectural or engineering.

A Quantity Surveyor is fundamentally a measurer or computer of quantities. Whatever else he represents to individual architects is only incidental to that function. When the Quantity Surveyor becomes an organization of specialized experts, it usually does suggest matters in the course of its work by queries as to structural or other details which an architect will wish to consider or even incorporate in his drawings and specifications. The analysis such an organization makes of the drawings and specifications to determine the architect's intent is valuable to the best architect and a great assistance to a novice.

To quote from Mr. Higgins' article, "in these days of business efficiency, what is not good busi-

ness for the owner certainly in the end will not be good business for the architect." And again, "to do a deed with maximum intelligence using the most highly developed instrumentality possible is efficiency."

The above quotations are strong arguments for the Quantity System.

It is not good business or efficiency to waste money, but it is variously estimated that from 3 to 7 per cent of the cost of buildings is wasted in payment of unnecessary expense in quantity estimating. Applied to the country at large, this means a waste of from fifty to one hundred million dollars yearly. It comes about through the cumulative estimating expense that contractors carry. On an average, contractors estimate fifteen times as many jobs as they win. Therefore, from the money a contractor receives for any job, he pays for estimating on fifteen jobs that he bid on and lost. This necessarily increases the cost of buildings. Another way to appreciate this wasted effort is by considering the multiplicity of quantities prepared for a single job. For example, say ten general contractors bid. They make ten separate lists of quantities. For the sub-trades, about twenty in number, each general contractor will get say ten bids each. That makes 200 sets of quantities by sub-contractors to a single general contractor. For the ten general contractors, this might demand the preparation of 2000 separate sets of quantities by sub-contractors. Of course, some sub-contractors will make bids to all the general contractors. Allowing for this, it seems conservative to say that on a good-sized job at least 500 separate quantity estimates will be made.

The Quantity System corrects this condition. It provides that the necessary quantities for use as a basis for bids shall be determined accurately by a responsible firm composed of specialists in all trades and distributed without charge to all contractors asked to bid. Instead of multiplying the labor of quantity preparation, it is done once only and made available to all interested parties.

I have only tried to allay any fear among architects as to the purposes and aims of Quantity Surveyors and to point out that it is in line with good business and efforts to increase efficiency. There is much besides to be said in favor of the Quantity System which should suggest itself to any thinking man.

WILLIAM GRAVES SMITH,
President, The Quantity Survey Co.
New York.

