A PROPOSED CAMPANILE FOR KANSAS STATE COLLEGE

by

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INTRODUCTION

The purpose of this thesis is to review and formulate the history and information concerning bells and campaniles which will aid in the designing of a campanile suitable for Kansas State College. It is hoped that the showing of a design for such a structure with the accompanying model will further stimulate the interest of both students, faculty members, and others in the ultimate completion of such a project.

The design for such a tower began about two years ago when the senior Architectural Design Class, of which I was a member, was given a problem of designing a campanile for the campus. The problem was of great interest to me and became more so when I learned that the problem had been given to the class with the thought in mind that some day a campanile would be built.

Up to that time very little work had been done on such a project. Some literature on bells and towers had been collected and a very few rough sketches on the design of such a tower had been made. This latter work ended, however, upon the graduation of the student who made them.

With so little work accomplished on such a project, I felt that it would be quite beneficial to myself and to the college to at least study and design a Proposed Campanile. With this view in mind, then, I chose the study of this subject.

The first part of the thesis takes up the history of bells, how they are made and tuned, and the required qualifications. Also, a short history and description of the early campaniles. The old primitive methods of playing the chime or carillon are contrasted with the modern methods of playing.

The last part of the thesis has taken up the studies that I have made in developing a suitable design as well as a discussion of each. Blue prints showing the plans, elevation, and section of the proposed tower are illustrated, as well as photographs of a model which was made to study the design from various views and angles.

The method used in the gathering of this material was to make myself as well acquainted as possible with this project by reading every important work on the subject that I could find. The information used in designing the tower has been attained through the experience and training received in my architectural design classes. The information thus obtained was used to describe and illustrate the Proposed Campanile.

THE EARLY HISTORY OF BELLS

There seems to be no trustworthy evidence of any bells in existance before the Christian Era and the only instrument which was used to summon the Romans to public baths or processions was a probable cymbal or resonant plate of metal which emitted some sort of rattle. The earliest Latin word for a bell (Campana) is late Latin of the fourth or fifth century A.D., and the first application of bells to churches has been ascribed to Paulinus, Bishop of Nola, in Campania about 400 A.D. There is, however, no confirmation of this story.

It has been maintained with somewhat more reason that Pope Sebinianus (604) first used church bells, but it seems clear that they were introduced into France as early as 550. In the seventh century Bede mentions a bell brought from Italy by Benedict Biscop for his abbey at Wearmouth, and speaks of the sound of a bell being well known at Whithy abbey at the time of St. Hilda's death in 680. St. Dunstan hung many bells in the tenth century, and in the eleventh century they were not uncommon in Switzerland and Germany.

Several old bells are extant in Scotland, Ireland, and Wales. The oldest are often quadrangular, made of thin iron plates, hammered and riveted together. A well known specimen is St. Patrick's bell preserved at Belfast which is called "the bell of St. Patrick's will". It is six inches high, five inches broad, four inches deep, adorned with gems and gold and silver filigree-work and is inscribed 1091 and 1105 but it is probably the bell alluded to in Ulster annals in 552. In these early times bells were usually small. Even in the eleventh century a bell presented to the church at Orleans weighing 2,600 pounds was thought to be large.

To these scanty records of the early history of bells may be added the enumeration of different kinds of bells by Hieronymus Magius.

1. Tintinnabulum, a little bell for refectory or dormitory.
2. Petasius, or larger broad-brimmed hat bell.
3. Codon, Orifice of trumpet, a Greek hand bell.
4. Nola, a very small bell used in the choir.
5. Campana, a large bell, first used in the Latin church towers.
6. Squilla, a shrill little bell.

BELL FOUNDING

The earliest bells were probably not cast, but made of plates riveted together. Later when casting was adopted, the earliest founders travelled about the country, setting up a temporary foundry to cast bells wherever they were wanted.

The chief English bell makers lived in London, York, Gloucester, and Nottingham and included Miles Graye (1605); Samuel Smith, father and son, of York (1680-1774); Mot, sixteenth century; Lester and Pack (1750); Christopher Hodson of London (who cast "Great Tom" of Oxford, 1681); Richard Phelps (1716); and H. Bagley (eighteenth century), all of whose works are still in high repute. The white-chapel Bell Foundry (now Mears and Stainbank) established by Robert Mot in 1570, incorporated the business of the Rudhalls, Lester and Pack, Phelps, Briant, and others, and is now one of the leading firms of bell founders. Others are Gillett and Johnston, Croydon, and Taylor and Company, Loughborough, the founders of "Great Paul" for St. Paul's Cathedral (1881). The only makers of bells in America are the Watervliet Foundry (Andrew E. Meneely and Alfred C. Meneely), Watervliet, New York, and The J. C. Deagon, Incorporated, Chicago, Illinois.

The bell is first designed on paper according to the scale of measurement. Then the outer mold is formed in an iron case lined with loam which is a mixture of special adhesive kinds of sand, cow hair, and other ingredients. A "strickle board" is fixed to an arm and central bar and is swept around the loam until the required shape has been formed in the case. Then the inner mold, called the core, is made which consists of a structure built up of bricks, tier upon tier, and then coated with the same loam as that used in the outer case. This mold is given it's shape by the use of another strickle board in the same manner as was used in the shaping of the outer case. These are the first or rough coats applied to the molds which are then placed in an oven to be thoroughly dried. This process may take two or three days in the case of medium sized bells and longer in the case of larger bells.

After the molds are dry they are brought out and coated a second time with a finer mixture of loam, and then returned again to the ovens to be dried. After this the surface of the molds are blacked and "sleeked" so that the castings may come out clean and smooth. Most bells have some kind of an inscription upon them and it is at this stage of the making that the words are stamped in the outer case.

The molds are then put together, the case filled over the core, and the metal having been brought to the correct temperature is then poured into the mold. The bell-metal is a mixture of copper and tin in the proportion of about four to one. In Henry III's reign it was about two to one.

In Layard's Nineveh bronze bells it was ten to one. Zinc and lead are used in the making of small bells. The cooling process takes about twenty-four hours in the case of moderate size bells or as much as a week in the case of larger ones. The case is then lifted off, the core knocked out and the bell is trimmed and sandblasted to remove the black and grease. In the American foundry this work is done with the use of a buffing wheel to bring a high polish to the surface of the bell.

BELL TUNING

Much curiosity exists and questions are often asked as to how the bells of a carillon are tuned. The process as a whole demands large experience, much scientific knowledge, and the possession of an ear which is responsive to extreme differences in pitch. Tuning a carillon is a matter of finest craftsmanship. Van der Straeton, says a fine carillon is as precious as a violin by Stradavarius. Once in tune, however, the carillon remains so through the ages.

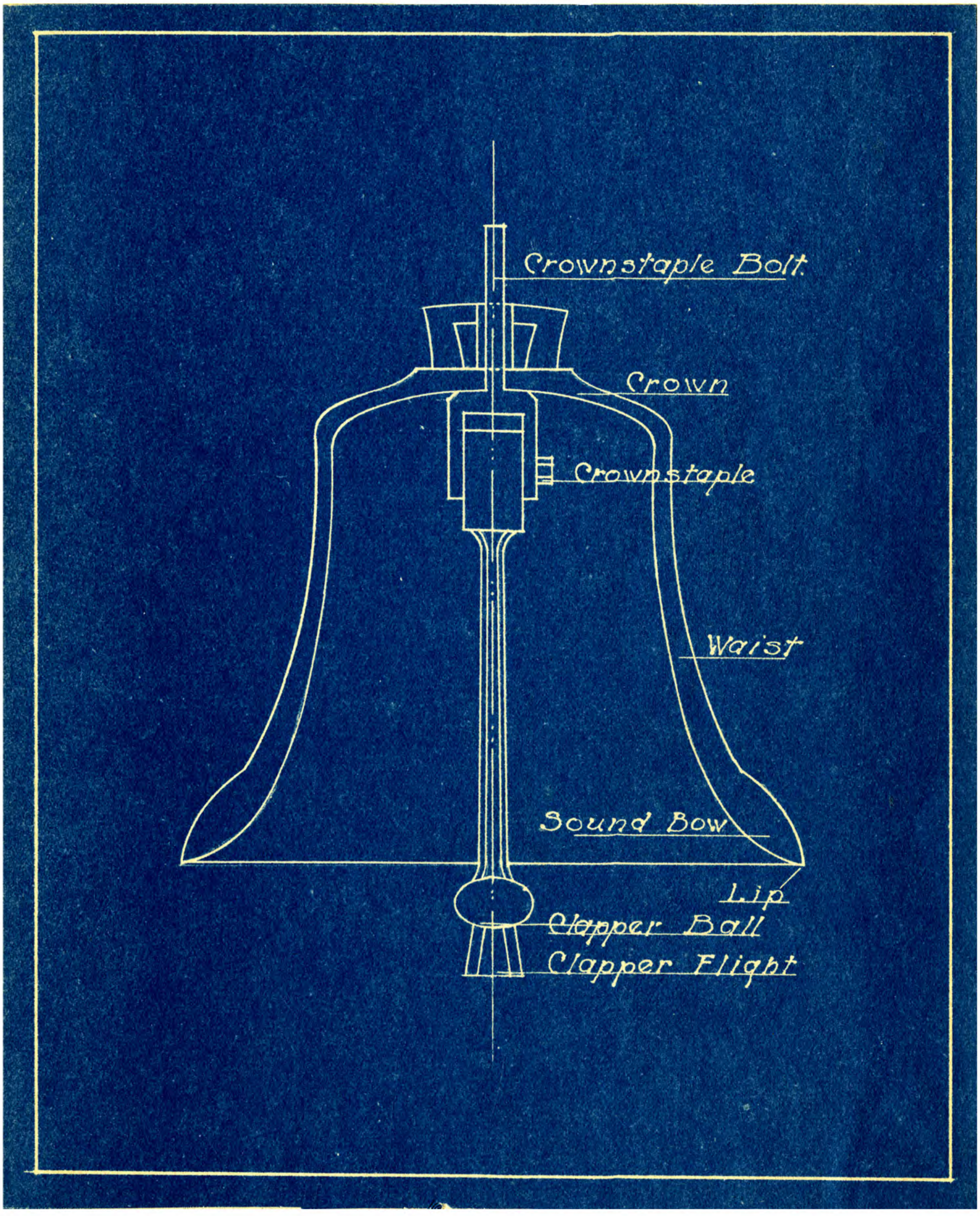
The actual mechanical operations of tuning are more or less a trade secret and as such are carefully guarded. The London Daily News, nevertheless, published an article which contains what seems to be a fairly accurate statement of these operations and the following description of the mechanical phases of tuning is substantially derived from this article.

