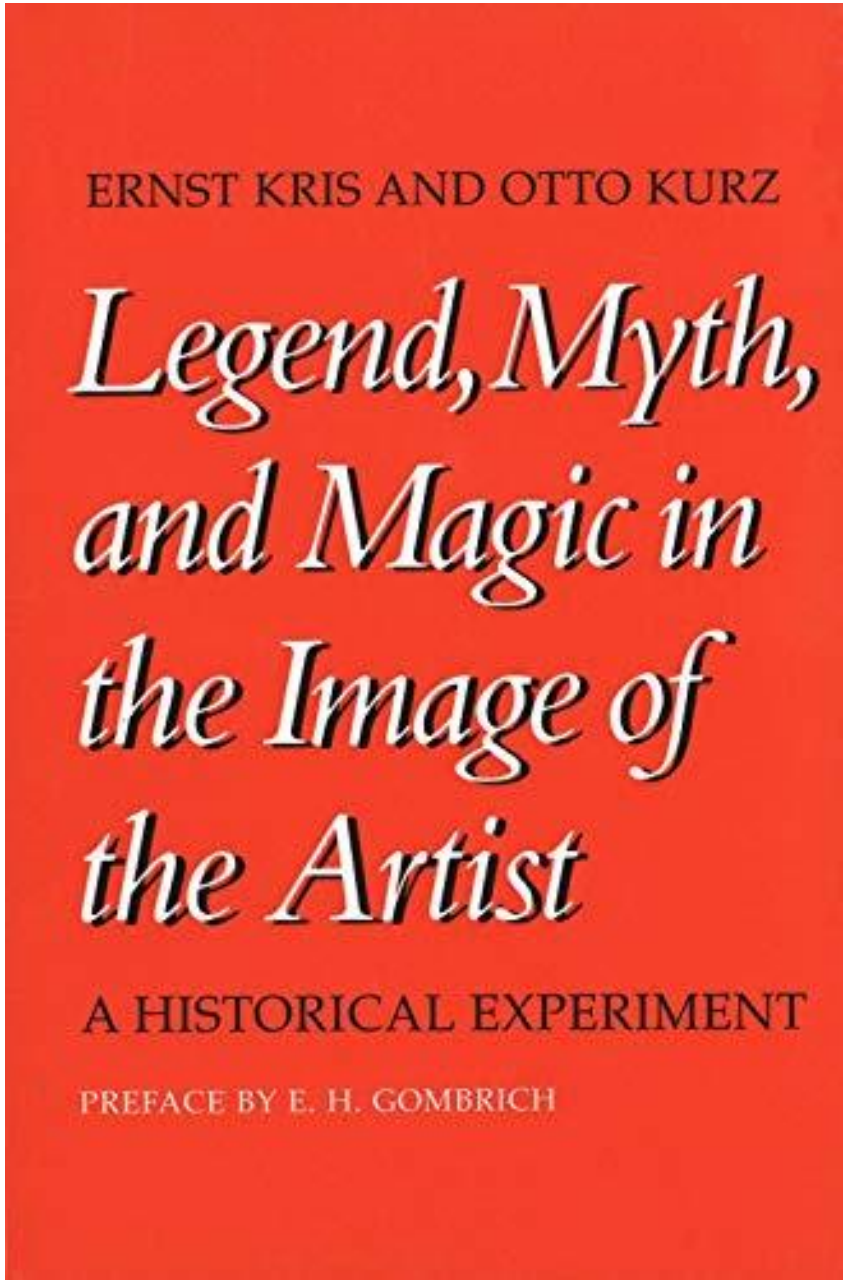
Constructing Global Modernism: Jaroslav J. Polívka, Frank Lloyd Wright and Henry Kaiser

Dr. Ladislav Jackson
Faculty of Fine Arts,
Department of Art History
Brno University of Technology


ERNST KRIS AND OTTO KURZ
Legend, Myth, and Magic in the Image of the Artist
A HISTORICAL EXPERIMENT
PREFACE BY E. H. GOMBRICH


Ernst Kris
Otto Kurz
Die Legende vom Künstler
Ein geschichtlicher Versuch
suhrkamp taschenbuch wissenschaft

Jaroslav J. Polívka

April 20,1886 Praha

February 9, 1960 Berkeley

Vlastní vila v Bučkově ulici v Bubenči.