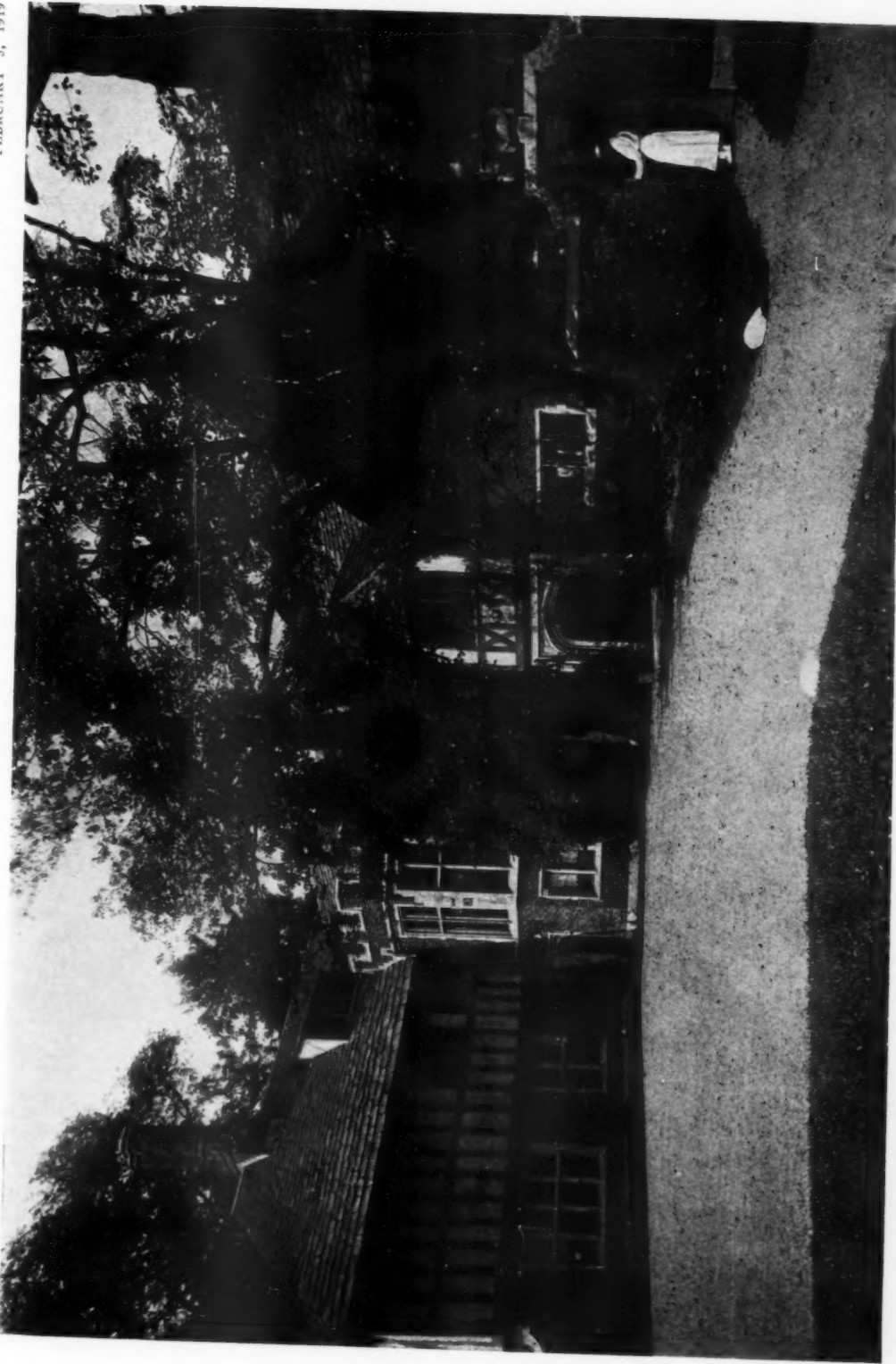


PLATE 42

SOUTHWEST VIEW

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

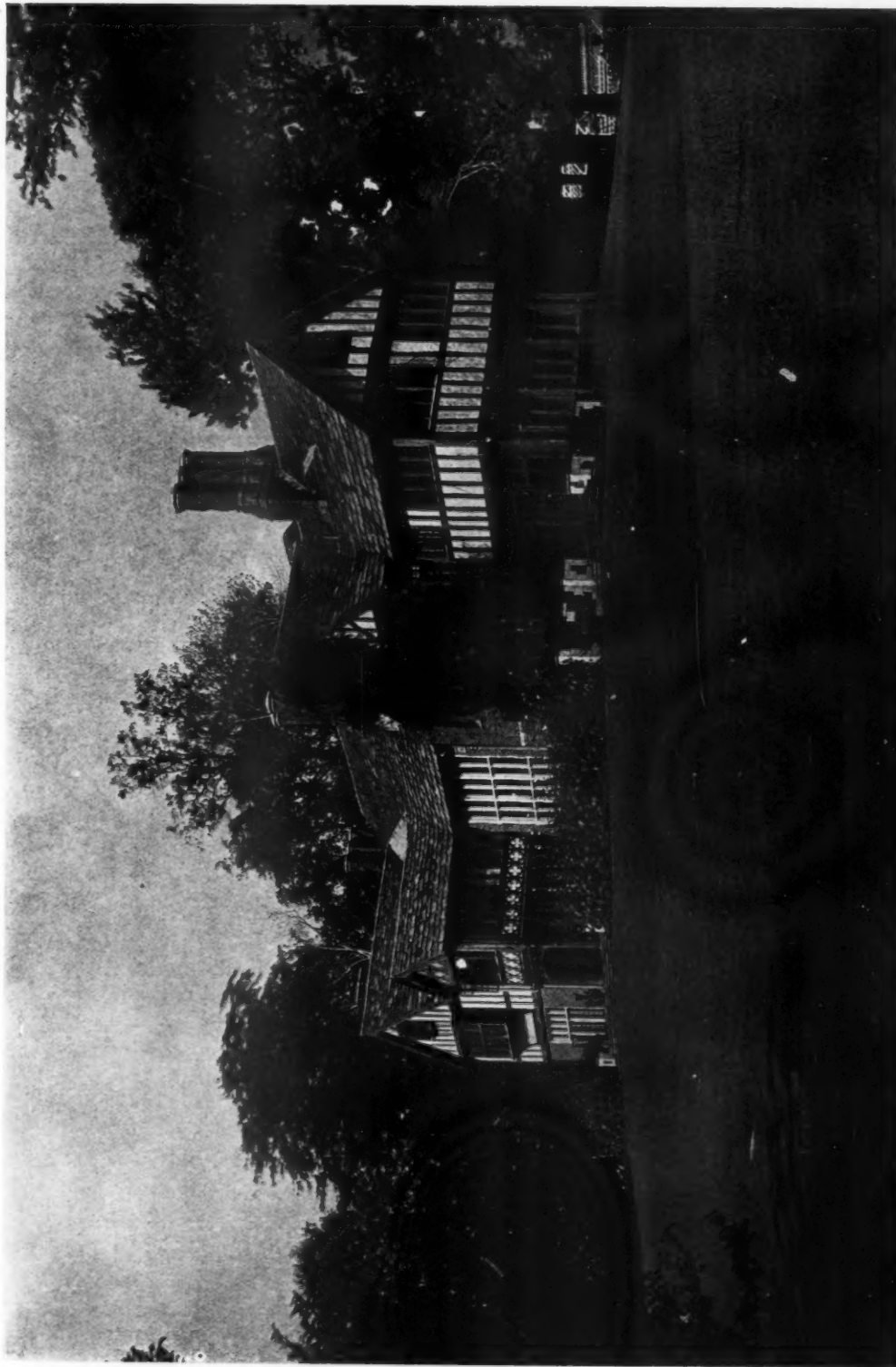


PLATE 43

NORTHEAST VIEW

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

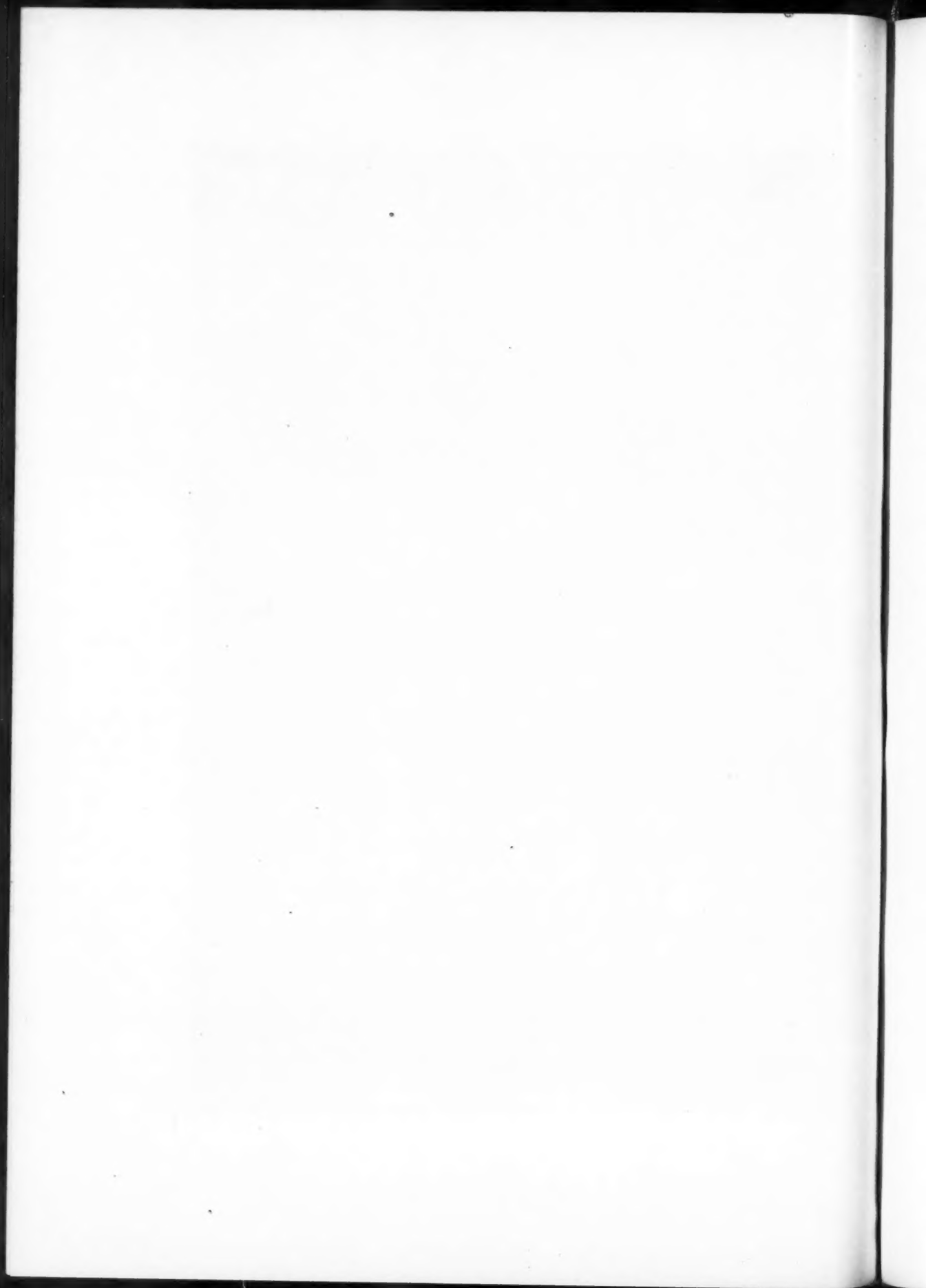


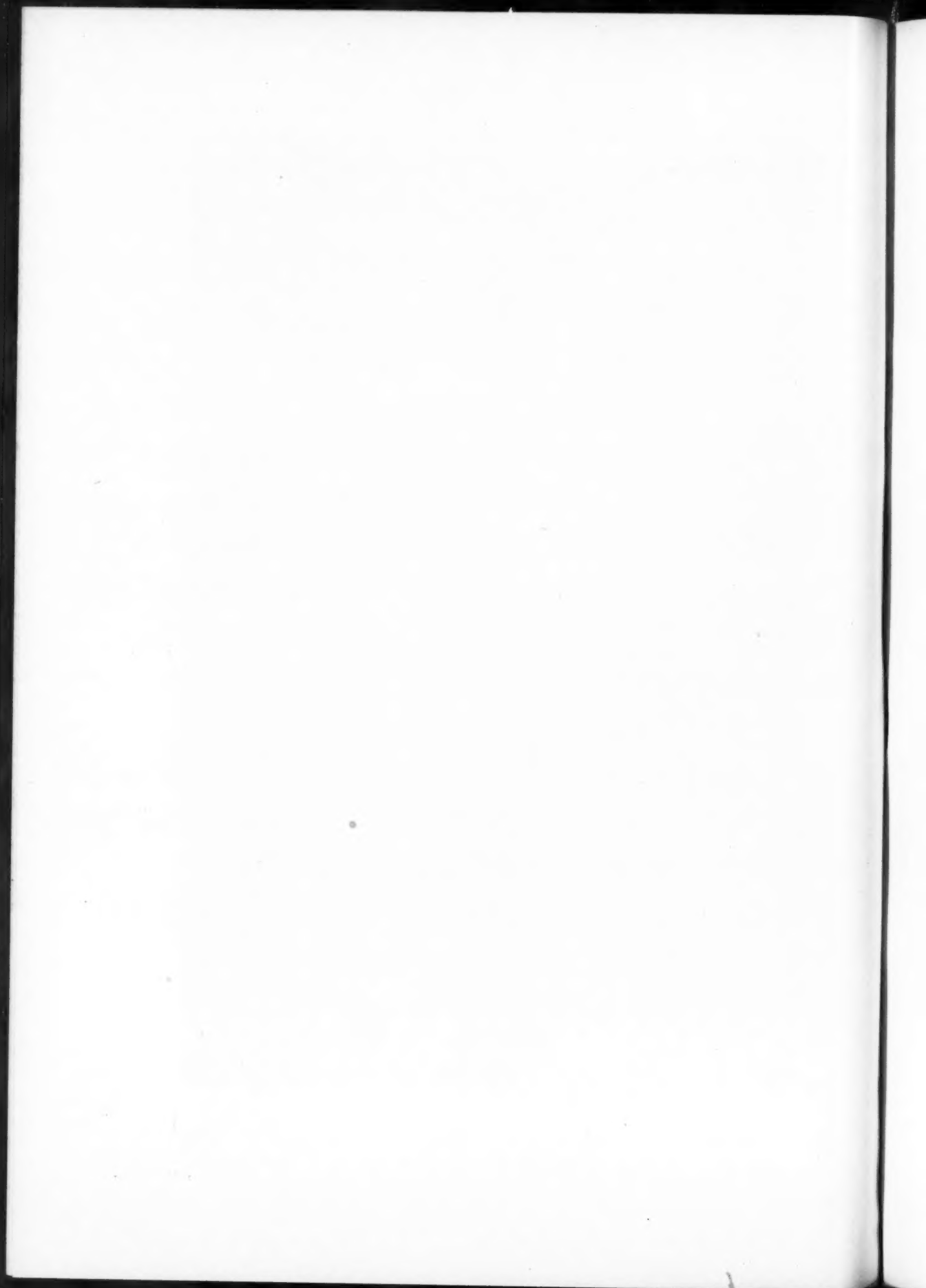


PLATE 44

MAIN ENTRANCE

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT



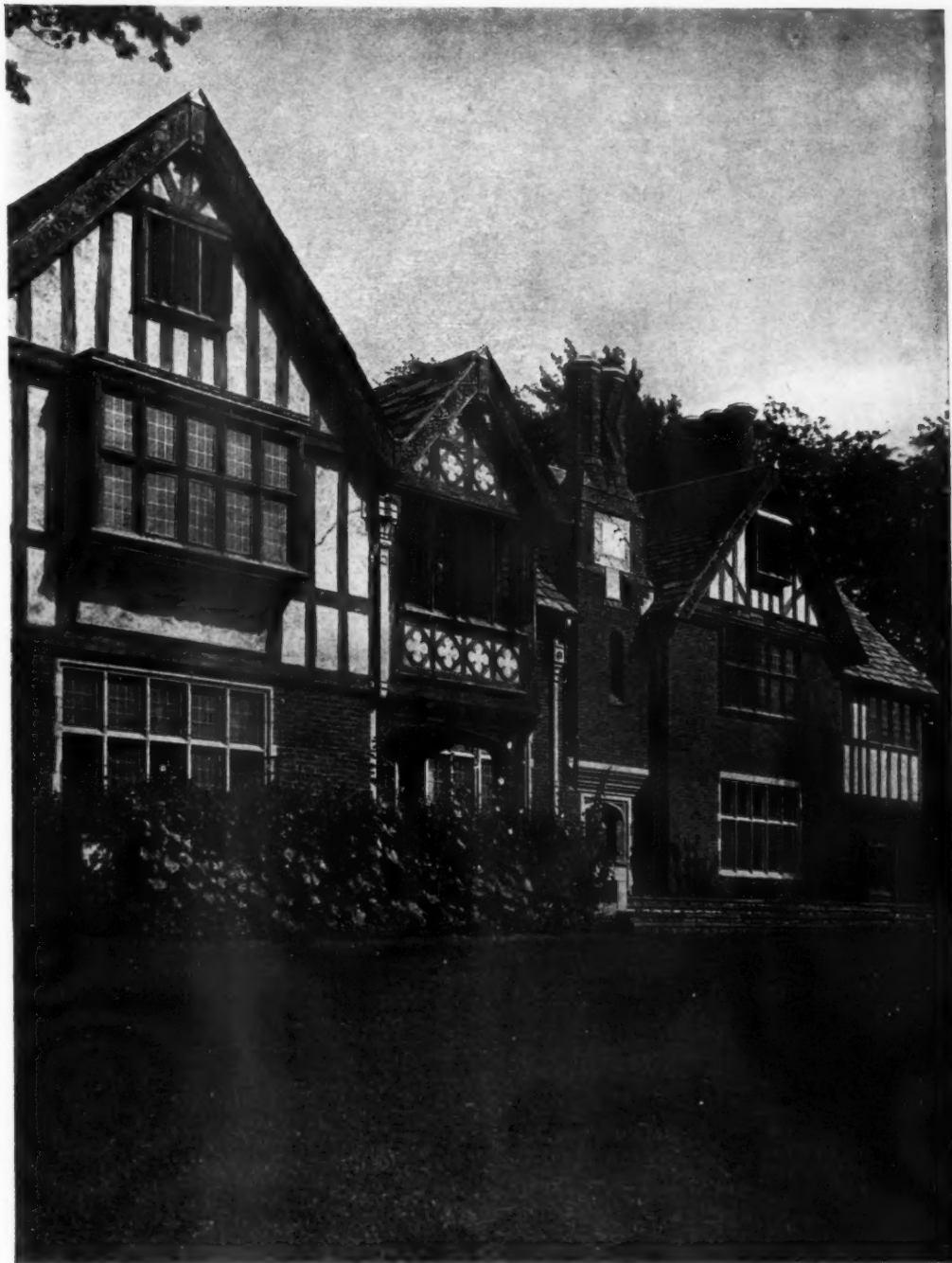


PLATE 45

DETAIL OF SOUTHEAST ELEVATION

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

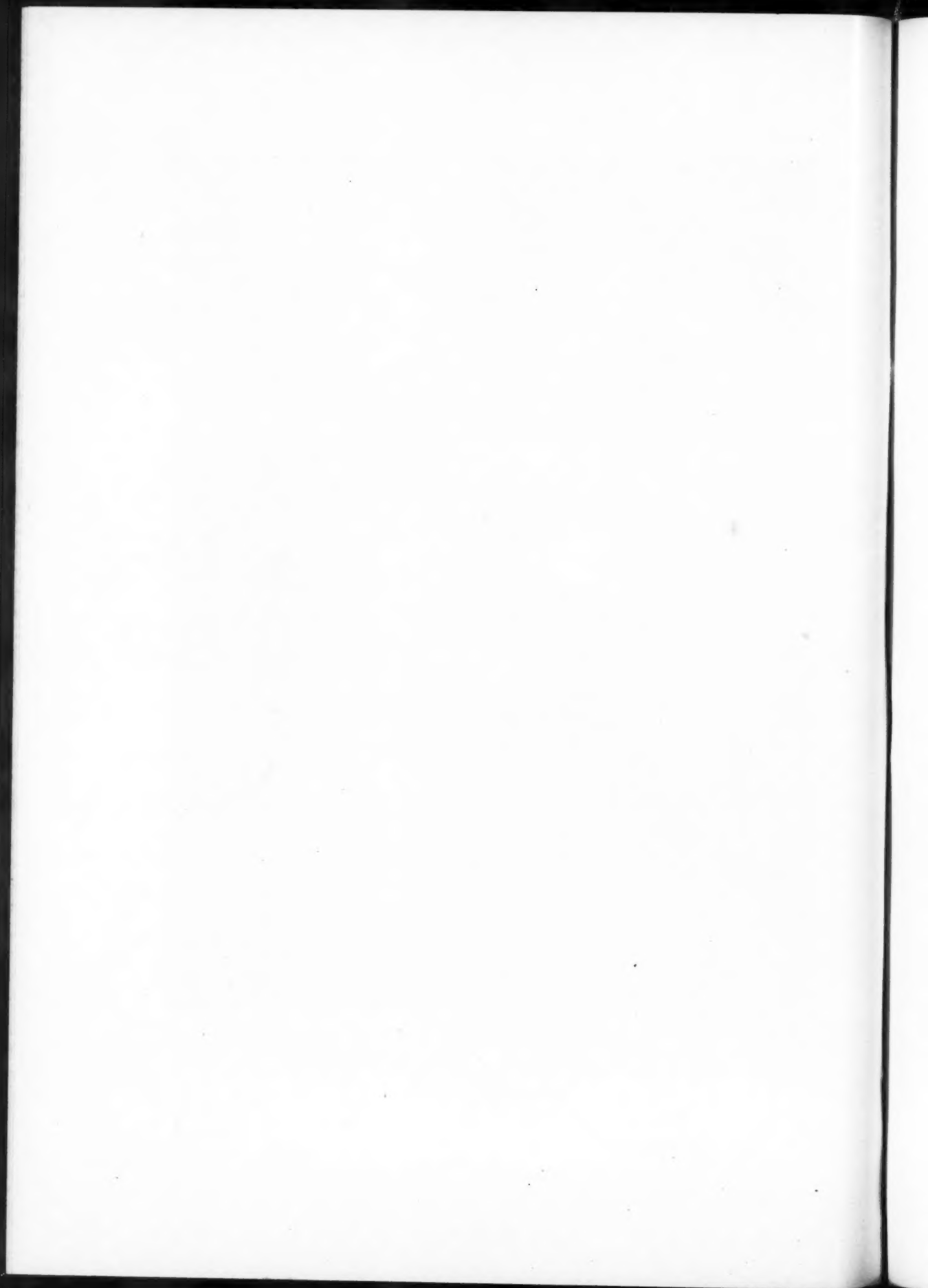


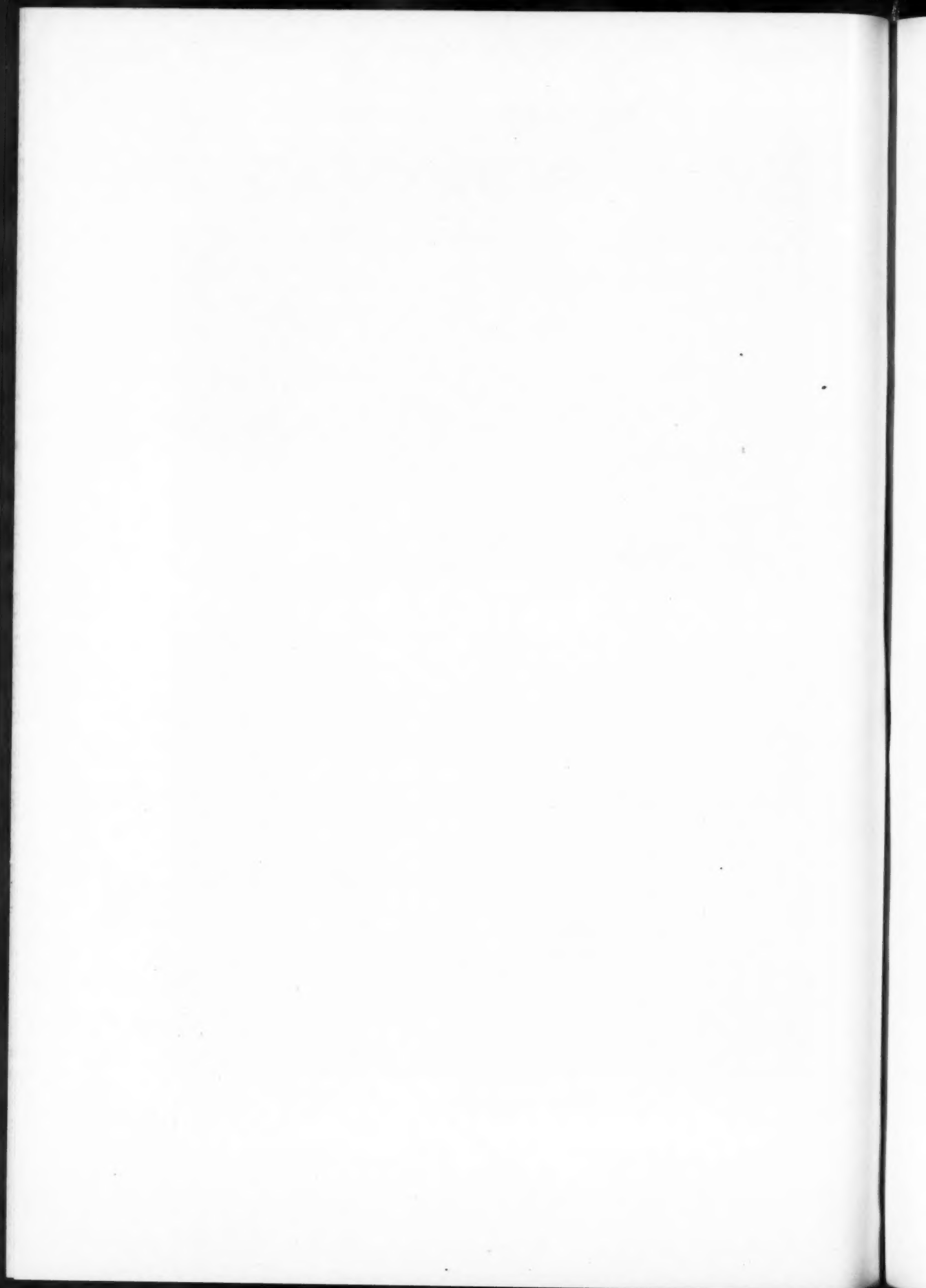


PLATE 46

DETAIL OF SOUTH ELEVATION

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT



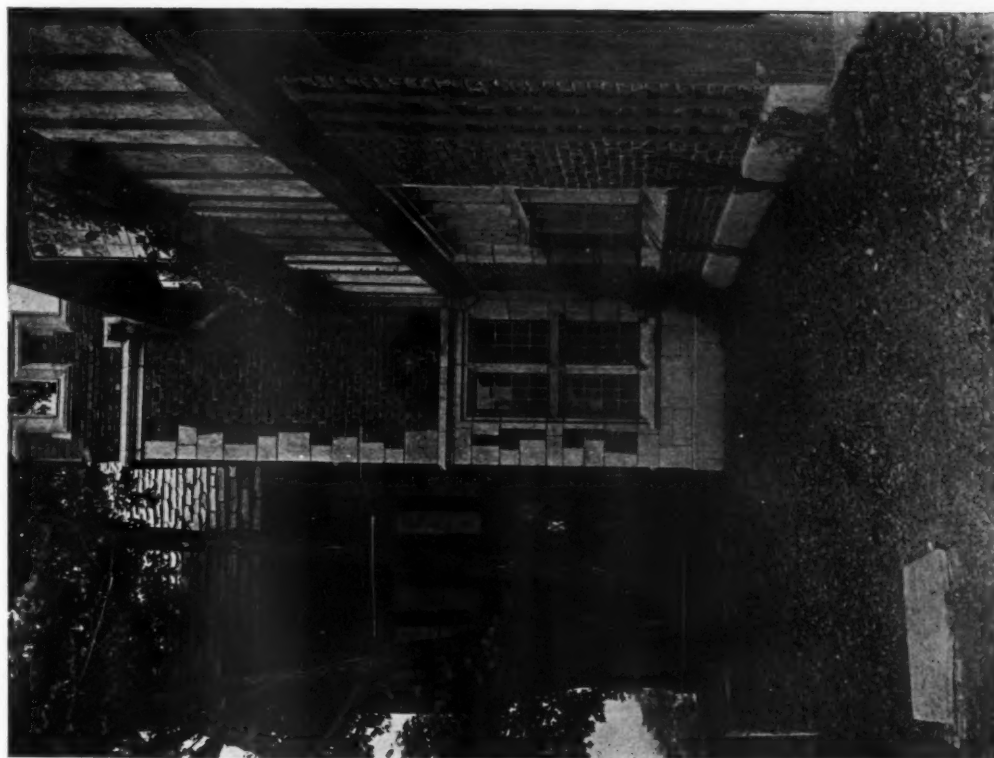


PLATE 47

DETAIL OF NORTHWEST ELEVATION

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT



DETAIL OF STAIR HALL BAY

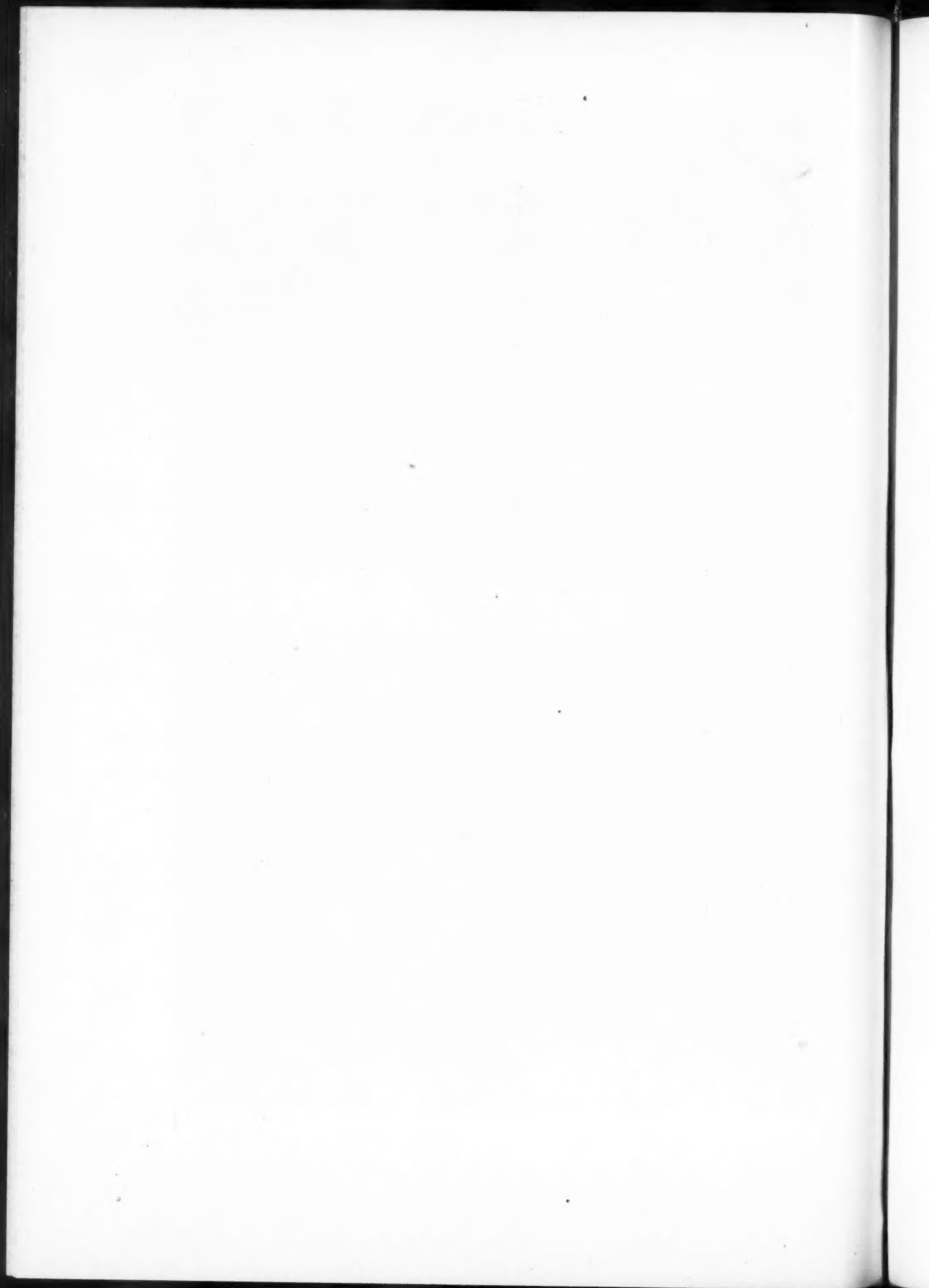




PLATE 48

STAIR HALL

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

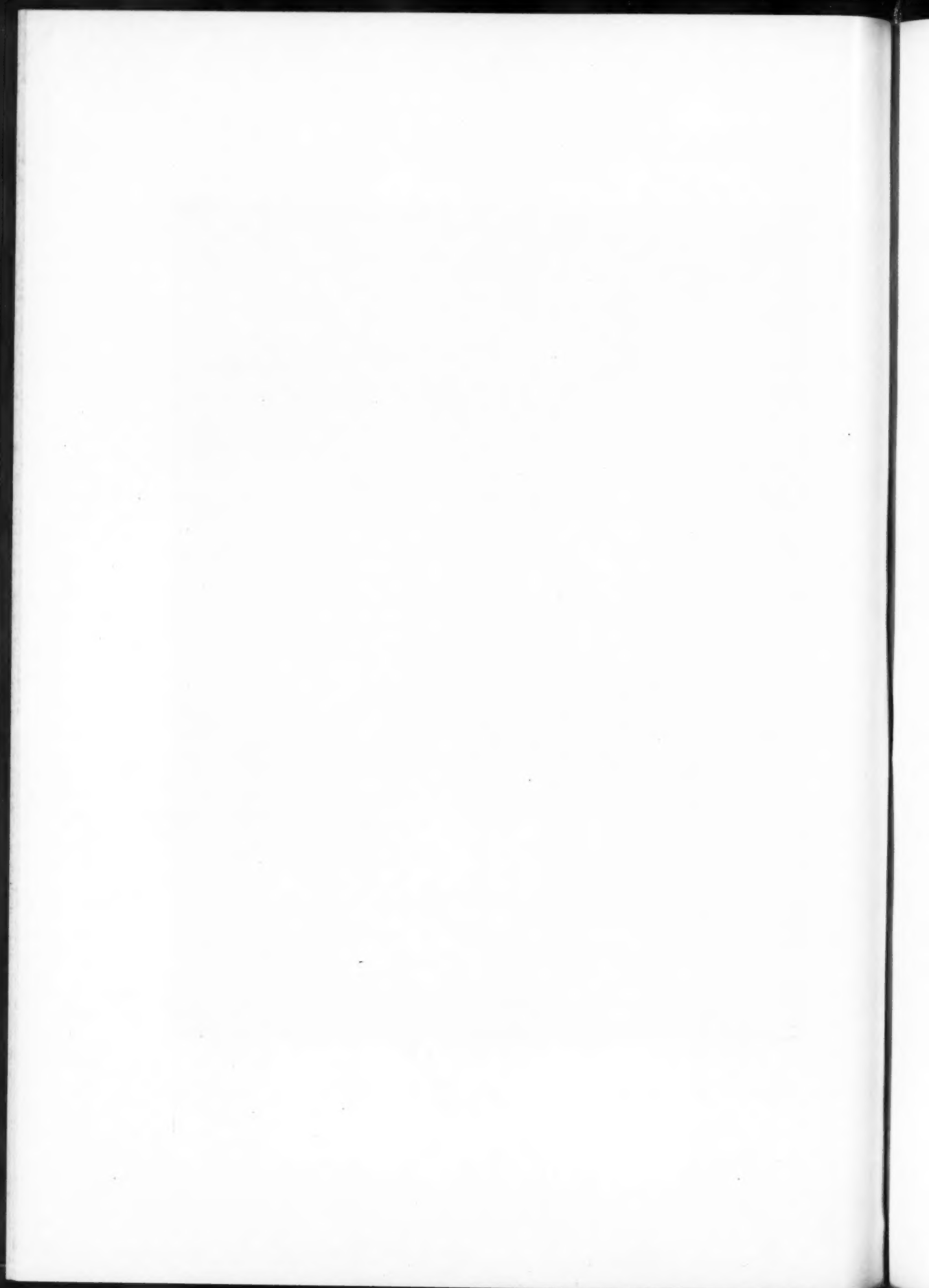




PLATE 49

GREAT HALL

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

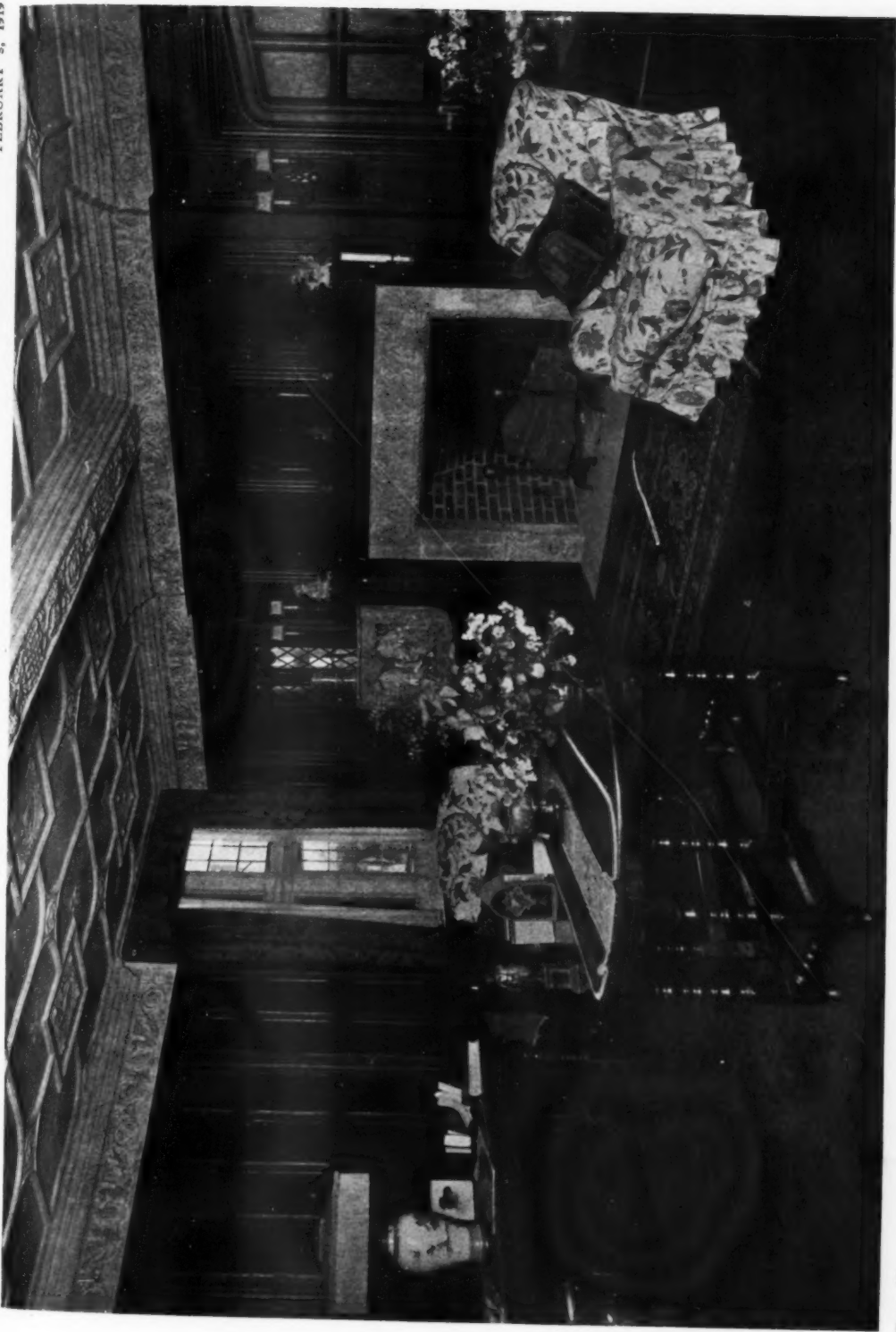


PLATE 50

LIBRARY

HOUSE OF ALLAN S. LEHMAN, TARRYTOWN-ON-THE-HUDSON, NEW YORK

JOHN RUSSELL POPE, ARCHITECT

Wi

I

issu
loan
thor
gene
com
tem
trad
25 p
"up
dolla
valu
grad
the
price
This
stabi
ing,
the
high

Se

has
liber
trade
grea
redu
ment
as fr

U
build
ent
woul
be a
the c
erect
\$700,
be \$
is sel

If
the l
millio
dred
years

Financing the Expected Boom in the Building Trade—Part II

With the Stabilization of Prices for Material and Labor, Builders Now Put It Up to Lending Institutions to Reform Methods of Making Mortgage Loans So Construction Can Proceed—Big Price Cuts Made—What Investors May Expect In Costs

DESPITE views held by some of the leading members of widely known loaning institutions that only by the flotation of bond issues would the problem of financing mortgage loans for big construction projects be solved, a thorough survey of the situation brings out the general opinion that the best method is for lending companies to adopt the amortized mortgage system. The consensus of opinion in the building