"Primarily it can be said that the pitch of a bell has a direct relationship to its interior diameter. The greater this diameter the lower will be the note. Exterior and interior curves, composition of the metal, its temperature at casting and cooling are also elements in the making of a perfect bell. Yet it is by varying the interior diameter that its pitch is chiefly affected.

When a bell is to be tuned it is placed upon its crown, Plate I, on a special vertical lathe having a revolving platform above which is a rigid but adjustable arm extending downward into the inverted bell and holding a cutting tool. The platform with the bell firmly bolted thereto is then set revolving, and by a proper adjustment of the arm and cutting tool circular shavings of metal can be turned off from any part of the interior of the bell.

It is always intended that a bell shall come from the mold so as to give a note slightly above that called for in the specification, for that particular bell. In other words, that it shall have as molded a diameter less than it is to have when finally tuned and finished. The endeavor is always to play on the safe side and give an excess of

PLATE I



SECTIONAL VIEW OF BELL

metal in certain portions of the interior of the bell. All of this is because tuning consists generally in flattening its interior diameter by turning off shavings of metal by the process mentioned above. Just at what points the shavings shall be removed and how thick the shavings shall be, in large, measure the secret of tuning. Sharpening the pitch is also possible but to a very slight degree only by turning off metal from the extreme bottom, or rim of the bell thus lessening its diameter at that point. But such cutting of the rim shortens the height of the bell and is an extremely dangerous operation as any change of this kind may seriously injure the timbre of a bell".

Now that some idea is known about the method used in tuning bells, attention should be turned to the specifications and quality of the bells which a foundry will use in producing a bell of some certain note.

Mr. Frans Hemony, who is a noted Flemish bell maker, declares that a bell should give forth three octaves (the middle one being the strike note) two fifths, and the major and minor thirds. This theory of tuning which is employed by the best English bell makers has been summarized as follows:

1. A bell must be in tune with itself before it can possibly be in tune with others.

2. Every bell has at least five tones which can be most accurately tuned.
3. The principle tones are: strike-note, nominal (above), and hum-note (below) which three should be perfect octaves with each other and the tierce (minor third) and the quint (perfect fifth) between the strike-note and the nominal. All these must be in perfect tune with each other.
4. The timber of a bell depends (a) on the consonance of its component tones; (b) on the relative intensities of the various tones, which in their turn are dependent upon the minute accuracy of sharply defined height, width, and thickness proportions. These again must be so adjusted as to admit several tones being perfectly tuned without upsetting the ratio between the thickness proportions and other dimensions of the bell.

The completion of one bell will lead to another so the specifications are for a carillon of bells as compiled by Mr. Fredrick C. Mayer of West Point, whose comprehensive knowledge of bell tones and wide acquaintance with carillon construction have rightly earned for him a deservedly high place in tower music development.

A carillon may be defined as a group of at least twenty-three bells proceeding chromatically (all full tones and semi-tones) up through two or more octaves.

A chime may be defined as a set of bells less than twenty-three in number. The usual chime has from twelve to eighteen bells. The definitions and conclusions as Mr. Mayer gives them to us are as follows:

1. A carillon requires that all of its bells be in good tune among themselves, just as all of the notes of a piano are required to be in good tune among themselves. Our modern conception of music demands that the notes of the carillon (that is the principle tones or striking tones) be tuned, collectively, to an accurately tempered scale, preferable in International Pitch, C:517.3.
2. A carillon also requires that each bell must have at least the five tones of the harmony series (the series of overtones) within each individual bell in good tone. The names and musical intervals of these five tones are as follows, arranged beginning with the lowest of the series:

   Hum-tone: a perfect octave below the strike-tone.

   Strike-tone: the principle tone of the bell, since it is heard at the most prominent member of the series at the instant of striking; consequently it is taken as the basis from which the other tones are measured.

Third: a minor third above the strike-tone.

Fifth: a perfect fifth above the strike-tone.

Octave: a perfect octave above the strike-tone.

It must be thoroughly understood that the proper tuning of the above mentioned tones within each bell can be and must be controlled by the bell founder. Thus, the tuning of a carillon differs radically from that of any other musical instrument.

3. An exceptionally fine bell will have the next two tones of the harmonic series also in good tune. The names and musical intervals of these are as follows:

Upper third: a major tenth (i.e., octave of the third) above the strike-tone.

Upper fifth: a perfect twelfth (i.e., octave of the fifth) above the strike-tone.

These tones which are the sixth and seventh members of the series of overtones are to be found in tune not only in the best bells of certain English bell founders of today, but also in the best Flemish bells of the seventeenth century, especially in those made by Frans and Pieter Hemony. While carillon bells are now being tuned on the 5-tone system, refined musical taste will soon demand a 7-tone system, including the upper third and upper fifth.

4. While the series of overtones within each bell continues upwards indefinitely, the strength and importance of these higher members diminish in proportion to their increased distance from the strike-tone. It is easily possible in the future that improved methods in the designing, casting, and tuning of bells may result in bringing more of these higher overtones under control. The lowest bell in the largest carillon ever cast, that of E:20,720 pounds, which hangs in the Park Avenue Baptist Church, New York, permits of thirteen members of it's harmonic series being easily recognized.
5. Fourth: a perfect fourth above the strike-tone. This is an unwelcome visitor to the well ordered series of overtones occurring only in the larger bells. This fourth can usually be heard when a bell attains a weight of about 5,000 pounds. When a weight of 10,000 pounds and over is reached, the problem of restraining this fourth becomes a serious one.

While the presence of this interval does not interfere unduly with the musical effect of the deep rich tones of these larger bells, yet we expect the science and art of bell founding to eliminate this disturbing fourth at some time in the future.

6. The tone of a bell whose principle harmonies are in tune will sound true, clear, and harmonious in quality, appealing to the affections musically and blending well with other tones. The tone of a bell whose principle harmonies are not in tune will sound proportionately false, dull, lifeless, and inharmonious in quality.

In these past few pages have been given some idea of the history of the bell, its early uses, how the bell of today is cast and tuned, and specicifications of the requirements of a truly tuned bell. One may ask as to the size of bells and these we find to vary from about six to eight inches in diameter and weighing approximately ten pounds up to bells which weigh many tons. Among the larger bells will probably be found a great deal of interest. A few of these are of world wide renown, and several others more or less celebrated. The great bell at Moscow, "Tras Kolokal", which was cast in 1733 was in the earth 103 years and was raised in 1836. The present bell seems never to have been hung or rung, having been cracked in the furnace. It now stands on a raised platform in the middle of a square. It's full weight is about 180 tons; height, nineteen feet, three inches; circumference, sixty feet, nine inches; thickness, two feet; and the weight of the broken piece about eleven tons. The second Moscow bell, the largest in the world in actual use, weighs 128 tons. In Burma hangs a bell sixteen feet in diameter, weighing about eighty tons. The eighteen and one-fourth ton bell of the carillon of sixty-four bells in Riverside Church, New York, is the biggest bell in the world that has ever been tuned and the largest bell that has so far been cast in England.