Vila Dra. Wintera v Bubenči.

Vila pí. Žákové v Bubenči.

Vila A. E. Bartha v Bubenči.

Obchodní a kancel. dům „HABICH“ ve Štěpánské ul. v Praze.

Obchodní a kancel. dům „CHICAGO“ na Národní třídě v Praze.

Ing. dr. Jar. Polívka

Nové izolačné sklo Termolux

Odtlačok z časopisu

„Slovenský staviteľ"

revue staviteľstva a architektúry

Hlavný redaktor: Eugen Markovič
Zodp. redaktor: Dr. Viktor Harman

Bratislava 1935

olux:

č. 1.	55 cm	—
č. 2.	24 cm	52 cm
střední hodnota	44 cm	

neboli vykonaná práce nárazová: 44 . 0.225 = 9.00 kg cm

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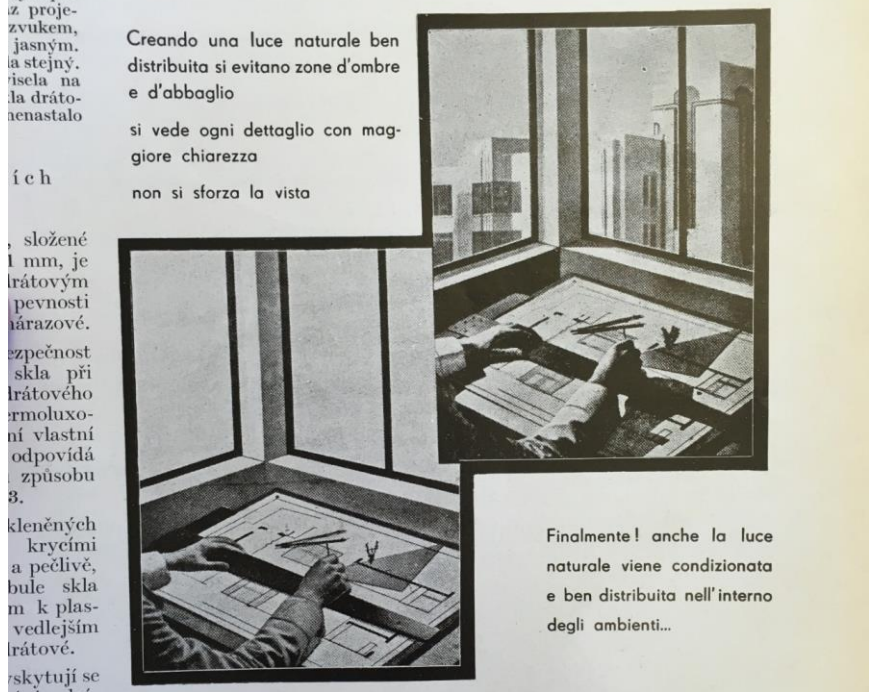
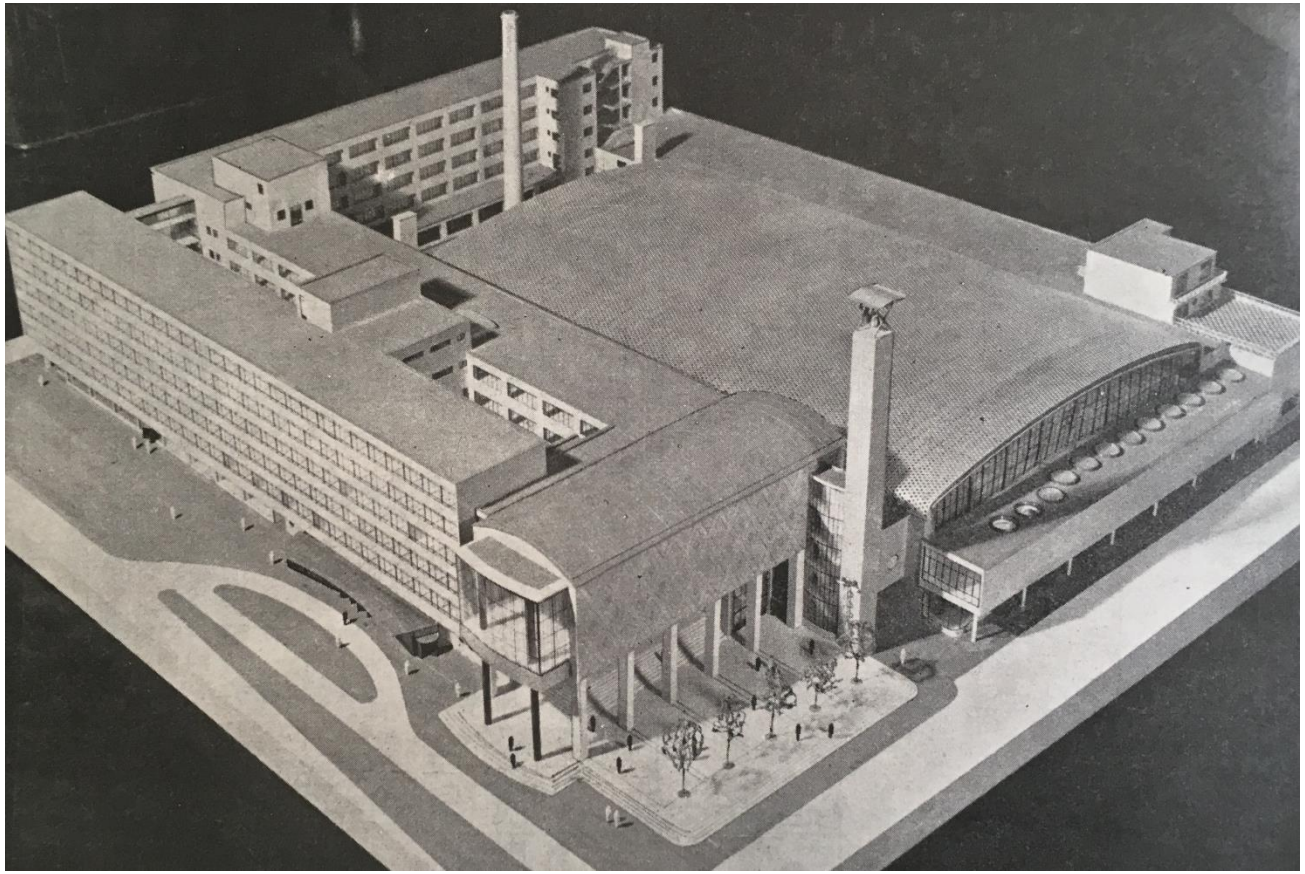
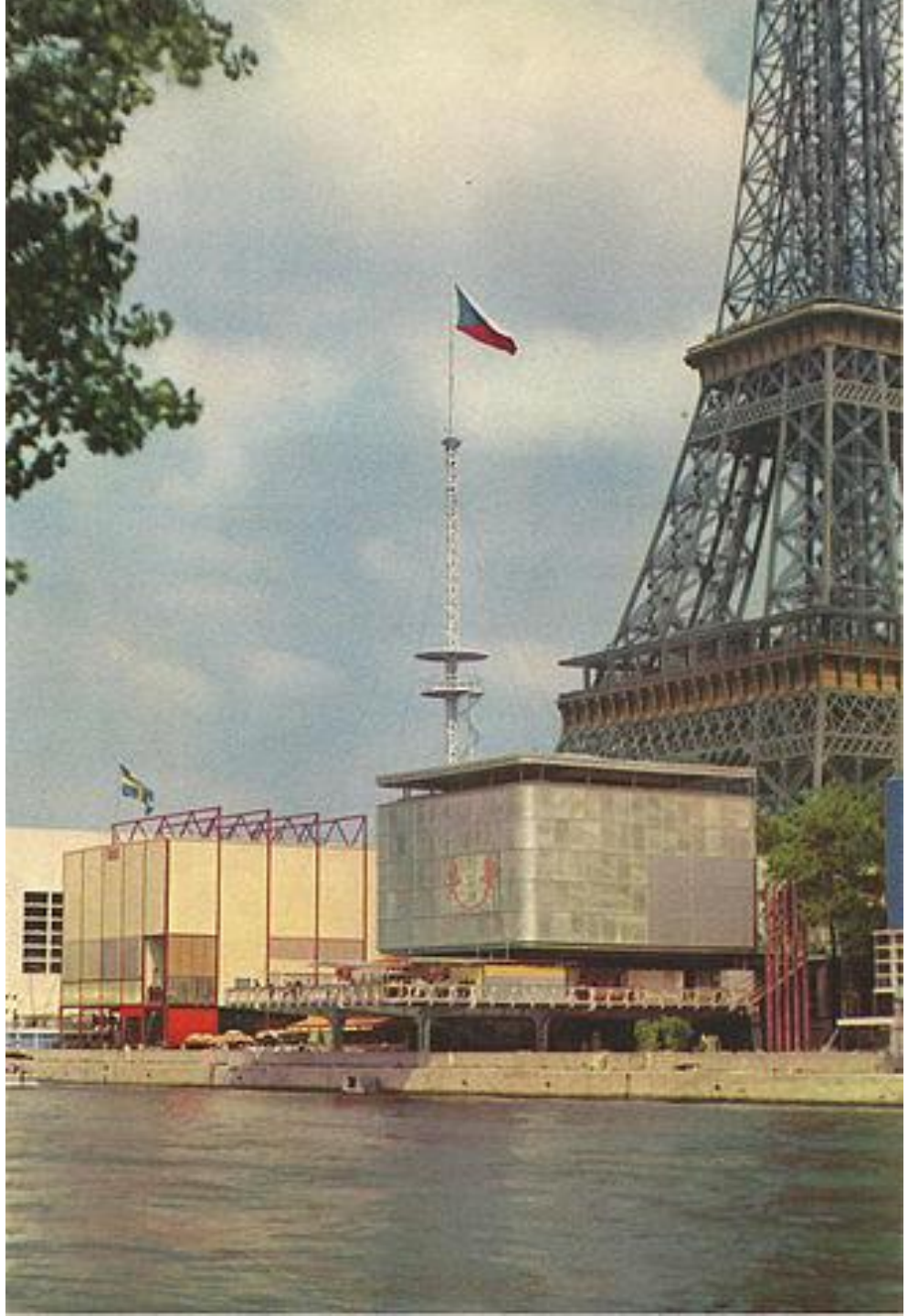