trade is that these institutions should insist upon a 25 per cent instead of the usual 10 to 15 per cent "upset equity" of the borrower, and upon a million dollar investment lend the usual 60 per cent of value, but by applying the principle of amortization gradually reduce the amount of excess loan to meet the assured lowering of war-time construction prices as reconstruction is gradually worked out. This, it is claimed in responsible quarters, will stabilize the construction market, prevent overbuilding, and at the same time have a tendency to relieve the "high cost of living" that keeps wage prices high.

Secretary Wilson of the Department of Labor has announced the Federal Government's policy of liberal construction, which is understood in the trade to mean that with everything else ready for a great construction market, including general price reductions on heretofore excessively costly equipments and materials, money also should be made as free.

Under this plan the borrower on a million-dollar building operation three years ago, under the present permanent plan of making mortgage loans, would be told that although the cost today would be a million dollars, the lender would only consider the cost equal to that of the same type of building erected five years ago, which would be around \$700,000. Therefore 60 per cent of that cost would be \$420,000, representing a permanent loan which is seldom paid off.

If the amortization plan were adopted, however, the loan would be made on the full value of a million dollars, which would represent a six hundred thousand dollar loan. In the course of five years, when, it is expected, building costs will

approximate normal, the lending interest will have been reduced to the basis upon which the borrower would have made the engagement.

A majority of the members of the American Institute of Architects, most of the prominent members of the Building Trades Employers' Association, practically all of the building material and distributing associations, as well as building investors, endorse the plan. When banking institutions were asked what they thought of the amortization method they gave out the statement that they had been asked by the Government not to make any big building commitments until after the Fifth Liberty Loan in April. To this, in an effort to start a nation-wide building revival at once, Secretary of Labor Wilson at Washington, co-operating with Roger W. Babson and Franklin T. Miller, replied:

"Inasmuch as the building industry is regarded by many as the means of facilitating the general industrial transition to a peace basis, it should have the encouragement of all interests. . . . Public construction will be helpful in mitigating conditions, therefore it is evident that private as well as public construction must be resumed before the country returns to normal conditions. Next to placing private funds in Government securities it is desirable that they be invested in enduring wealth, like construction. The accumulated earnings of the country should not be diverted into forms of wealth easily consumed and without earning power. Permanent investments of wealth will stabilize the moral and financial conditions of the country as a whole, as well as benefit the individual investor and his dependents. To bring this about all factors interested in construction must co-operate."

The situation seems to have boiled itself down to a case of what in the army is called "passing the buck" by the loaning interests. First they announced to the building and material interests that as soon as prices had been lowered and stabilized loans would be forthcoming. The material men co-operated, but no loans were made. So now the building trade has "passed the buck" back again with the rejoinder that the loaning interests change

THE AMERICAN ARCHITECT

their methods of making mortgage loans so construction work can proceed.

To relieve the tension incident to the deplorable lack of building space many firms dropped their prices at once. Reports show that radiator prices were lowered 25 per cent; pipe fittings, 5 per cent; porcelain knobs, from 5 to 25 per cent; weather-proof wire, 3-4 per cent a pound; friction tapes, 2 per cent per pound; brass butts, 25 per cent; linoleums, 5 to 25 per cent; tools, 10 to 20 per cent. Considerable drops in prices are also contemplated by soil pipe interests and conduit manufacturers within a short period.