THE EARLY HISTORY OF CAMPANILES

Some consideration should now be given to the tower within which the bells are placed. Such a tower is known as a campanile and may be said to have been a bell tower used in connection with churches and town halls in Italy where they are supposed to have first originated. The earliest campaniles are those of the churches of S. Appollinare in Classe, and S. Appollinare Nuovo at Ravenna, variously dated from the seventh to the tenth century. These are simple round towers without decoration and with small, round, arched openings in pairs near the top. The more usual type of square campanile appears frequently from the tenth century onwards, and was apparently developed simultaneously in Rome and Lombardy. It is generally decorated by means of projecting vertical strips, known as pilasters and ranges of arcaded cornice which divide the tower into several stages. Each stage has openings on all four faces, either single, double, or triple arched openings being used. Where double or triple arches are used, there is frequently but a single column between the adjacent arches, so that a capital between the column and the arches becomes necessary. The top of the campanile has an arcaded cornice little, if any, larger than the cornices below. The roof in early examples is usually a pyramid of low pitch and invisible from the ground. This remained the Roman type throughout the Middle Ages, although many variations occurred. Such changes as the rise of a classic type of cornice and the enlargement of window openings were quite noticeable. In general, the tendency in Roman examples is towards horizontality rather than verticality of effect.

The campanile reached it's most highly organized forms in the north. The Lombards were obviously a tower-building prople and they found in the campanile a great opportunity. The early tower of S. Satiro in Milan, of the late ninth century, already showed an advanced composition of horizontal stage. In the later and much larger northern campanile of S. Ambrogio in Milan (early twelfth century) semi-circular projections like engaged columns break up the stages and give additional vertical lines. The top story so developed that it gave the effect of a crown to the whole composition and was finally completed by a pyramidal, and sometimes a conical spire, even when the tower below was square in which case the tower was first capped by a balustrade.

The spired and crowned tower became a favourite in Venice by the elimination of horizontal cornices and large openings below the belfry stage. Every effort was made to develop a sense of height. The Venetian campanile consisted of a tall, square, slim shaft frequently tapered, and rose unbroken to the open belfry at the top. The belfry had one or two stages of arcade, and was often in stone although the rest of the tower was of brick. Above the belfry cornice rose the spire, sometimes square as in the famous campanile at Venice. This type of tower, owing to it's perfection, remained in constant use far into the Renaissance period.

Two campaniles of mediaeval Italy do not belong to any of these types. The famous leaning tower at Pisa is a circular structure of great beauty and richness with a heavy wall surrounded by stages of arcaded galleries. The other great campanile is that of Florence which uses the Lombard tradition of horizontal stages but attains a sense of lightness by the daring octagonal corner buttresses and the enlargement of the belfry stage which is about twice as high as any other.

The great height of many of these Italian campaniles is very notable. The total height of that campanile at Venice is 320 feet; at Florence 275 feet; of the Palazzo del Signore, Verona 250 feet; and at Cremona 396 feet.

With the advent of the Renaissance and the subsequent popularity of the dome, the rise of campaniles, except in Venice, diminished quite rapidly until in the last two centuries when their popularity was restored.

METHODS OF PLAYING THE CARILLON

Until very recent years the carillon has been played in a very primitive method and even in Europe and England today we find these methods still being used. The first method was mechanical and generally a great revolving drum is the device used. Pins or studs of iron are placed in holes on the surface of the cylinders arranged so that as the cylinders revolve they trip levers connected with hammers which strike the outside of the bell. Sometimes there are 10,000 or more holes suitable to receive the pins, say 100 rows, or measures of 100 holes each. Thus, an unlimited number of tunes may be played. In order to secure the quick repetition of a note, a single bell is sometimes equipped with as many as six hammers. The pins are variously offset from their centers. Thus, a bell may be sounded by the rise of a properly selected pin at any or all of several points in a measure. Tunes are set upon the cylinders by the carillonneur and by periodic changing are made appropriate to the season of the year.

The second primitive method was the ringing of bells by hand. Playing by hand by the means of ropes attached to the fittings of the bells, whereby the bell itself is moved just so that the clapper ball touches it's side, is technically called "chiming". Ringing, technically is the case in which the bell is swung around nearly a full circle with it's mouth uppermost in which case the impact of the clapper is much heavier and the sound produced is much louder and more far reaching.

The mechanical ringing is more common in America and on the continent of Europe, especially in Belgium and Flanders. Ringing by hand is more common in England where the development of change ringing has brought it into prominence. So much for the older methods of bell ringing.

The art and science of bell ringing has developed, within the last few years, two new methods of playing to replace the older ones which should be discussed briefly since both will be proposed in the campanile for the college.

In place of ringing or chiming the bells by ropes, the clavier and console have been developed and introduced, both of which have keyboards. The console somewhat resembles the keyboard of a piano or organ. It's exact designation is then "Carillon a Clavier".

The keys of the clavier are somewhat different from those of the console in that they are made of wood and instead of being built into a keyboard they project out from the face of the clavier about six inches. The carillonneur plays seated in front of the instrument; a bell being sounded by pressing down on the wooden key which is connected by levers and wire with the clapper of it's corresponding bell. Each clapper when at rest is held by a spring and guide wires in an exactly defined position close to the inner sound bow. The bells are all hung in parallel lines, one row above the other--the heavier bells at the bottom and the lighter ones in the upper rows.

The bells of the lowest octave are connected also with a pedal clavier. This is done for the reason that the larger bells require a force stroke when it is desired to bring out their full tones. This arrangement gives the carillonneur greater command of the resources of his instrument by allowing the use of both hands and feet and so enables him to play music in three or more parts.

At this time much might be said about the technique of playing the carillon but what I could add would only be from the pages in a book. More profitable then could be the notes of a noted carillonneur on the technique of playing. The following is a note written by Mr. Rocke who is a carillonneur at Morristown, New Jersey:

"The acquisition of technique in carillon playing is, perhaps, one of the lesser difficulties that precede complete mastery of the instrument. For the actual physical elements are few. An experienced organist would find carillon playing a simple matter; a pianist would, of course, have to undertake the practice of the pedal board before he could perform accurately and rapidly with his feet.

"The side of the hands is used, the curved little finger engaging the lever. The stroke is a pressure stroke; the impulse coming from the upper arm muscles. However much it may appear to an observer that the performer is "striking" the levers, very little striking is done. Even in staccato scale and arpeggio playing the movement is rather a rapid, light pressure than a blow. In tremolando (the principal means of sustaining legato melodies) the pressure is increased so as to keep the lever low during the very rapid iteration of the note or notes.

"Advanced players acquire enormously strengthened fingers in playing two and three notes with one hand (in this case the hand is held out straight and the fingers stretched to reach the wide intervals) and players of the highest accomplishment can play a triad tremolando with one hand. The pedal playing differs from organ pedal-playing in some respects. The heels are not used. There can be little "crossing" although arpeggios can be quite easily played if the "footing" is looked over first. The left foot will be used almost entirely for the lower half and the right foot for the upper half of the pedal levers but, in actual playing, it will be found that good organ pedal technique is an aid to the carillonneur and if the latter be also a practising organist he will be relieved to know that his carillon pedalling will not interfere in the slightest with his organ pedalling.

"When the few physical elements have become a part of the player's habits the further development of individual technique is solely a matter of psychology; the ear and the sense of touch guiding him entirely. The desired "pianissimo" prepared itself through the instantaneous response of the sense of muscle pressure; "touch" if you prefer the word. In this respect carillon playing offers practically all the fascinating problems in dynamics that the pianist enjoys. The carillonneur who thrills his audience with the multitide of gradations of tone, single and in combination, has passed through the same preparation that the pianist has.

"The real difficulty in carillon playing is the acquisition of the art of transcription. The most accomplished musician will find it necessary to listen long to the bells, analyse thoroughly the splendid examples (when he can get them) of the transcriptions of Denyn, Brees, and Lefevere of ancient and modern works; hear the works played by the men who have prepared them for the carillon and welcome all the criticism he can possibly obtain from experts.

"The carillon art is a very individual one. No two players handle the levers alike; obtain nuances and effects in just the same way; or transcribe and perform in an identical manner. In this factor lies inexhaustible possibilities for the enthusiast."

To take the place of the old cylinder or drum method of playing, the console has been perfected in a fashion, the mechanism of which resembles that of a player piano. The keyboard is also like that of a piano. Paper rolls, of the tunes of music desired are placed in the electrically controlled console and played with the accuracy of an experienced carillonneur. Such a device is made so that a clock will turn the player into operation at any desired time.

If, however, it is not desired to use the automatic console a carillonneur may play the instrument in the same manner as the piano is played. This is known as electric ringing. Such an instrument as perfected by the Meneely and Company of Watervliet, New York, has wires leading from the console to relays located near the bells and wires from the relays running to solenoids or large magnets which are connected to the bell clappers. Pressure on the keys transmits the electricity to the solenoids which pull the clappers. Quick playing is thus secured--repeat blows at the rate of three per second are possible on any one bell.