Corn Exchange Building, Rotterdam



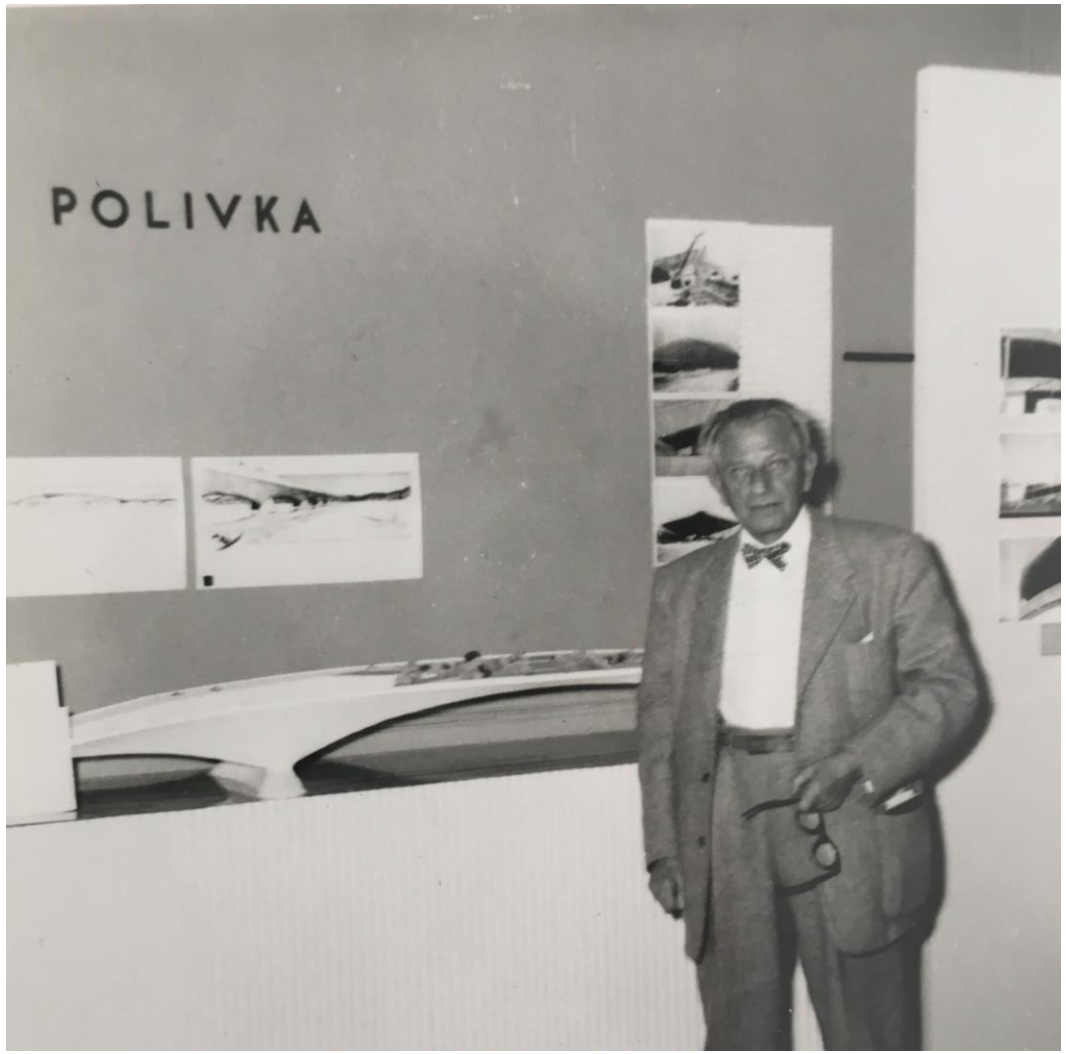

OK-LOA
VYSOČINA
Bata

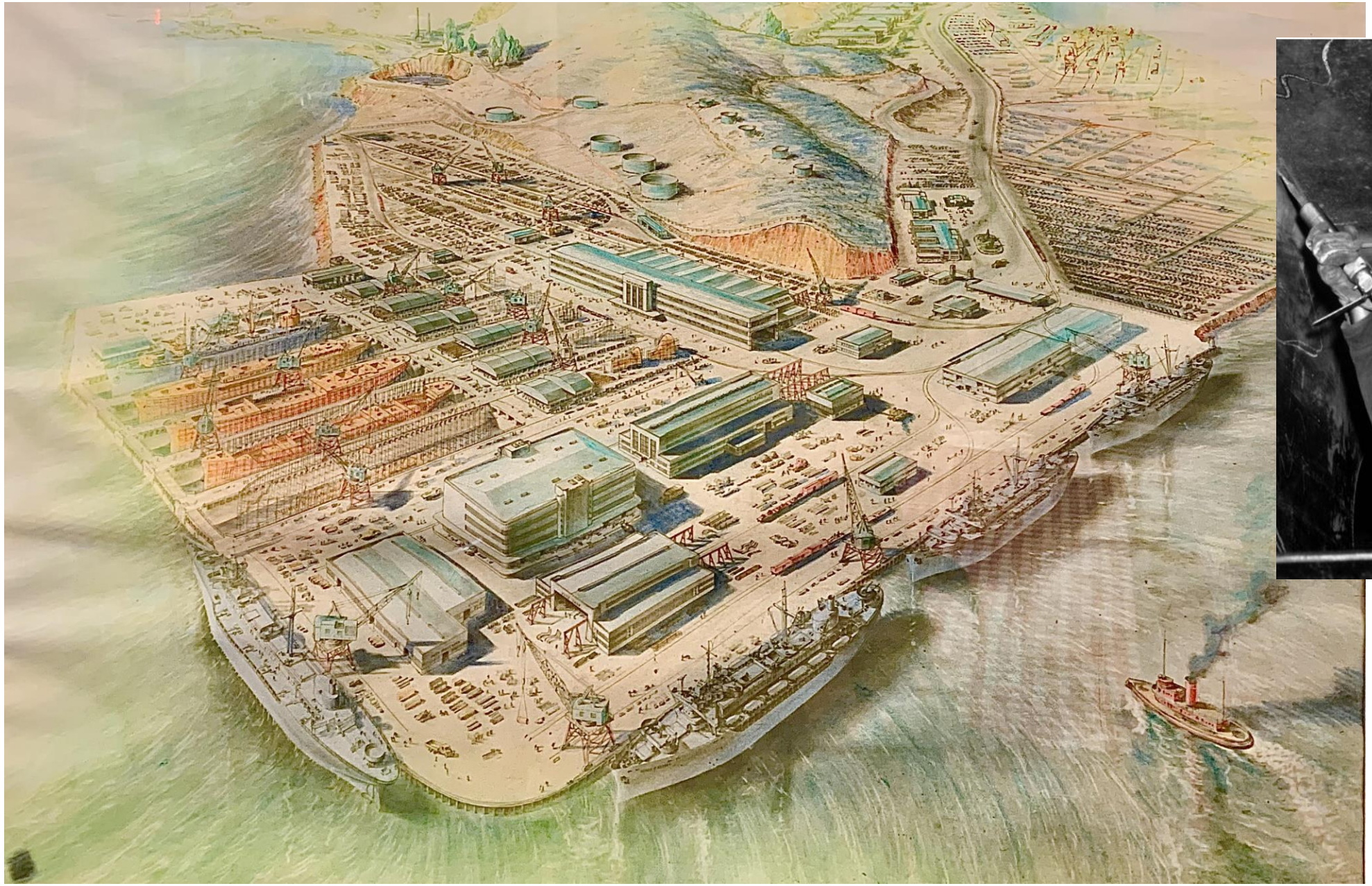
Podolsko bridge

Czechoslovak Pavilion
New York World's Fair 1939

Hogart Building in San Francisco

Own house in North Berkeley


POLIVKA



Richmond Shipyards

Richmond Kaiser buildings

Richmond Permanente hospitals

TECHNICKÁ TRIBUNA

Vychází ve volných lhůtách. Řídí Miloš Bloch a J. A. Holman. V Praze, dne 27. srpna 1921

Dr. Ing. JAR. POLÍVKA:

Stavba lodí a vagonů ze železového betonu.

Podnikatelství staveb Ing. Vlad. Vlček, Praha-Král. Vinohrady, vyvěsilo před nedávnem ve svém výkladci u kavárny „Slavie" na Národní třídě několik velice podařených snímků, znázorňujících zajímavá stadia při stavbě 700t. vlečné lodi ze železového betonu v Kremži, prováděné Syndikátem pro stavbu lodí a vagonů ze železového betonu, na němž jmenované podnikatelství jest súčastněno. Není divu, že kolemjdoucí obecenstvo jeví pro tyto u nás neobvyklé stavby veliký zájem, i chceme tudíž poukázati na některé podrobnosti a dosavadní vymoženosti v tomto oboru badací technické práce.

Jest zajímavo, že betonové lodi, které teprve v poslední době dospívají, dík obsáhlým pokusům a důkladným studiím theoretickým, své dokonalosti, objevily se již v kolébky železového betonu. Francouz Lambot sestrojil již r. 1854 první člun ze železového betonu, který až do dneška se zachoval, a dobrý jeho stav svědčí o vhodnosti tohoto materiálu ve stavitelství lodním. V následujících desetiletích nebylo vykonáno v tomto oboru téměř ničeho. Teprve r. 1887 byl učiněn druhý pokus zhotoviti železobetonový člun, a sice bratry Picha Clevens v Sas von Gent. Člun tento do dneška jest v dobrém stavu a nevyžadoval žádných oprav. Ve větším slohu započal

Obr 1. Betonová vlečná loď o 700 t nosnosti postavená „Syndikátem pro stavbu betonových lodí a vagonů" a spuštěná dne 3. července 1921 v Kremži na Dunaji.