With regard to New York building, the labor situation is improving, the stabilized basis of 1918 instead of the sought for 1919 basis is apparently proving acceptable, with some modifications. These modifications have been at the request of the loaning institutions, and it was hoped that with the lower prices for materials, mortgage money would be released so that building construction could accept the new price basis and give the men employment.

That immediate action to prevent disastrous results is necessary is shown by the strangulation of demand, which has caused the complete closing down of the Eastern Portland cement industry, while the brick situation is so acute that Hudson river plants, closed for the winter, probably will not be opened until late in the spring. Other basic commodity plants are also either shut down or running at greatly reduced capacities. Reduced prices, therefore, are not just baits for the building investor, but acts of desperation. Authorities assert that if the reduced prices are not accepted now while the market needs support, when the Spring movement gets under way prices will be forced to much higher levels, and builders then will have to take their chance on supply.

The situation as to labor has materially changed in many sections in the past week. Twelve states report a surplus, as against seven the previous week. The country's surpluses seem to belt across country from Connecticut to Minneapolis. Weather conditions as affecting lake navigation are said, in a measure, to be responsible for this.

It is the duty of business to go right ahead and not wait for a bigger decline in prices, and the tendency on the part of business men to hold back new enterprises, in the expectation of lower commodity prices and wages, is a mistake, in the opinion of Joseph E. Otis, vice-president and acting head of the Central Trust Company of Illinois.

Mr. Otis says that he has no sympathy for the man who is sitting back, awaiting still lower prices.

"The people who are awaiting a drastic decline in prices,"

continues Mr. Otis, "aren't going to get it. They are going to get left. In other words, I do not believe we are going to see any immediate and drastic decline in commodity prices. There is a world-wide scarcity of many materials, and production costs are going to continue abnormally high.

"We have had perhaps a certain amount of inflation. To the extent that present high prices are due to that cause, moreover, we can expect no immediate decline. The process of deflation will be gradual.

"If we were all to hold back, awaiting lower prices we should produce conditions of a sort that would benefit no one. It is the duty of business to go ahead and seize the opportunities now awaiting. If a manufacturer were to defer building needed additions to his plant, in the hope of securing a lower construction cost at some indefinite time in the future, he probably would lose more profits on goods which he might have been producing and selling in the meantime than he will save on cheaper construction costs."

Frank W. Thomas of A. O. Slaughter & Co., stated:

"In considering the outlook for commodity prices, we must bear in mind that wages are going to continue high for an indefinite time, and that European competition, formerly so keenly felt in our markets, is not going to be so severe as it was before the war. Wages have been advanced abroad with no immediate prospect of their return to pre-war basis."

Frank A. Vanderlip, president of the National City Bank of New York, declares that it is possible to transfer 15,000,000 men now engaged in war activities to works of peace without greatly disturbing conditions.

"I would not argue that we can make this transition without any jolt," he said. "There will be some. But I believe that the demand for labor is so great that it is possible to make the transition without disaster.

"We may make a cushion of public works. That is possible. But there are really tremendous orders that may now be executed, and on the whole I would not be surprised to find that we shall see no surpluses of labor, providing labor and the employer of labor each does his best to help in this readjustment."

John N. Willys, president of Willys-Overland Company, says:

"Material prices and wages are not likely to come down in a hurry. With the passing of the first flurry of unsettlement of prices which followed the signing of the armistice there is now a noticeable steadying of the market."

In order to interest the public in building during the transition period from war to peace, an aid to home builders on a national scale has been suggested to the Division of Public Works and Construction Development of the Department of Labor by President Kessler of the United States League of Building and Loan Association. It is similar to the method used by the Federal Farm Loan Banks to aid agriculture.

According to the plan, building loan associations of this country would perform the same service for working men as performed for farmers by Farm Loan Banks. In order that the loan associations may render the most effective service, mortgages made over to building and loan organizations, it is suggested, should be rediscountable at Federal Reserve Banks.

Two difficulties stand in the way at present. First, the associations are not members of the Federal Reserve Bank system, and have no capital stock and reserve therein. Second, the Reserve

THE AMERICAN ARCHITECT

Banks are designed for handling commercial paper and not mortgages. Solutions offered for meeting these two problems are that, first, special measures be taken to protect the Reserve Banks, and that the second be met by limiting the amount of mortgages rediscounted. Perhaps, as an alternative, the Farm Loan Banks might be authorized to accept mortgages on homes, as well as on farm lands, but either method would be preferable to the creation of new organizations.

Building loan associations are admirably equipped to take care of the financing of home building, and it is believed that in view of the necessity for obtaining immediate relief from the congestion in the private home situation, they can be of great assistance. The restrictions on buildings due to the war and the gradual decline in building for some

years preceding the war have reduced the amount of housing per capita in the United States to figures below the normal for a number of years.

President Kessler has been in conference with Franklin T. Miller, director, and other officers of the Division of Public Works and Construction Development in the Department of Labor. The building and loan associations for the country number 7,269, with a total membership of 3,838,612. Their total assets exceed \$1,750,000,000. Their receipts from all sources in 1917 were \$1,220,000,000 and their cost of doing business \$9,800,000, amounting to only eight-tenths of one per cent. Losses are light, because of the conservative method on which loans are made. Ordinarily, if a man owns a lot of ground he may immediately obtain a loan for two-thirds of the land and buildings.

Current News

An International Federation of Architecture

Commenting on the editorial, Federating Architecture among the Allies, in *THE AMERICAN ARCHITECT*, issue of November 27, *The Building News* of London reprints the entire editorial and states:

"Let us by all means, say we, and let it be followed by yearly gatherings in the capitals of all countries successively, at which the principles and practice of our art may be discussed in similar fraternal fashion to that which prevails in regard to science at the meeting of the British Association."

Washington State Chapter Elects Officers

Officers elected at the twenty-fourth annual meeting of the Washington State Chapter of the American Institute of Architects, held at Seattle, Wash., were: President, D. R. Huntington; first vice-president, Carl Gould; second vice-president, George Gove; third vice-president, Albert Held; secretary, L. Baeder; and treasurer, F. L. Baker.

Deposits in Postal Savings

The total deposits in the Postal Savings Department of the New York City Post Office, covering the Boroughs of the Manhattan and the Bronx, on Dec. 31, 1918, was \$36,138,861, an increase of \$6,253,209 during the year.

Debt Comparisons and Obligations

The belligerent nations owe about six times the amount of all the gold and silver produced in all time, \$30,000,000,000. Incidentally, Austria owed \$2,736,000,000 at the beginning of the war, which had increased by June, 1917, to \$11,573,000,000.

To Study Post-War Problems

Post-war problems, which include housing conditions of the state and the necessity of speeding up public works to meet employment conditions, will be taken up by a reconstruction committee of thirty-six members just named by Governor Smith of New York, which includes some of the most influential men and women in the State. Abram I. Elkus of New York, who served as counsel to the New York State Factory Investigation Commission, Ambassador to Turkey, and a member of the State Board of Regents, will act as chairman of committee.

Co-ordination of State resources with Federal, municipal and private resources is most important, the governor urges, in the solution of the employment problem. The public is requested to apprise the commission of unemployment that may come to its attention. The commission also is committed to dealing with any labor crisis which may arise during the period of readjustment.

The Federal proposal, as embodied in what is known as the "Soldiers' Settlement Act," will be considered by the commission, as will the suggestion of Secretary of Labor Wilson, that necessary public

works be speeded up to meet unemployment conditions.

In concluding his message the governor said:

"More than all I enjoin upon the commission such speed as may be consistent with thoroughness, in order that situations demanding immediate relief be remedied as soon as possible. The commission is directed to utilize all available material in the possession of special agencies or state departments to this end. I shall rely upon the commission for advice and counsel in all of the matters mentioned, and shall hope to receive early reports of progress and recommendations for action."

Structural Steel

George E. Gifford, secretary of the Bridge Builders and Structural Society, has announced that the bridge and structural shops of the country contracted during the year 1918 for about 1,210,000 tons of steel work, or 56 per cent of their entire shop capacity. This compares with 1,285,000 tons in 1917 and 1,500,000 tons each for both 1916 and 1915, and 1,080,000 tons the amount for each year 1914 and 1913. The new contracts taken on December, 1918, amounted to about 52,000 tons or 29 per cent of capacity.

Will Not Cut Steel Workers' Wages

There is a uniformity of opinion among iron and steel producers that no general reduction in wages should be attempted now or in the near future, despite the fact that the daily earnings of the men are from two to two and a half times greater than they were before the war. What employers do seek, however, is a restoration of the labor performance of before the war. They expect men to render a standard day's service, and as there is no opportunity now to make selections, the men who are willing to do a full day's work will receive the preference.

To Extend Banking Affiliations

For personal conferences with foreign bankers as to the needs of their countries during the readjustment period, many representatives of American banking interests either have sailed or are about to sail for Europe, with a view of largely extending American banking affiliations. That this country has become a heavy creditor nation means the absorption here of large amounts of foreign securities.

John J. Arnold, vice-president and head of the foreign department of the First National Bank of Chicago, speaking of a trip which he is about to take to Europe, is quoted as saying:

"The bankers are undertaking a vast task. We hope a preliminary peace treaty will be signed soon,

and when that is done many barriers to active work will be lifted and we can start our operations. I personally shall visit all of the countries of Europe. We have two fundamental tasks: to lay the foundation for financing the rehabilitation of the war-wrecked cities and towns in allied territory and to restore bank connections with countries where they have been broken off by the war, and to form new connections where needed. This work will probably require three or four months.

"In devastated regions our energies will be chiefly devoted to arranging for financing the restoration of public utilities and to investigate and report on industrial needs as well."

The World's Largest Office Building

Larger than the Woolworth, Whitehall and Flatiron Buildings combined, is the Equitable Building, New York. It comprises a floor area of 1,227,000 square feet, equalling the area of a 28-acre farm, which makes it the largest office building in the world. Making a round trip in each of its sixty-one elevators would provide a seven-mile ride, and one walking its corridors would cover 5.8 miles. To build it 20,000,000 bricks were used.

Partnership Discrimination in Income Tax Bill

Prominent business men at a conference between the Senate and the House at Washington last week pointed out one of the inequalities in the pending \$6,000,000,000 War Revenue Bill, which, it was argued, if not corrected, would result in discrimination against partnership as against corporations in the operation of the income tax section. The delegation argued that the bill was so drawn that it did not carry out the expressed intent of both committees which had charge of the original drafting of the bill, which was that it would put corporations and partnerships on a parity of taxation.

As the bill stands, the corporations are subject to the payment of an excess profits tax and the payment of a war profits tax, and then, if they have not paid dividends, they would be subject to an income tax of 12 per cent on the amount of their profits undistributed and left in the business. But in case of partnerships the profits would be divided among the partners and each partner would be subject, first to a normal income tax and then to a surtax increasing in proportion to the extent of the profits divided.

Consequently, it had been discovered that in the case of a very large partnership, the amount of the

surtax would exceed the aggregate of the taxes imposed upon corporations, in cases where corporations and partnerships were of like size and similar conditions, so that the intent of the committee in such cases would not be carried out in the plan of the bill as drafted and under consideration in conference. The fact was brought out that one of the large partnerships represented at the informal conference would, unless the bill were modified so as to remove this inequality, have to pay a difference as a partnership amounting to \$175,000 in excess to what it would pay if it were a corporation of like size and equal number of partners.

As a remedy an amendment has been suggested providing that in such cases of discrimination a partnership might elect, subject to suitable regulations to be framed by the Treasury Department, to be taxed under the provisions applying to corporations. The only question after the conference appeared to be the application of the form of the remedy proposed and the effect it might have on other parts of the schedule considered.