THE PROPOSED CAMPANILE

The Site

As to just where such a tower might be erected on the campus is quite hard to determine because of the many requirements necessary and also because of the fact that there does not exist today a campus plan which defines the location of any possible future buildings. Had there been a plan developed, a proposed site would probably have been definitely located. Under existing conditions, it would, therefore, be impractical to arbitrarily propose a future site as it might interfere with the possible location of future buildings. With that fact in mind then a few possible sites will be suggested.

One good possibility would be the removing of the old Illustrations Buildings and erecting the tower in the quadrangle formed by the Library on the north, Anderson and Denison Halls on the south, the Shops on the west, and the Education Building on the east. This site would then be on an axis with Anderson Hall.

Another site would be located immediately north of the Library. This site would form a quadrangle with the Library on the south, the east and west wings of Waters Hall on the north, and proposed future buildings on the east and west sides. I do not believe that this site would be quite so desirable as it is a little too near the north side of the campus.

It was thought that another possible site might be found in the quadrangle on an axis between the Library and Power House, but with the already existing smoke stacks and the water tank, I do not believe that this site would be very desirable. There would be too many disturbing vertical elements.

A fourth site might be suggested in the quadrangle formed by the Auditorium on the east, Calvin Hall on the west, Fairchild Hall on the north, and Nichols Gymnasium on the south.

The irregular shaped plot of ground immediately in front of Anderson Hall might be another possible site. This site, unlike the others, is not surrounded by buildings which may be quite an advantage since the music of the bells would not be interfered with. I hardly believe this question would arise, however, since the lowest bells would be over seventy feet above the ground--this height exceeding that of the library which is the tallest building on the campus. The ideal location would be to erect the tower in a larger area than those suggested so that the tower might face a large mall, but the lack of space on the campus may eliminate this suggestion. However, the site that is chosen should be quite large and not be too crowded with high trees and buildings.

Designing the Campanile

In the past few years there has developed a keen interest among the students and faculty members of the college for the erection of a campanile. To many, it was just a dream, but to others it appeared to be a true story still untold, that some day we will have a beautiful singing tower on our own campus.

The first work to be done on this project was about two years ago when a design problem was issued to the Architectural Design Class. This problem proposed a campanile for the college and among the requirements were listed the following:

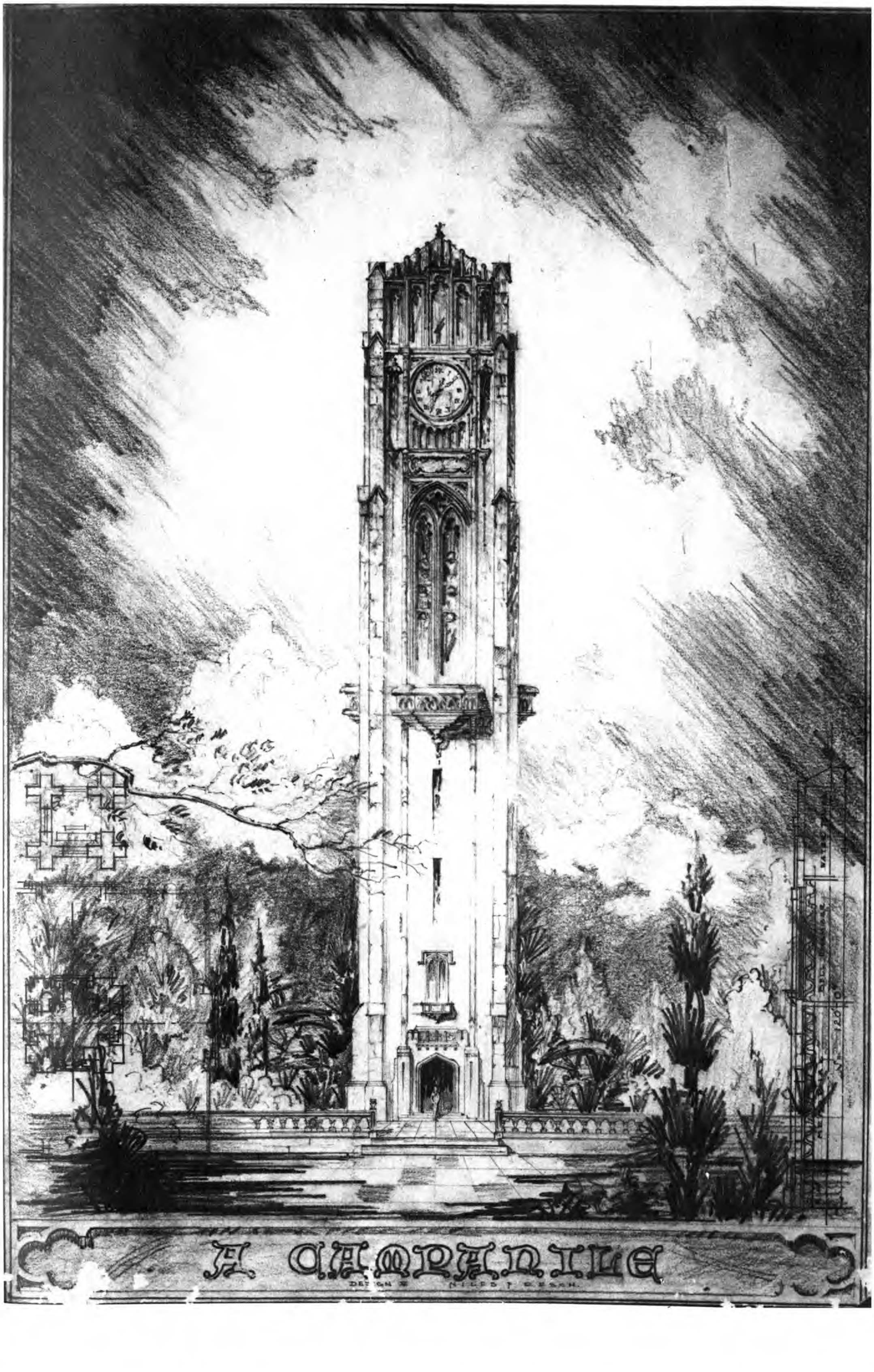
1. The height of the tower shall not exceed 150 feet.
2. Material used to be of native stone.
3. The design of the tower shall conform to the style of buildings already on the campus.
4. In the top of the tower shall be incorporated a water tank which will eliminate the present water tower.
5. Also, in the top of the tower shall be located a clock--the faces of which will be seen on all four sides.

Thus, the competitor was free to design a tower as he wished as long as the elements as listed in the program were incorporated. As many different designs were submitted as there were students in the class. On Plate II is a picture of the first design which was drawn and submitted by the author.

PLATE II

A RENDERED STUDY OF

A TOWER


A CAMPANILE

This tower, as designed, is of a Gothic style of architecture, stands 123 feet high, and is twenty-five feet across the base. Around the tower is a stone terrace sixty-four feet square. The first floor was designed to be a memorial room in which would be located bronze tablets in memory of those for whom the bells were to be given. A spiral stair would lead from this room to the console room and above that to the clavier room. In the former room would be placed the console or keyboard which is played much like a piano. In this room also would be placed any automatic mechanism or instruments of control. The clavier room would contain only the clavier which is situated immediately under the bells. A steel ladder would lead from the clavier room to the bell chamber above, in which would be located the bells. In the design, sufficient height was allowed to accommodate as many bells as may be desired. The number would depend upon the amount of funds available to purchase the bells. Above the bell chamber was provided sufficient space to accommodate the mechanism of the clock and a water tank.

From the picture it might be said that this tower appears quite graceful and the character of the design does present some suggestion of music in that it is tall and slender and sufficiently ornate. On the other hand, it may be criticized as appearing to be a little top heavy because of the space provided for the water tank. Then too, one might ask if the tower really needs to be so ornate to be beautiful. Personal judgment and taste would answer this question, but to say the least it would be much more economical to build a tower not quite so ornate and the design still be in harmony with existing college buildings.

A second sketch was then prepared showing a more simple and massive design with less ornamentation, and more suitable to and in closer harmony with the character of existing buildings on the campus. A very rough sketch of such a tower was drawn and is illustrated on Plate III. From studies of this type, a more detailed tower was designed and submitted as is illustrated on Plate IV.

This illustration is of a rather simple design, more massive in character with buttresses accentuating the four corners. The tower stands 154 feet high and is thirty-eight feet across the base. As in the first design submitted, the tower contains the Memorial Room, the console and clavier rooms, the bell chamber, and in the top there is sufficient space for the mechanism of a clock. In this design the water tank has been enlarged to hold 110,000 gallons of water which is the capacity of the present water tank. Some features are found in this design that are not

PLATE III

A STUDY IN MASS

PLATE IV

A DESIGN WHICH INCORPORATES THE

CLOCK AND WATER TANK

PLATE IV

A DESIGN WHICH INCORPORATES THE
CLOCK AND WATER TANK

present in the first one, particularly the fact that it is a simple and economical design. A very unpleasant element in this second sketch does exist; namely, in the enlargement of the water tank compartment, the tower appears rather top heavy and too weak in appearance through every section of the bell chamber. In other words there appears to be too heavy a mass of masonry wall above the bell chamber grille.