Canal Tonnage Shows Decline

In his annual report General W. W. Wother- spoon, State Superintendent of Public Works, reports that the total canal tonnage for the season was 1,159,270 tons, distributed as follows: Erie Canal, 667,374; Champlain Canal, 434,784; Oswego Canal, 44,661; Cayuga and Seneca Canal, 7,509, and Black River Canal, 4,932.

France's Coal Shortage Will Boom Industry

Large distributors of bituminous coal in Pennsylvania predict that a great stimulus will be given the coal situation in this country for several years due to the wrecking of the rich coal mines of northern France. American engineers who have inspected the mines in the Lens section of northern France estimate that it will be at least two years before the mines will be in full operation again. Many of the mines are flooded and conditions in that region are generally bad.

Will Recommend Continuance of Housing Projects

Completion of twenty-two Government war housing projects, costing \$48,000,000, will be recommended by the House Public Buildings Committee, which has decided to amend to this end the Senate bill calling for the discontinuance on work on all projects not seventy-five per cent completed.

The projects for completion are at the following places: Aberdeen, Md.; Alliance, Ohio; Bath, Me.; Bridgeport, Conn.; Charleston, W. Va.; Davenport, Iowa, and Rock Island, Ill.; Erie, Pa.; Hammond, Ind.; Indian Head, Md.; Mare Island, Cal.; New Brunswick, N. J.; New London, Conn.; Newport, R. I.; Niagara Falls, N. Y.; Watertown, N. Y.; Niles, Ohio; Norfolk and Portsmouth, Va.; Philadelphia, Pa.; Puget Sound, Wash.; Quincy, Mass.; Waterbury, Conn., and Washington, D. C.

New York Apartments to Cost, with Land, \$2,000,000

In the heart of the Fifth Avenue residential district and next door to the Astor family mansion at Sixty-fifth Street and Fifth Avenue, New York, will be erected a twelve-story apartment house of the superluxurious type. Preliminary architectural details for the building, which it is estimated will cost over \$1,000,000 and outstrip anything of its kind in point of artistic effect and conveniences offered tenants, are being drawn by J. E. R. Carpenter in association with Cross and Cross. Several new methods of apartment house construction will be featured in the building, which is expected to be ready for occupancy early in the summer of 1920. The building will be erected on the site owned by the estate of the late Grant B. Schley.

The apartment house will have but one suite to a floor, the idea being to make each floor as much like a separate dwelling as possible, so that the structure will be more in the nature of twelve superimposed dwellings than a mere apartment house. Each suite will have a floor area of about 11,000 sq. ft. and a main living room extending across the entire frontage of Fifth Avenue. This feature alone, it is said, has already brought applications for the renting of several of the floors. There will be twenty rooms to a suite.

In addition to the Astor mansion, it will have distinguished neighbors, for other properties in the immediate vicinity are owned by Thomas F. Ryan, Mrs. H. O. Havemeyer, Frederick Lewisohn, Mrs. James B. Haggin, William Guggenheim, Henry C. Friek and Mrs. E. H. Harriman. The invasion of this district by apartment houses has made some interesting history. It precipitated a crusade by the Fifth Avenue Association in which the Real Estate Board of New York participated. The amendment of the zoning resolution to prevent the construction of any building over 100 ft. in height on the avenue, between Sixtieth and Ninety-sixth Streets, was proposed, but failed of adoption.

The entire property has a frontage of 50.6 ft. on the avenue and 160 ft. on Sixty-sixth Street.

Posters Issued by the Department of Labor to Stimulate Building

The Department of Labor, through its Information and Education Service, is doing a useful and constructive work in stimulating the building industry to a resumption of pre-war activity. One

Wilson, we reproduce a typical example. Others read:

"I want to see every wage-worker own his own home."

Construction adds to the wealth of the country—build now.

Build now that city hall, court house, school house, church, factory, memorial.

Let this building be built so well and so quickly that the owner will be encouraged to build another.

Own a home for your children's sake.

Every architect and builder by liberal use of these posters can aid in this campaign. They may be had by addressing Roger W. Babson, chief, Information and Education Service, 1706 G Street, N. W., Washington D. C.

Prof. Rolla Clinton Carpenter

Rolla Clinton Carpenter, professor emeritus of experimental engineering at Cornell University, and widely known by construction engineers for his book on heating and ventilating, which was the first practical treatise of the subject ever written and which has been used extensively as a text book, died last week at his Ithaca, N. Y., home. He was sixty-six years old.

As every Cornell trained architect knows, Prof. Carpenter was also on the faculty of the college of architects, teaching the subject of heating and ventilation. His research in this line has never been surpassed, while his "formula" has for many years been considered by heating experts as the standard where accuracy is essential. The Carpenter formula, it will be recalled by many, was tested out in a full-sized building over a period of months during the winter and proved to be 98 per cent accurate. He wrote numerous important works on engineering.

Professor Carpenter was born in Orion, Mich., and was graduated from the Michigan Agricultural College in 1873 and later took a course in engineering at the University of Michigan. From 1875 to 1890 he was instructor and professor of mathematics in the Michigan Agricultural College. He went to Cornell as associate professor of engineering, and in 1895 was made professor of experimental engineering, holding the chair until 1917, when he was made professor emeritus.

He had been engaged in many important commercial enterprises. He was engineer for the construction of high power pumping stations in New York City and Brooklyn, and constructed the high pressure fire system of Baltimore.



of the means employed is a series of posters, supplied free of charge to contractors and builders. These posters are of inspirational character and aim to bring home to employer and employee the thought that they are both selling their services to the public, and if the building in hand is well and quickly completed, another, figuratively speaking, is likely to be built across the street.

The posters, 10 x 15 inches in size, have each a direct appeal, officially made by the Department of Labor to all the people to co-operate in a general movement in building construction. From a large collection of these posters, all signed by Secretary

Department of Architectural Engineering

Useless Waste in Concrete Construction Due to Legal Requirements*

By W. STUART TAIT, *Assoc. M. Am. Soc. C. E., Assoc. Mem. Inst. C. E.*

WE have on record a mass of tests on reinforced concrete columns both spirally reinforced and otherwise. In practically all of these tests, however, no records were made of the amount of water used in the concrete and the nature of the mixing was not recorded. One of the most recent series of tests, and one which represents average building construction results, was the series recorded in the proceedings of the American Concrete Institute in 1915. The columns for this test were made by construction forces at a building under construction, and represent the results which can be expected from fairly good concrete. In the report of the committee conducting this test a formula is given by which the ultimate strength of the columns covered by this test can be obtained. This formula shows that, for a concrete column of 1-1½-3 concrete with 1½ per cent of spiral and 2 per cent of vertical steel, the ultimate strength is 5,660 lb. per sq. in. The ruling for column design adopted by the American Concrete Institute would credit this column with a working stress of 1,340 lb. per sq. in. These figures, of course, refer to the average stress per square inch considering the concrete only and adding together the resistance of the concrete, the vertical and the spiral steel. These figures indicate a factor of safety of 4 in this rule. In all spiral column design the area of the concrete outside the spiral reinforcement is not considered as contributing to the strength of the column and is treated as fireproofing material only. The series of tests referred to seem to indicate that the concrete placed outside the spiral reinforcement actually contributes to the strength of this column in much the same way as the concrete within the spiral. This concrete appears to be restrained in a similar manner to the concrete within the core through the tensile strength of the concrete and also by shear. This seems to indicate that the material lying outside of the spiral can be relied upon to provide the

additional strength necessary to overcome a reasonable bending moment in the column resulting either from eccentricity or unequal loading of panels adjoining the column. It would appear, therefore that a factor of safety of 4 was somewhat severe provided we have proper supervision, as previously outlined. The Table II shows the working strength of a certain column according to a few building ordinances now in force. Those who are conversant with designing of concrete construction throughout the United States have found, to their

TABLE II.

Strength of a 30-inch concrete column of 1-2-4 concrete reinforced with 1½ per cent of spiral, 26-inch diameter and 2 per cent of vertical steel, according to various city ordinances:

Chicago	525,000 pounds
Cincinnati	620,000 pounds
Cleveland	620,000 pounds
Detroit (1-1½-3)	565,000 pounds
Minneapolis	825,000 pounds
St. Louis.....	850,000 pounds
Am. Concrete Inst.	640,000 pounds

sorrow, that practically every city which boasts a building code, has a different method of figuring the column strength and uses different stresses in its steel reinforcement. This lack of uniformity is clearly brought out in Table II, and we see that a column constructed in Chicago is credited only with about 60 per cent of the strength of the same column constructed in St. Louis. There is no material difference in the construction methods and inspection in force in these two cities, and it would therefore seem unreasonable that the manufacturers of Chicago, Detroit, Cincinnati, Cleveland and numerous other cities should have this apparently unnecessary burden placed upon them. According to the tests referred to above, a concrete column in St. Louis has a factor of safety of 3.

*Continued from our issues of December 11-18, 1918, and January 8, 22 and 29, 1919.

THE AMERICAN ARCHITECT

The dead load on a concrete column is a larger portion of the total load than in the case of a concrete slab, consequently the probability of column overloading is less than in the case of a floor. In a previous article the overloading of a floor in warehouse construction was shown to be limited to approximately $1\frac{1}{2}$ times the design load, and it is the writer's opinion that the use of a factor of safety of 3 in concrete columns provides amply for the existing conditions.

In factory construction, engineers are practically compelled by many building ordinances to allow the same floor load as coming upon the columns as is used in designing the floor construction. An engineer may design the floor construction with an equivalent live load considerably in excess of the actual load occurring, to provide for concentration of load and for impact from machinery. Many building ordinances, however, would not recognize the right of an engineer to design the floor for one uniformly distributed load and the columns for a less load. Most building ordinances make some allowance for the floors of a building not all being loaded at one and the same time by permitting a reduction in the live load figured in the columns from that for which the floors are designed. This is a reasonable allowance but is, of course, entirely independent of the point just referred to above.

Some building departments rule that the column stresses specified in the ordinance must be used in designing a column for combined bending and direct load, while other cities, where columns are designed for this condition, permit the use of the extreme fiber stress governing beam design. The writer can see no reason whatever in the former stand for the reason that in a column subjected both to bending and direct load we have an extreme fiber stress on one side of the column which, in the case of a circular column, diminishes very rapidly. In the same way many building departments require that, under the same condition of column loading, the concrete outside of the spiral reinforcement shall not be considered as contributing to the resisting strength of the column in bending. This ruling appears to be far from logical. One argument presented by a building inspector in support of this requirement was that the material outside of the spiral was simply fireproofing. When this argument was brought up the writer did not consider it advisable to argue further and to compare this case with that of a concrete beam. In the case of the concrete beam all of the concrete above the neutral axis is counted as acting in compression, and it therefore always appeared to him that, since the same conditions applied in a concrete column subjected to bending, the concrete outside of the spiral should be considered as contributing to the column

strength in bending. In fact, from an observation of fire tests it would appear that a circular concrete column was less liable to damage from fire than the corners of a concrete beam, and these corners are vital in providing the necessary resisting strength for negative moment.

In a previous article the bending moment occurring in exterior columns was discussed. To provide against possible overstressing resulting from the bending moment caused by the fixed end condition of the beam, a limit for the dimension of the columns should be set which is based on the span of the girder resting on the column as well as a limit based on the column length. The writer feels that in this respect a limitation of about $1/18$ of the span of the girder is reasonable and would, to a large extent, prevent the possibility of overstressing developed by a condition as illustrated in Fig. 1 in a previous article.*

The factor of safety used in columns of steel construction is very little in excess of 2, based on the elastic limit. These columns, just as in the case of concrete columns, may be subjected to bending moment. It is true that this may not be as great in value as that occurring in the concrete column, still in a steel column we have a much more slender member than in the case of a concrete column and, as a result, the effect of a bending moment is more severe in the steel column. In a building in which steel columns are used the floor construction is usually also of structural steel and, as a consequence, the dead load on the steel column is a smaller percentage of the total load than in the case of the concrete column. The possibility, therefore, of overloading a steel column is generally greater than in the case of a concrete column. With proper supervision, it appears unreasonable to use a factor of safety of more than 3 in concrete column design.