To eliminate this heavy mass above the bell chamber opening, the distance from the top of the window to the top of the parapet wall was shortened. Additional studies were made and it was found that by decreasing this distance the proportions of the design were enhanced, and the appearance of excessive heaviness above the tracery windows was reduced. The water tank and clock was therefore discarded as requirements of the problem. This removed two of the requirements of the original problem but after due consideration it was thought quite advisable since the additional weight of the tank and water would also bring about a more serious problem structurally.

The Proposed Campanile as Submitted By the Author

With the changes in the tower as discussed in the last paragraph, a design is obtained which is quite simple, pleasing to the eye, and more economical to build, since considerable masonry, the clock, and the water tank have been eliminated. Thus, we have a design of the Proposed Campanile as submitted by the author--illustration of which appears on Plate V.

The tower of Gothic design stands 134 feet, six inches high from the ground to the top of the parapet wall and is thirty-six feet, six inches across the base including the depth of the buttresses. Native stone masonry, as used in the other buildings on the campus, has been indicated in the design of the tower. On Plate VI, and Plate VII, are blue prints of the front elevation and a section of the tower.

As suggested in the other studies, the first floor, Plate VIII, shall be the Memorial Room and above this shall be the control room. From this room, admittance to the upper part of the tower may be had and here also will be placed control valves and switches for heat, light, and power. Any necessary storage space may also be found in this room. The next room above shall be called the console chamber in which is located the console and any automatic mechanism. Sufficient space is also allowed on this floor for a small music library. The clavier shall be located in the clavier chamber above the console chamber. This

PLATE V

A RENDERING OF THE PROPOSED

CAMPANILE

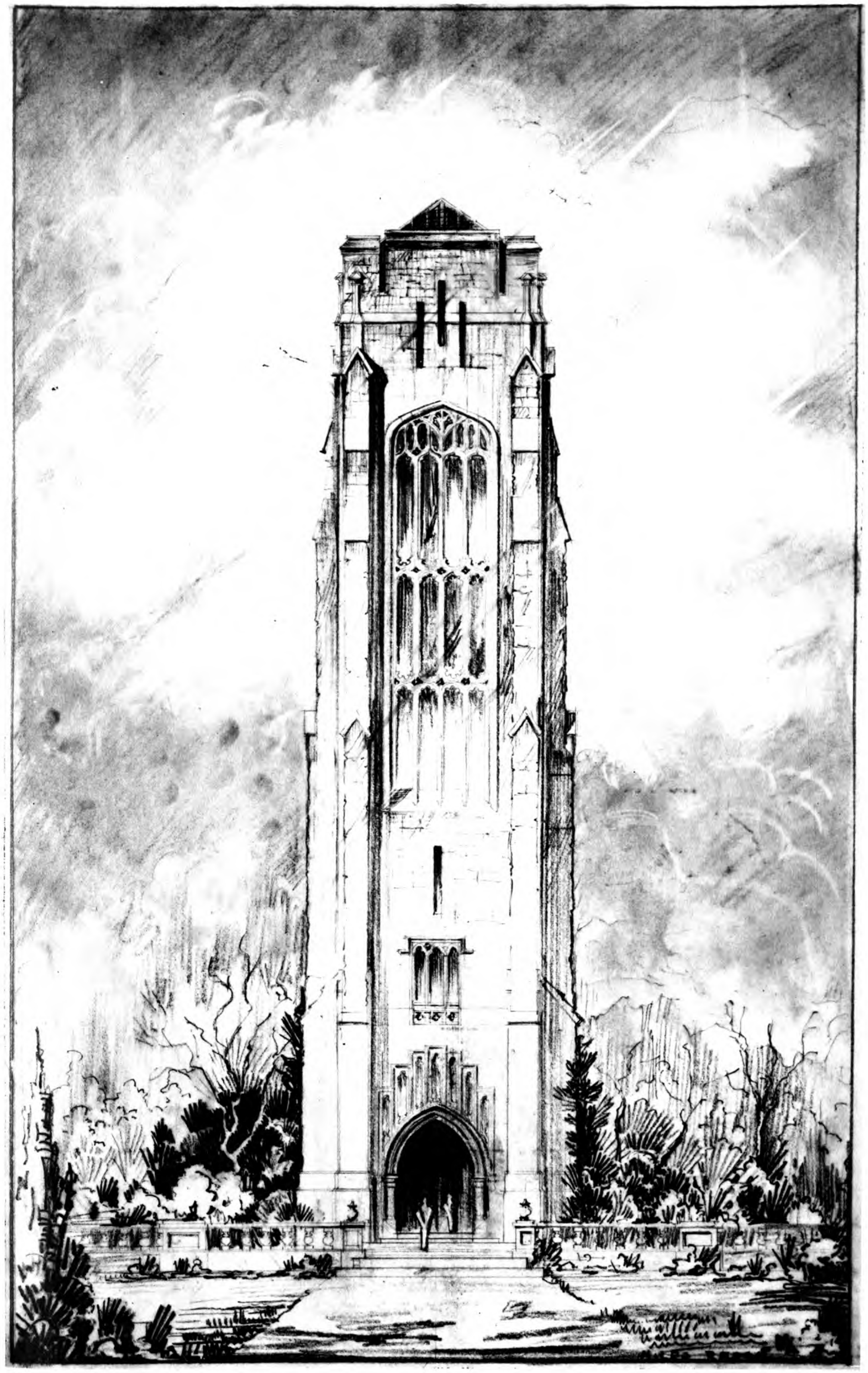
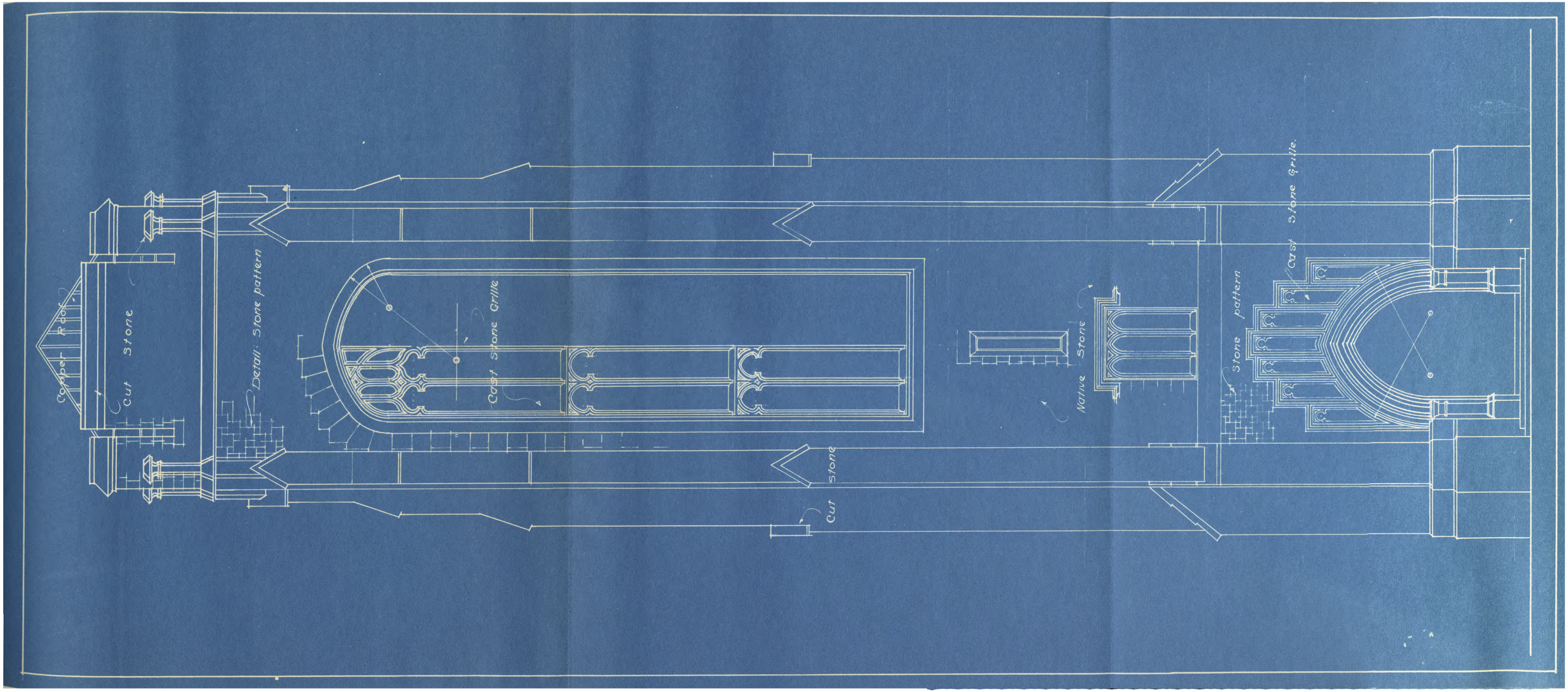
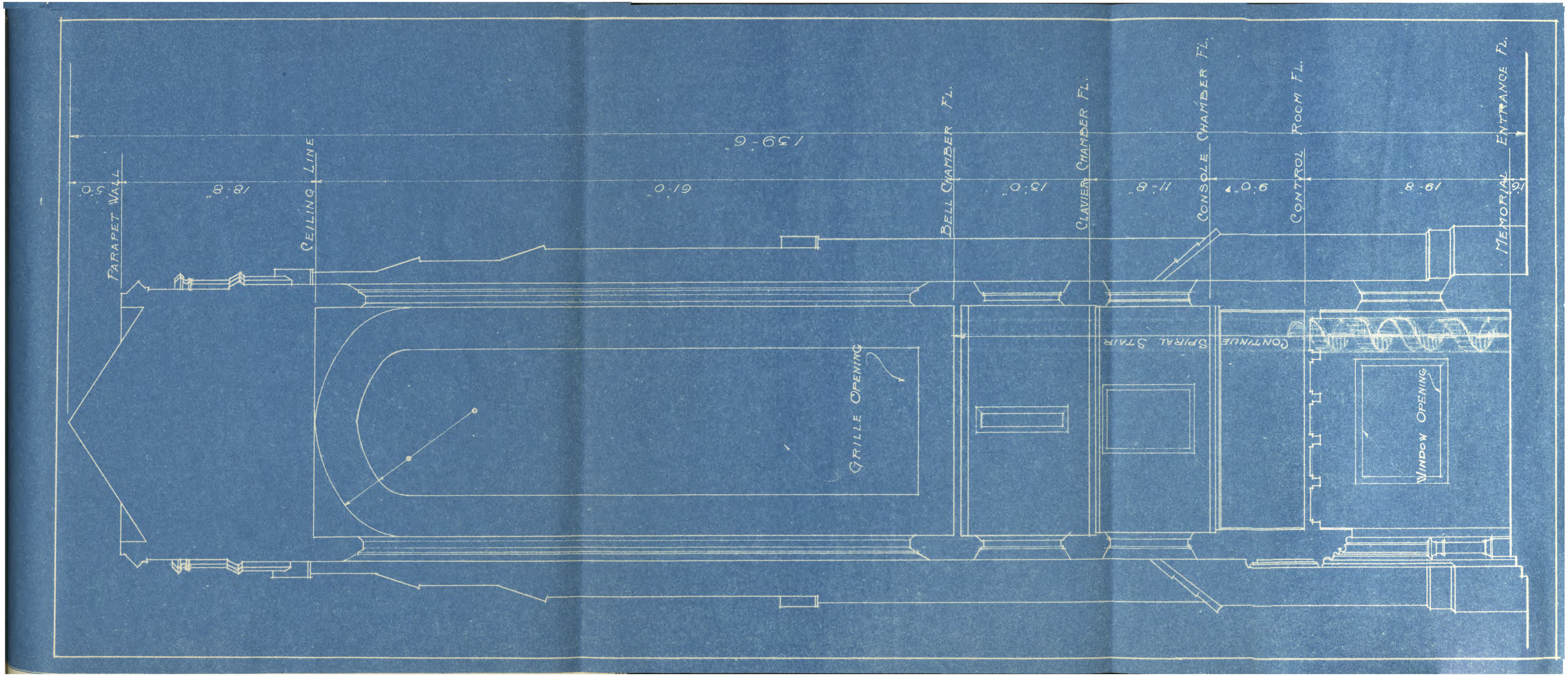