(To be continued)

The A. S. M. E. Code for Low-Pressure Boilers

IN THE AMERICAN ARCHITECT of April 10, 1918, page 446, was printed the code for testing low pressure heating boilers as presented to the American Society of Heating and Ventilating Engineers by its committee. The purpose of this code is to establish a uniform method of testing low pressure heating boilers in order to determine the ability of the boiler to heat or evaporate water; in other words, to measure its power to render service.

The Boiler Code Committee of The American Society of Mechanical Engineers submitted its re-

*See THE AMERICAN ARCHITECT of January 9, 1918, page 79.

THE AMERICAN ARCHITECT

port to the council of that society in December, 1918, in which it embodies a code regulating the *construction* of low pressure heating boilers. The reports of this committee are almost universally accepted as the standard for this country, and some states have embodied its recommendations in their laws pertaining to such matters. That portion of the report covering the construction of low pressure heating boilers is entirely new and it is the first recommendation of any kind for the standardization of that very important factor in building construction. The growth of low pressure heating boiler manufacturing has been along individual lines and has resulted in a great variety of designs, more particularly in cast iron boilers. Too often their design has been dictated by the requirements of foundry practice and manufacturing profits rather than a scientific analysis of the problem. The application of this code will necessitate the revision of some types now on the market and in the interest of safety to the user. This, with the application of the code above referred to, will result in boilers uniform as to performance as well as to construction.

The architect can, with safety, specify that the boilers used for this purpose shall comply in all respects to the two codes.

A. S. M. E. Boiler Code

Part I—Section II

BOILERS USED EXCLUSIVELY FOR LOW PRESSURE STEAM AND FOR HOT WATER HEATING AND HOT WATER SUPPLY

(This does not apply to Economizers or Feed Water Heaters.)

GENERAL

335 The Rules for power boilers shall apply:

- a To all steel plate *hot-water* boilers over 60 in. in diameter.
- b To all steel plate *hot-water* boilers where the grate area exceeds 10 sq. ft. and the maximum allowable working pressure exceeds 50 lb. per sq. in.
- c Under other conditions, the following rules shall apply.

MATERIALS

336 Specifications are given in these Rules, Pars. 23 to 178, for the important materials used in the construction of boilers, and where given, the materials shall conform thereto.

337 Flange steel may be used entirely for the construction of steam heating boilers covered in this section, but in no case shall steel of less than $\frac{1}{4}$ in. in thickness, nor tube sheets or heads of less than $\frac{5}{16}$ in. in thickness be used.

MAXIMUM ALLOWABLE WORKING PRESSURE

338 The maximum allowable working pressure shall not exceed 15 lb. per sq. in. on a boiler built under these Rules to be used exclusively for low-pressure steam heating.

The maximum allowable working pressure for a hot-water boiler or heater used on a closed system shall be one-half of the maximum allowable working pressure for the same hot-water boiler or heater when used on an open system.

Hot-water systems shall be designated as either open or closed systems. Open systems are those in which the pressure is balanced by a fluid column, the cross sectional area of which is at least equal to the cross sectional area of the water supply pipe, or where the system is freely connected to the street supply. All other systems are classed as closed systems.

Open systems shall be so installed that there will be no opportunity for the fluid column to freeze or to be accidentally shut off. If a valve is used in the supply line, it shall be locked and sealed open and bear a tag stating that the system shall be relieved of pressure whenever the valve is closed.

339 A boiler to be used exclusively for low-pressure steam heating may be constructed either of cast-iron, steel cast, or wrought iron or steel, or any combination of these, but in all cases the connecting rods and bolts shall be wrought iron or steel.

340 All steel-plate *hot-water* and *steam-heating* boilers shall have a factor of safety of not less than five.

BOILER JOINTS

341 Longitudinal lap joints will be allowed on boilers to be used exclusively for low-pressure *steam* heating, when the maximum allowable working pressure does not exceed 15 lb. per sq. in., and the diameter of the boiler shell does not exceed 60 in.

342 The longitudinal joints of a horizontal return-tubular boiler if of the lap type, shall be not over 12 ft. in length.

343 In a *hot-water* boiler to be used exclusively for heating buildings or hot-water supply, when the diameter does not exceed 60 in. and the grate area does not exceed 10 sq. ft., or equivalent as defined in Pars. 359 and 360, longitudinal lap joints will be allowed. When the grate area exceeds 10 sq. ft., or equivalent as defined in Pars. 359 and 360, and the diameter of the boiler does not exceed 60 in., longitudinal lap joints will be allowed provided the maximum allowable working pressure does not exceed 50 lb. per sq. in.

344 *Protection of Joints.* When a boiler is built wholly or partially of steel and is used exclusively

THE AMERICAN ARCHITECT

for low-pressure steam heating, or when a hot-water boiler is used exclusively for heating buildings or for hot-water supply, it shall not be necessary to water jacket the rivets in the fire-box where one end of each rivet is exposed to the fire or direct radiant heat from the fire, provided any one of the following conditions is fulfilled:

- a Where the ends of the rivets away from the fire are protected by means of natural drafts of cold air induced in the regular operation of the boiler.
- b Where the ends of the rivets away from the fire are in the open air.
- c Where the rivets are protected by the usual charges of fresh fuel, which is not burned in contact with the rivets.

WASHOUT HOLES

345 A boiler used for low-pressure steam or hot-water heating or for hot-water supply shall be provided with washout holes to permit the removal of any sediment that may accumulate therein. Steel shell boilers of the locomotive or vertical fire-tube type shall conform to the requirements of Pars. 265 and 266 for washout holes.

BOILER OPENINGS

346 *Flanged Connections.* Openings in boilers having flanged connections shall have the flanges conform to the American Standard given in Tables 16 or 17 of the Appendix, for the corresponding pipe size, and shall have the corresponding drilling for bolts or studs.

SAFETY VALVES

347 *Outlet Connections for Safety and Water Relief Valves.* Every boiler shall have proper outlet connections for the required safety, or water-relief valve or valves, independent of any other connection outside of the boiler, the area of the opening to be at least equal to the aggregate area of all of the safety valves with which it connects. A screwed connection may be used for attaching a safety valve to a heating boiler. This rule applies to all sizes of safety valves.

348 *Safety Valves.* Each steam boiler shall be provided with one or more safety valves of the spring-pop type which cannot be adjusted to a higher pressure than 15 lb. per sq. in.

349 *Water Relief Valves.* Water relief valves shall be placed on all hot-water heating and supply systems and be connected to the boiler or heater. The valve shall be of the diaphragm-opening type set to open at or below the maximum allowable working pressure, the diaphragm being so designed that, if the valve fails to open, the diaphragm will rupture at a pressure not exceeding 50 per cent above the maximum allowable working pressure.

350 The outlets of water relief valves shall have open discharges in plain sight.

351 No safety valve for a steam boiler shall be smaller than 1 in. nor greater than $4\frac{1}{2}$ in. standard pipe size. No water relief valve shall be smaller than $\frac{3}{4}$ in. nor greater than 2 in. standard pipe size.

352 When two or more safety or water relief valves are used on a boiler or heating system, they may be single, twin or duplex valves.

353 Safety or water-relief valves shall be connected to the boilers or heating systems independent of other connections and be attached directly, or as close as possible, to the boiler or heater without any intervening pipe or fittings, except the Y-base forming a part of the twin valve or the shortest possible connection. A safety valve or water-relief valve shall not be connected to an internal pipe in the boiler or heater. Safety valves shall be connected so as to stand upright with the spindle vertical when possible.

TABLE 9—ALLOWABLE SIZES OF SAFETY VALVES FOR STEAM HEATING BOILERS

(Maximum Allowable Working Pressure, 15 lb. per sq. in.)					
Water Evaporated per Sq. Ft. of Grate Surface per Hr., Lb.		50	75	100	125
Diameter of Valve, In.	Area of Valve, Sq. In.	Area of Grate, Sq. Ft.			
1	0.7854	2.25	1.50	1.00	1.00
1 1/4	1.2272	3.50	2.25	1.75	1.50
1 1/2	1.7671	5.00	3.25	2.50	2.00
2	3.1416	8.75	6.00	4.25	3.50
2 1/2	4.9087	13.75	9.25	7.00	5.50
3	7.0686	20.00	13.25	10.00	8.00
3 1/2	9.6211	27.25	18.00	13.50	10.75
4	12.5660	35.50	23.50	17.75	14.25
4 1/2	15.9040	44.75	30.00	22.50	18.00

TABLE 9a—ALLOWABLE SIZES OF WATER RELIEF VALVES FOR WATER HEATING BOILERS AND FOR HOT WATER SUPPLY BOILERS

Diameter of Valve, In.	Area of Grate, Sq. Ft.
1	Not exceeding 8
$1\frac{1}{4}$	Over 8 and not exceeding 13
$1\frac{1}{2}$	Over 13 and not exceeding 18
2	Over 18 and not exceeding 28

Above 28 sq. ft. of grate area, more than one valve shall be used, the sum of the areas handled by the valves as given in the Table to be equal to or greater than the grate area.

354 No shut-off of any description shall be placed between the safety or water-relief valves and boilers or heaters, nor on discharge pipes between such valves and the atmosphere.

355 When a discharge pipe is used its area shall be not less than the area of the valve or aggregate area of the valves with which it connects, and the discharge pipe shall be fitted with an open drain to prevent water from lodging in the upper part of the valve or in the pipe. When an elbow is placed on a safety or water relief valve discharge pipe, it

THE AMERICAN ARCHITECT

shall be located close to the valve outlet or the pipe shall be securely anchored and supported. The safety or water-relief valves shall be so located and piped that there will be no danger of scalding attendants.

356 Each safety valve used on a *steam* heating boiler shall have a substantial lifting device by which the valve may be raised from its seat at least $1/16$ in. when there is no pressure on the boiler. A relief valve used on a hot-water heating system need not have a lifting device.

357 Every safety valve or water-relief valve shall have plainly stamped on the body or cast thereon the manufacturer's name or trade mark and the pressure at which it is set to blow. The seats and discs of safety or water-relief valves shall be made of nonferrous material.

358 The minimum size of safety or water-relief valve or valves for each boiler or heater shall be governed by the grate area as shown by Table 9 or 9a. The equivalent grate area for oil or gas fired boilers or water heaters heated by steam shall be used as specified under Par. 360.

When the conditions exceed those on which Table 9 is based, the following formula for bevel and flat seated valves shall be used:

$$A = \frac{W}{4.7P}$$

in which

A = area of direct spring-loaded safety valve per square foot of grate surface, sq. in.

W = weight of water evaporated per square foot of grate surface per hour, lb.

P = pressure (absolute) at which the safety valve is set to blow, lb. per sq. in.

GRATE AREA

359 *Double-Grate Down-Draft Boilers.* In boilers of this type the grate area shall be taken as the area of the lower grate plus one-quarter of the area of the upper grate.

360 *Boilers or Heaters Fired with Oil or Gas or Heated with Steam.* In determining the number and size of safety or water-relief valve or valves for a boiler using gas or liquid fuel, 15 sq. ft. of heating surface shall be equivalent to one square foot of grate area. If the size of grate for use of coal is evident from the boiler design, such size may be the basis for the determination of the safety-valve capacity.

For a heater heated with steam the maximum amount of steam that can be condensed per hour shall be determined and the equivalent grate surface taken as the maximum weight of steam condensed in pounds per hour divided by fifty.

STEAM AND WATER GAGES

361 *Steam Gages.* Each *steam* boiler shall have a steam gage connected to the steam space or to the water column, or its steam connection, by means of a syphon or equivalent device of sufficient capacity to keep the gage tube filled with water and so arranged that the gage cannot be shut off from the boiler except by a cock placed near the gage and provided with a tee or lever handle arranged to be parallel with the pipe in which it is located when the cock is open. Pipe connections to steam gages less than 1 in. pipe size, shall be of brass, copper or bronze composition when the distance between the gage and point of attachment of pipe is over 5 ft. If less than 5 ft., the connections shall be of brass, copper or bronze composition if less than $1/2$ in. pipe size. The dial of a steam gage for a *steam* heating boiler shall be graduated to not less than 30 lb.

362 *Pressure or Altitude Gages.* Each *hot-water* boiler or heater shall have a gage connected in such a manner that it cannot be shut off from the boiler or heater except by a cock with tee or lever handle, placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is opened. Pipe connections to gages less than 1 in. pipe size, shall be made of brass, copper or bronze composition when the distance between the gage and point of attachment of pipe is over 5 ft. If less than 5 ft., the connections shall be of brass, copper or bronze composition if less than $1/2$ in. pipe size. The dial of the pressure or altitude gage shall be graduated to not less than $1\frac{1}{2}$ times the maximum allowable working pressure.

363 *Thermometers.* Each *hot-water* boiler or heater shall have a thermometer so located and connected that it shall be easily readable when observing the water pressure or altitude. The thermometer shall be so located that it shall at all times indicate the temperature in degrees fahrenheit of the water in the boiler or heater.

Temperature Regulators. A temperature regulator which will operate to prevent the temperature of the water from rising above 200 degrees fahr. shall be used on all hot-water supply and hot-water heating systems in which the working pressure exceeds 30 lb. per sq. in. It shall also be used on all closed systems irrespective of the working pressure.

FITTINGS AND APPLIANCES

364 *Bottom Blow-off Pipes.* Each boiler or heater shall have a blow-off pipe, fitted with a valve or cock, in direct connection with the lowest water space practicable.

THE AMERICAN ARCHITECT

365 *Damper Regulators.* When a pressure damper regulator is used, it shall be connected to the steam space of the boiler.

366 *Water Glasses.* Each steam boiler shall have one or more water glasses.

367 *Gage Cocks.* Each steam boiler shall have two or more gage cocks located within the range of the visible length of the water glass.

368 *Water Column Pipes.* The minimum size of pipes connecting the water column of a boiler shall be 1 in. Water-glass fittings or gage cocks may be connected direct to the boiler. The steam connection to the water column of a horizontal return tubular boiler shall be taken from the top of the shell or the upper part of the head; the water connection shall be taken from a point not less than 6 in. below the center line of the shell. No connections, except for damper regulator, drains or steam gages, shall be placed on the pipes connecting a water column to a boiler.

METHODS OF SETTING

369 Wet-bottom steel-plate boilers shall have a space of not less than 12 in. between the bottom of the boiler and the floor line with access for inspection.

370 *Access Doors.* The minimum size of access door used in boiler settings shall be 12 by 16 in. or equivalent area, the least dimension being 11 in.

371 The longitudinal joints of a horizontal return-tubular boiler shall be located above the fire-line.

HYDROSTATIC TESTS

372 A shop test of 60 lb. per sq. in. hydrostatic pressure shall be applied to steel or cast-iron boilers or to the sections of cast-iron boilers which are used exclusively for low-pressure steam heating.

373 *Hot-water* boilers for a maximum allowable working pressure not exceeding 30 lb. per sq. in. used exclusively for heating buildings or for hot-water supply, when constructed of cast-iron, steel cast, or wrought iron or plate steel or any combination of these, shall be subjected to a shop test of 60 lb. per sq. in. hydrostatic pressure applied to the boiler or, at the option of the manufacturer, to the sections thereof.

374 A maximum allowable working pressure in excess of 30 lb. per sq. in., but not exceeding 160 lb. per sq. in., will be allowed on hot-water boilers

or heaters constructed of cast iron, or of cast iron excepting the connecting nipples and bolts, used exclusively for heating buildings, or for hot-water supply, provided they are subjected as a whole or, at the manufacturer's option, in sections, to a shop hydrostatic test of $2\frac{1}{2}$ times the maximum allowable working pressure for an open system and 5 times the maximum allowable working pressure for a closed system.

All hot-water boilers or heaters that are to be used for a working pressure in excess of 50 lb. per sq. in. on open systems, or for a working pressure in excess of 25 lb. per sq. in. on closed systems, are to be subjected to a field hydrostatic test upon the boiler after it is installed. The boiler is not to be tested at a pressure in excess of the shop test required to be made by the manufacturer. For hot-water boilers or heaters constructed of cast-iron, or of cast iron excepting the connecting nipples and bolts, used exclusively for heating buildings or for hot-water supply, the hydrostatic pressure for the field test shall be $2\frac{1}{2}$ times the maximum allowable working pressure for open systems and 5 times the maximum allowable working pressure for closed systems. For steel plate boilers or heaters, the hydrostatic test pressure shall be $1\frac{1}{2}$ times the maximum allowable working pressure for open systems and 3 times the maximum allowable working pressure for closed systems.

375 Individual shop inspection shall be required only for boilers which come under the rules for power boilers.

STAMPING

376 Each plate of a completed boiler shall show a sufficient portion of the plate maker's stamp for identification.

377 *Name.* All boilers referred to in this section shall be plainly and permanently marked with the manufacturer's name and the maximum allowable working pressure, this to be indicated in Arabic numerals, followed by the letters "Lb."

All hot-water boilers or heaters are to bear a manufacturer's label, that is irremovably attached to the front section, stating the maximum allowable working pressure for which the boiler is allowed to be used on "open systems" and on "closed systems."

All heating boilers built according to these rules should be marked A.S.M.E. standard.

Industrial Information

In this Department there is published each week information as to the development of materials and methods, derived from reliable sources.

The Safe Stairway

Despite the constantly increasing dependence of man upon elevators in public buildings, the importance of the stairway does not decrease proportionately. In fact, the sense of the necessity for speed which elevators have augmented, makes him heedless of his step when elevator service is inadequate and he resorts to stairways. Particularly in times of danger, when fire or other cause demands a hasty egress, safety in stairways looms up as an element of considerable importance. In subways, where no artificial urging is needed to encourage such hasty egress, in schools or lecture halls, the test of a good stairway is made. And what is a good stairway but a safe one?

Several predominating factors commend the use of Universal Safety Tread, made by the company of that name, at 40 Court Street, Boston, for stairways, indoor and out.

The factor of safety in a stair tread depends on the non-slip character of the surface material used, and the absence of any hard supporting metal which in a short time become very slippery and dangerous. The wearing surface of the Universal Safety Tread is composed entirely of the mineral abrasive known in the trade as Alundum. This is an artificial preparation of corundum, the hardest material known next to the diamond. Alundum grains give this tread the highest efficiency as a non-slipping surface, while at the same time its extraordinary hardness insures permanence and durability to a very high degree. Thus perfect safety is combined with a maximum length of service.

As a stiffening element, a baseplate of light steel is used to which the abrasive composition is securely attached. In the process of manufacture this baseplate is coated on all sides with lead, making the finished product absolutely rustproof.

On all treads exposed to severe usage, especially on down-traffic stairways, the edges get the brunt of the wear. To meet this condition, reinforced nosings have been worked out, and a thick body of the abrasive material is presented where it is most needed.

It can be furnished, with or without nosing, in one piece, in any width up to 12 inches, thereby avoiding unnecessary joints.

The Universal Safety Tread is particularly well adapted to cement stairs, as it not only prevents slipping, but also acts as a metal guard to the edges of the concrete, thus preventing them from becoming chipped or otherwise defaced. Safety Tread also protects the stair itself from wearing out if it be made of wood. On iron stairs protection of some kind is very necessary, as they rapidly become slippery, and unless some measures are taken to prevent, many accidents result. The Universal Safety Tread has been made with a view to eliminating all these difficulties and to giving service of the right sort.

A Matter of Life and Death

A fire escape that will serve its purpose simply and surely, that will give confidence to its users and dissipate the fear and panic generally incident to a quick fire, needs no comment. Everyone wants one like this. An introduction is all that is necessary for architects to profit by the acquaintance.

The fire escape referred to is a device manufactured by the Davy Automatic Fire Escape Co., Syracuse, N. Y. It is a machine controlling a steel cable, to the end of which is fastened a life belt, and, the makers claim, is so positive and sensitive in its construction and operation that it will lower a small child or a heavy adult with equal safety. It is used only for descending, and has a carrying capacity of three persons per minute, one at a time, from a third or fourth floor, or one per minute from a twentieth floor. It is a pulley arrangement, the mechanism of which is simple and dependable.

A number of statements are set down by the makers to demonstrate its superiority and reliability. Enough of these machines are installed to empty the building of all occupants in less than four minutes. They are never provided except throughout an entire building and in numbers adequate for all the people, and including an allowance for the loss of the use of escapes on the side where the fire is located. They require no adjustment or manipulation by the user for varying weights. Automatically they lower a small child or a helpless person as safely as a trained fireman. If the belt is placed around such a person and he is

THE AMERICAN ARCHITECT

put out of the window, the Davy will do the rest, and more safely and gently than can human hands. Its use in hospitals and schools is therefore particularly apparent. Finally they are low in cost and require no attention after they have been installed.

Concrete Reinforcement

In the large variety of wire products made by the American Steel & Wire Co. their triangle mesh concrete reinforcement is of particular value to architects and engineers. This company has sales offices in the eighteen chief cities in the United States, beginning at 208 S. La Salle Street, Chicago. Here they may be addressed for a small technical pamphlet on the present subject. This pamphlet sets forth the essentials of concrete reinforcement and shows how triangle mesh steel wire reinforcement fulfills the conditions. It is stated that this material, providing even distribution of the steel, reinforces in every direction. The tension or carrying members are accurately spaced. A reliable mechanical bond is obtainable. A sufficient area of steel is provided in the cross wires of the triangle mesh reinforcement to prevent temperature cracks, thereby eliminating the necessity of laying additional reinforcement at right angles to the longitudinal or tension members. In this material the diagonal wires assist the longitudinal wires in carrying the load. This the makers claim as a unique feature of their product.

Ungalvanized reinforcing fabrics are recommended for the reason that both greater strength and better adhesive bond are provided. By the use of galvanized wire, on the other hand, the adhesion is to the coating on the steel and not to the steel itself. Furthermore, in the process of galvanizing, the steel is annealed or softened, thus reducing its elastic limit and ultimate strength.

A curious statement based on the assumption that concrete embedded in steel does not rust is made in the discussion of this material. The makers state that in the case of a smooth round rod used as reinforcement, it is more desirable to have a thin surface coat of rust than a perfectly bright and smooth one, provided the rust has not penetrated sufficiently to pit the steel and produce a scale. Such a slight coating of rust, they maintain, provides a rougher surface and hence a better bond.

Right here is reprinted a short paragraph from the *Scientific American* explaining the action of cement on rusted steel, and showing how rust disappears from iron bars, etc., in the process of erecting reinforced concrete structures.

Certain valuable formulae and tables are presented in the booklet which give further information on this important topic.

The Effect of Good Illumination on Surroundings and Morale

If a mill is well lighted throughout, it will be tidy, for litter and refuse will not be permitted to accumulate, if it is clearly visible to the superintendent. Waste material always tends to gather in dark corners. Shop sanitation is an important element. A well-lighted shop is pleasant to work in. It attracts and holds employees. In view of the possibilities of even greater labor shortages this feature is of much importance, for contented employees certainly constitute an essential asset. Cases are on record where one mill in a section has been markedly better illuminated and has actually, through this means, obtained the very pick of the hands in the surrounding country.

Good lighting is also reflected in faces of the operators, in the form of healthful, buoyant spirits. Bad lighting is irritating because it makes it difficult to see, and strain is involved in the efforts of workers to adapt themselves to unnatural conditions. The mind, unconsciously perhaps, becomes obsessed with the idea that it is being imposed upon. Everyone has seen this condition evident in employees, possibly the reader himself has experienced this feeling of resentment. Bad lighting will react to produce nervous, irritable, discontented employees.

Any plant manager knows that the experienced or trained man is an asset not easily replaced. If this man has been working continuously under insufficient illumination, its detrimental effect will eventually show up in his failing eyesight. He becomes incapacitated at the very time when he should be yielding the biggest return on the investment made in training.—*From a bulletin issued by the Edison Lamp Works, General Electric Co., Harrison, N. J.*