PLATE VI



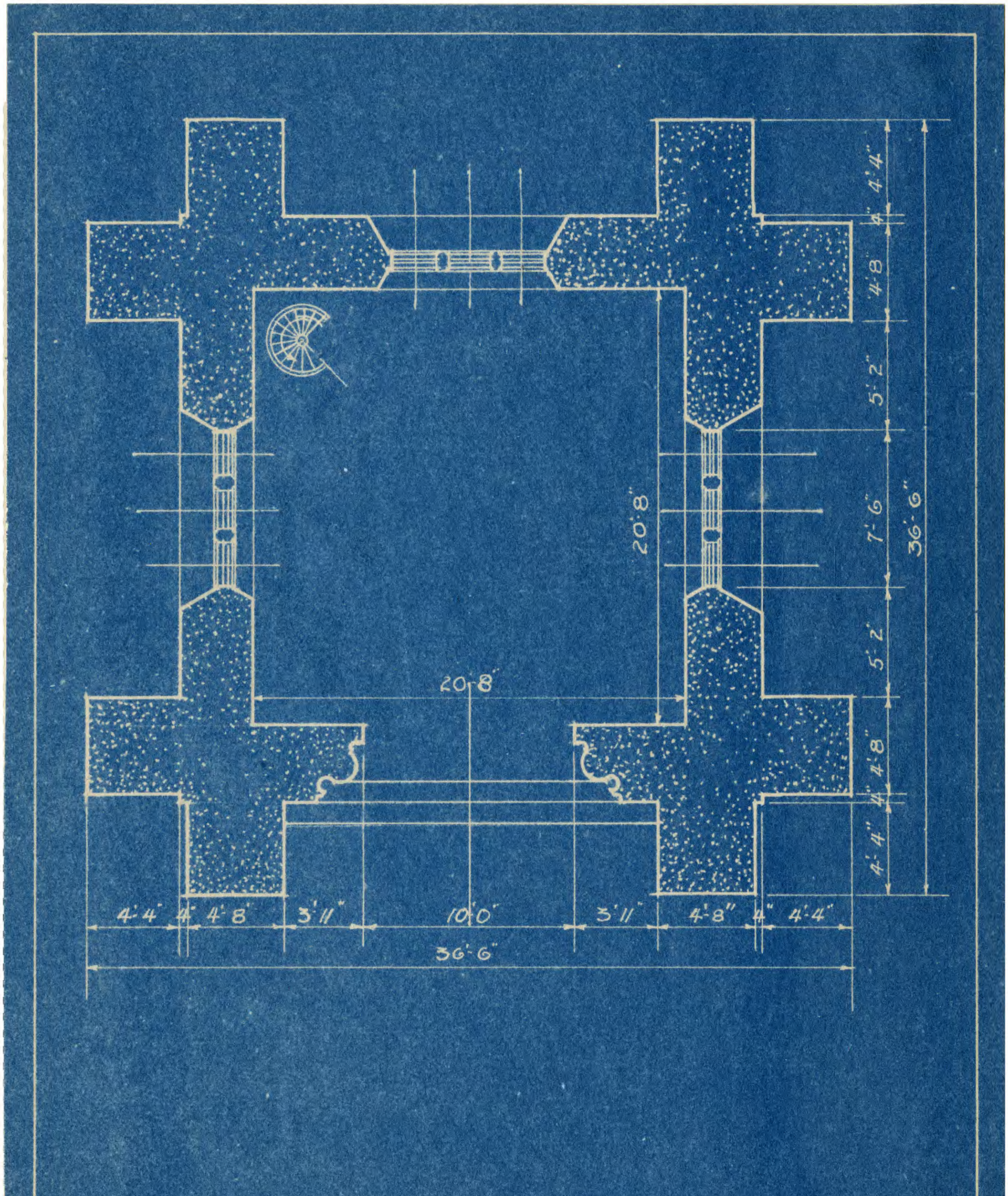
ELEVATION OF TOWER--Scale 1/8”= 1’ - 0”

PLATE VII



SECTION OF TOWER--Scale 1/8" = 1' - 0"

PLATE VIII

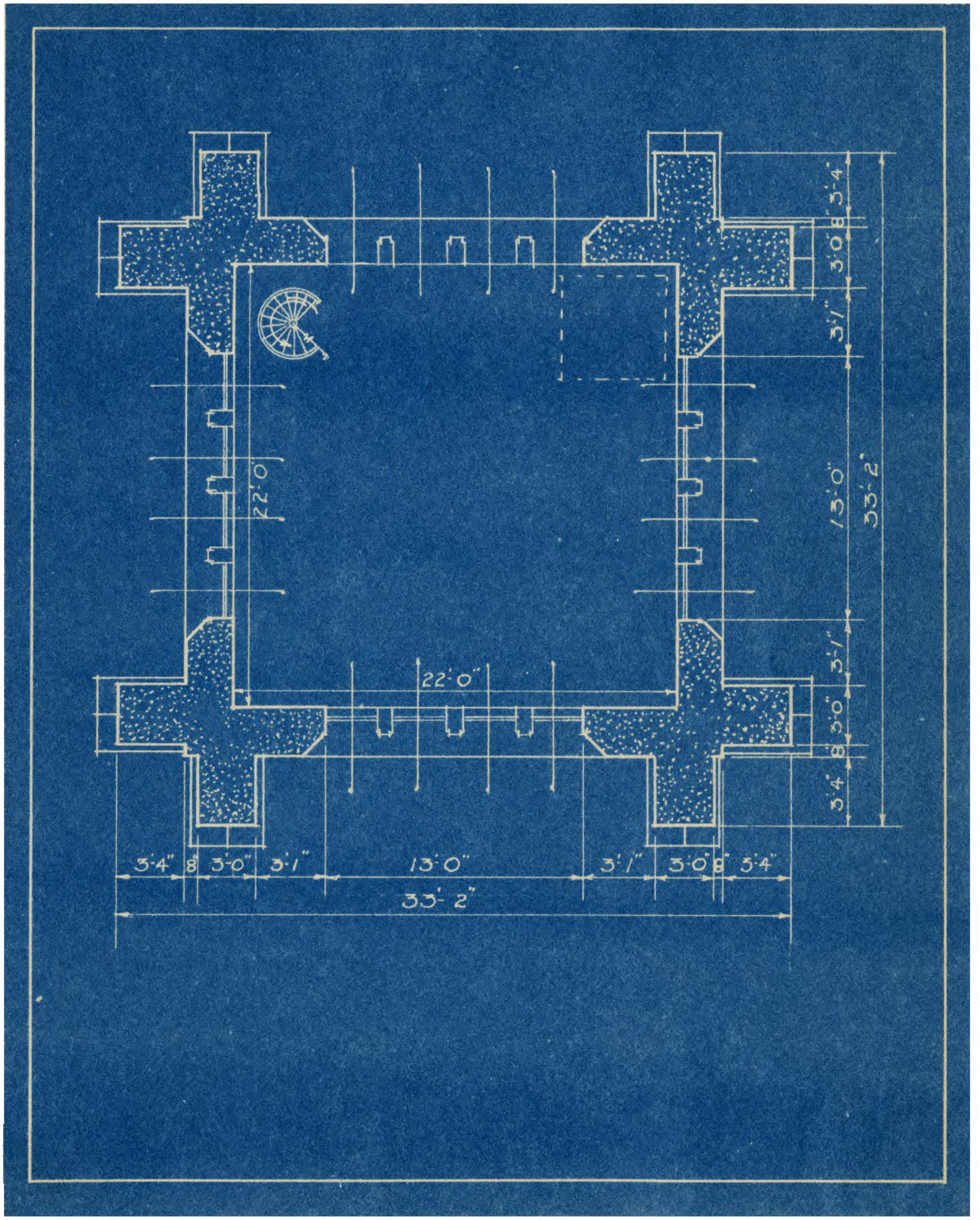


PLAN OF MEMORIAL ENTRANCE FLOOR--1/8" = 1' instrument is necessarily quite large and it would be impossible to carry it up the spiral stairs. A large hatchway about five to six feet square must be provided in each of the lower floors so that the clavier may be pulled up by a hoist. Such a hoist would be installed in the top of the bell chamber so that bells may be lifted up from the ground and into place in the bell chamber. The top floor or bell chamber, Plate IX is large enough in area and has a ceiling height sufficient to accommodate as many bells as may be desired. A small chime of thirteen, sixteen, or eighteen bells may be purchased at the initial installation and then as funds are secured, additional bells may be placed in the tower. The smallest chime that may be used consists of thirteen bells. A set of bells consisting of over twenty-three bells is known as a carillon and may be made to have as many as seventy-four bells.

A Model of the Proposed Campanile

After the campanile was designed a model of the same was made, the purpose of which may be twofold. Many times buildings and other structures are designed on paper and when presented in a rendering, look quite satisfactory, but after being built there may be many defects in the design which appear too late to be corrected. For this reason a

PLATE IX



PLAN OF BELL CHAMBER FLOOR--Scale 1/8" = 1'- 0" model of the tower has been built so that the design may be studied from different views. In this way any undesirable defects in the design may be changed before the construction of the real tower begins.

Since the tower will be built as a memorial, funds will be raised through popular subscription, donations, and class memorials. A secondary reason for the building of the model tower was to have a model to place on exhibit to help create an interest among the students, faculty members, and other parties who might offer gifts for the cause.

With these purposes in mind, a model of the Proposed Campanile was made by the author. The model was made at one-fourth inch scale, stands thirty-eight inches high, and is nine inches square at the base. The frame of the tower including the roof, buttresses, and moldings were made of white pine wood. The grille windows were all carved of plaster and then cast of aluminum after which they were painted white so as to represent cut stone. Small wooden bells were turned on the lathe and painted with bronze paint after which they were hung in the bell chamber. A stone pattern, like that of the new college Library as illustrated on Plate VI, was then molded of clay on the exterior of the tower to represent the stone masonry. After the stones were painted various shades of grays and siennas, the tower had all the appearances of a real campanile except that it was in miniature form. On Plate X, is a photograph of the front elevation of the model. The illustrations on Plates XI and XII are perspective views showing what one might expect to see if the real tower were to be built.

SUMMARY

It would be quite impractical to try to find a final answer or solution to such a project as this, since there are so many different possibilities. A dozen different designs could be made all of which might be good in character, proportion, and pleasing to the eye, and yet some would have very distinct advantages and others just as many disadvantages. The only way a suitable design could be picked from a group of drawings would be by a jury, the decision of which would be based only upon opinion. In my own personal case, in which I have made several different studies, I am submitting the design I believe is best as the "Proposed Campanile for Kansas State College". I do not claim that it is the one and only solution of such a problem, but do believe that it is one good solution which has it's merits as already discussed.

PLATE X

A PHOTOGRAPH OF THE MODEL

SHOWING THE FRONT ELEVATION

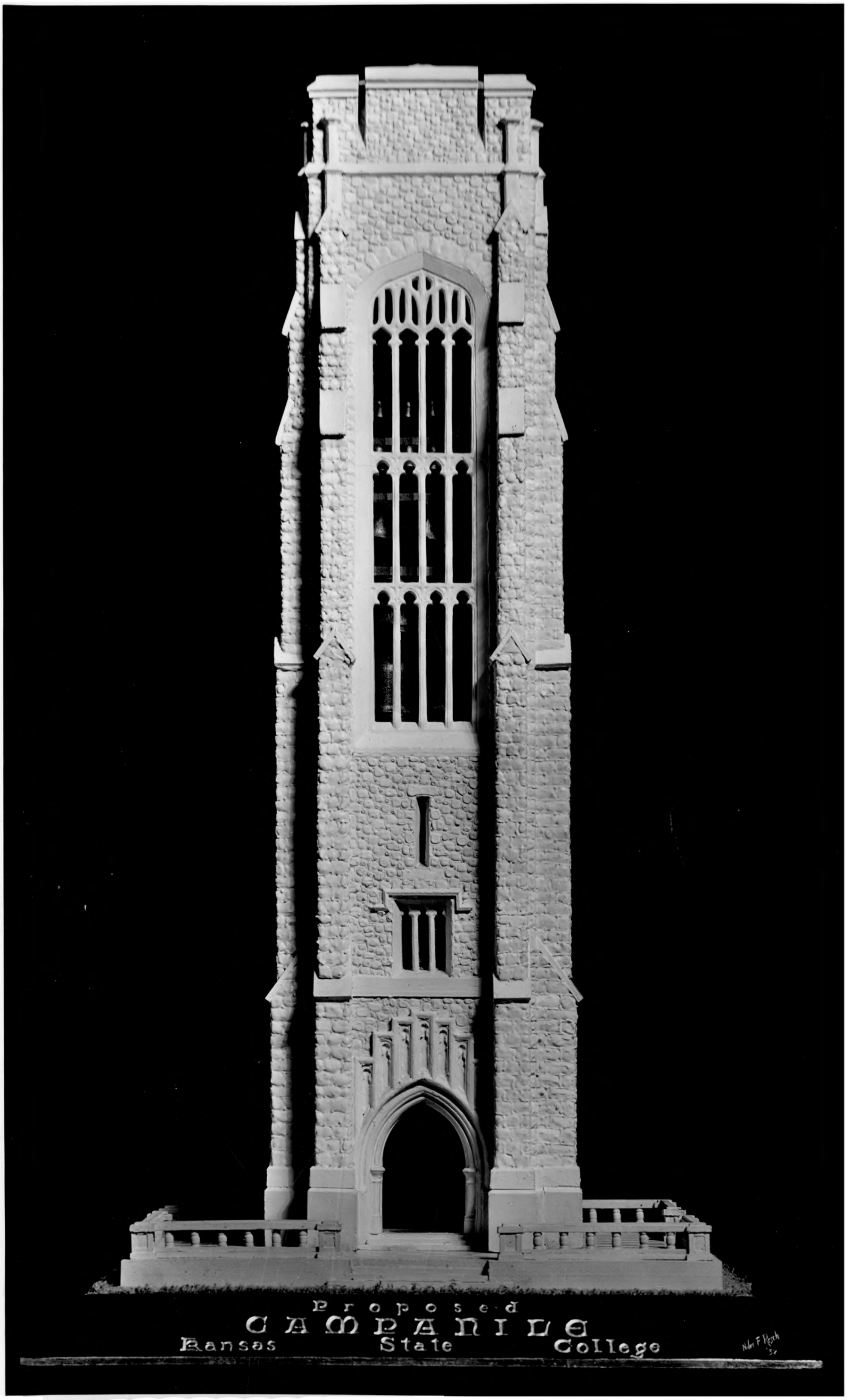

Proposed
CAMPANILE
Kansas State College

PLATE XI

AS THE CAMPANILE WILL

APPEAR WHEN BUILT

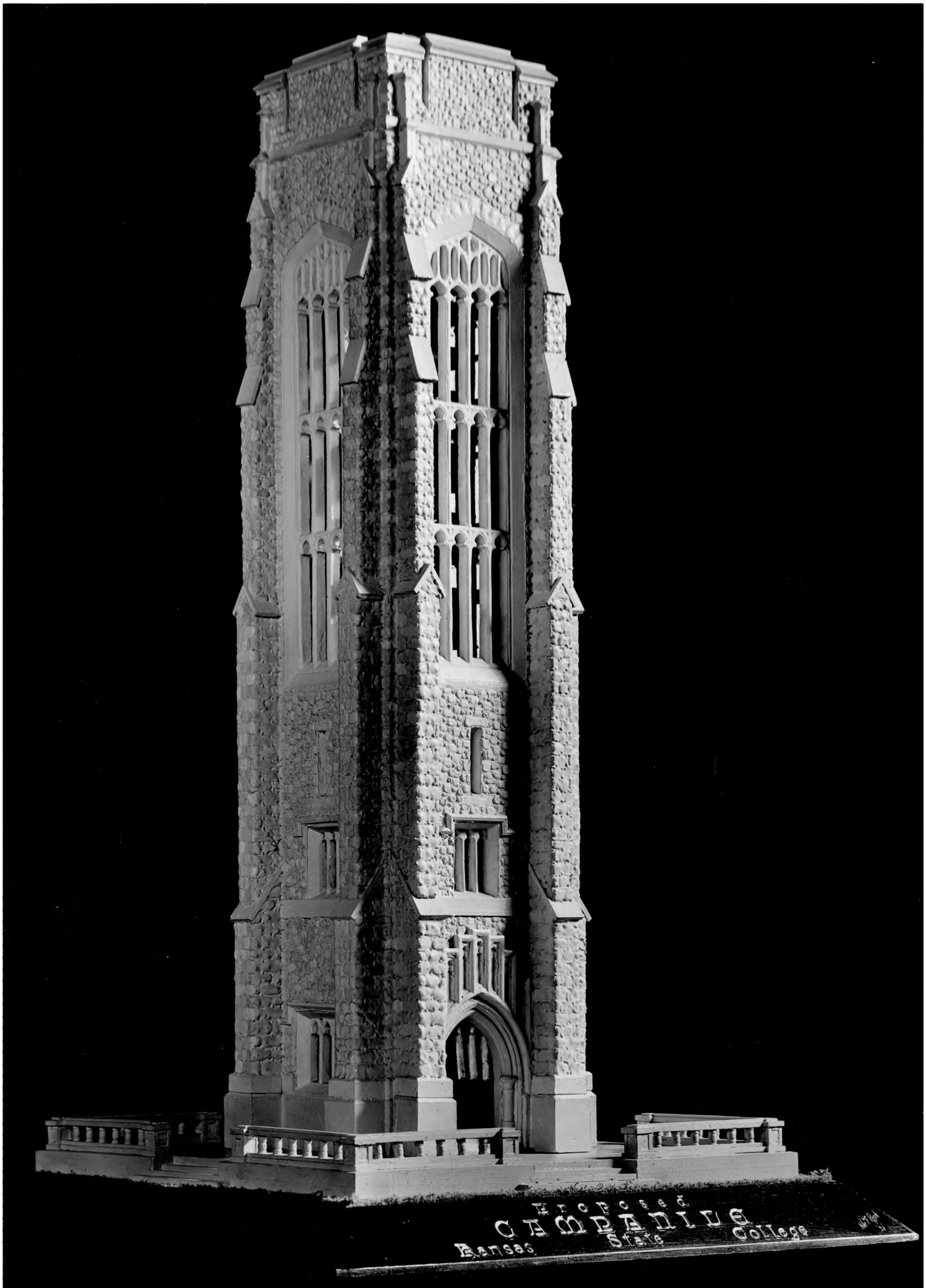
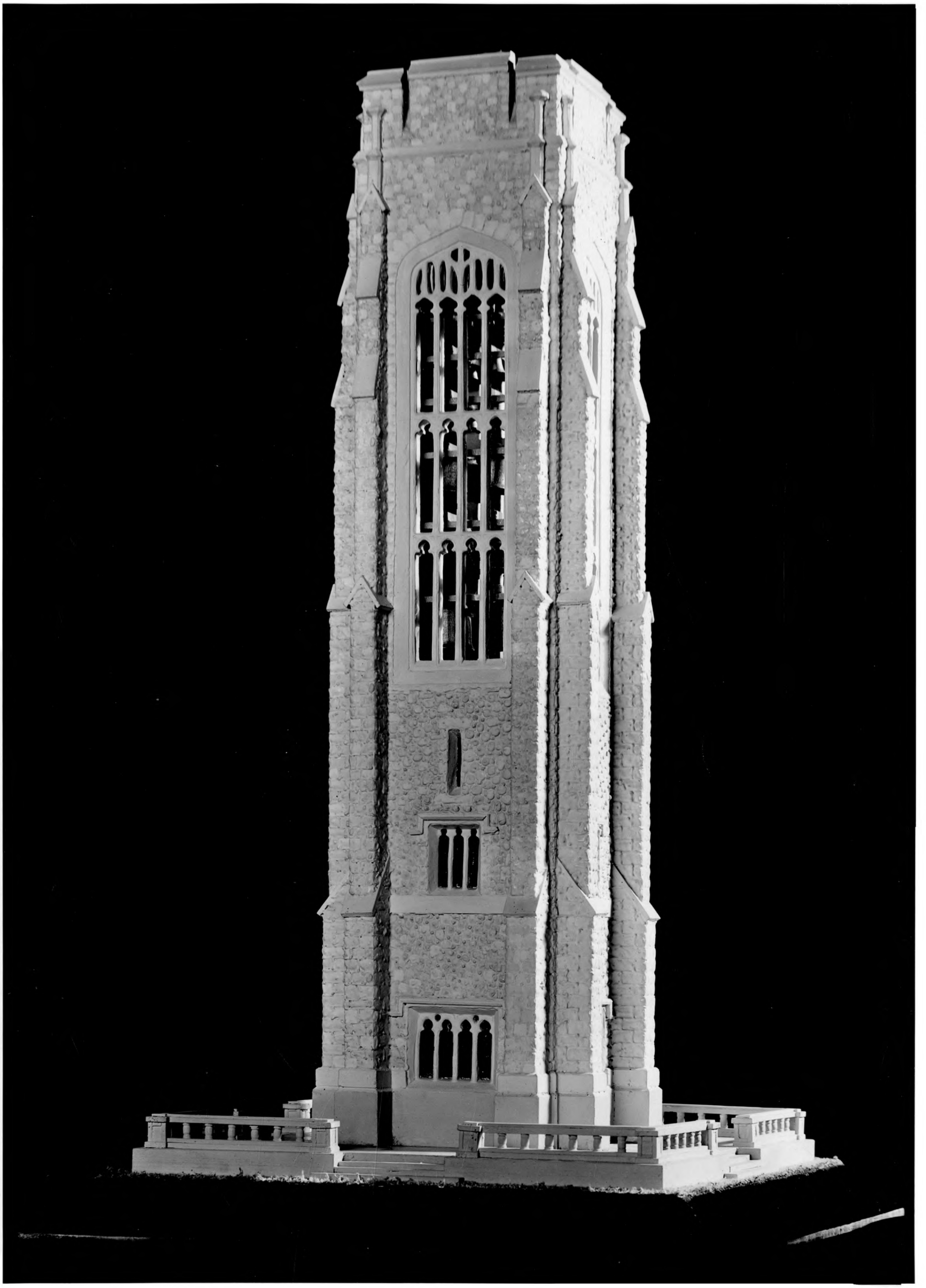

Proposed
CAMPANILE
Kansas State College

PLATE XII

A REAR VIEW OF
THE TOWER



ACKNOWLEDGMENTS

I wish to express my most sincere appreciation to Professor Paul Weigel who so ably directed me in the designing of the Proposed Campanile, and to the late Mr. Elbridge J. Best who was so kind as to loan me the use of his entire workshop and also for the assistance he gave me in making the model.

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