novým lodím přinesla svrchovaný úspěch, kdyby nebyl býval tento způsob stavby zdiskreditován Amerikou. Ohromná spotřeba tonáže, která vznikla ze stále stoupajících požadavků dopravních a torpédováním lodí dopravních, a značná spotřeba železa a jeho nedostatek byly by musily přivésti betonovou loď k rozmachu nikdy netušenému. Amerika v prvé řadě pustila se překotně do stavby lodí ze železového betonu, a sice nejenom lodí vlečných, nýbrž jak již jinak ani býti nemůže. Inženýr Alan Mac Donald dal zhotoviti v San Francisku r. 1918 loď o nosnosti 5000 tun (deplacement 7.900 t.) s třícylindrovým expansním strojem o 1.750 k. s. Téměř současně postavil inženýr E. Lee Heidenreich loď stejného typu.

Po válce, kdy americký železářský průmysl, zbaven byv válečných dodávek do miliard jdoucích, byl nedostatkem zaměstnání ohrožen, zahájil kampaň stavby betonových lodí, propaguje lodi železné. Co americký ocelářský trust zmůže, jest každému národohospodáři dobře známo. Přes to však nepodařilo se mu potlačiti stavbu lodí betonových, a můžeme směle říci, že v Americe se nyní přes odpor ocelářů betonové lodě staví. Zmiňujeme se jenom o lodích tankových pro dopravu petroleje, při jichž stavbě použito geniálních myšlenek amerických inženýrů. I u nás podnítily některé kruhy železářského průmyslu k boji proti železovému betonu. Kolbištěm jsou prozatím odborné časopisy. Technický tisk betonovým lodím nepřátelský vyzdvihuje ojedinělé neúspěchy v prvých počátcích, pomíjeje při tom technické vymoženosti poslední doby. Poukazuje na př. na to, že stavební doba betonových lodí oproti lodím železným není podstatně kratší, a že nákladným spouštěním není jejich úspor-

Reprinted from • ENGINEERING NEWS-RECORD • December 3, 1942

Designing Rigid Frames of Timber

Jaro J. Polivka,
Civil Engineering Research Associate, University of California, and Consulting Engineer, Berkeley, Calif.

***Contents in Brief**—That large lumber savings are possible by using rigid frames for timber buildings is demonstrated. Tables to permit rapid design of such members are made available and a typical problem is analyzed step by step, including design of the joints.*

LARGE LUMBER SAVINGS are possible in timber construction if the buildings are designed as rigid frames. As in steel and reinforced-concrete construction, rigid frames used for wood structures result in a more uniform distribution of the internal stresses and aid in the elimination of extreme bending moments. Generally the total cost for timber rigid frames will be less than for timber designs of other types.

Rigid frames have not been more generally adopted in timber construction for three reasons: (1) the design analysis is cumbersome; (2) the formulas made available in handbooks are complicated and some are actually erroneous, and (3) tables taking into account all of the factors of economical design are not generally accessible.

Unusual loading conditions

In designing a 40x160-ft. wood-frame, two-story building for a shipyard on the Pacific Coast the writer prepared the comparative truss and rigid-frame designs illustrated by Fig. 2. The loading conditions, although not severe, were unusual for a timber structure. The two major requirements were that the first floor be free of columns and that the second floor be designed for a live load of 100 lb. per sq.ft. A 2-ton monorail on the first floor also was required, which added to the severity of the loads and made the stress analysis more complicated.

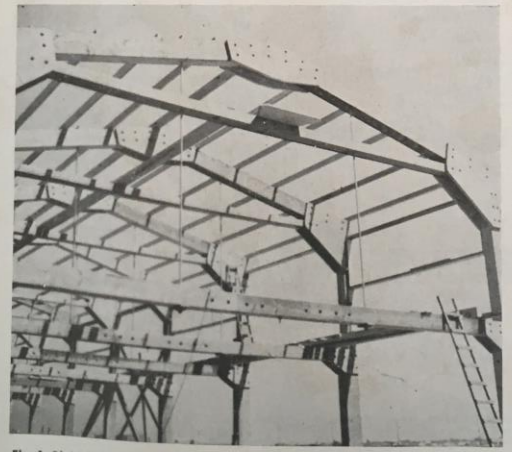


Fig. 1. Rigid frames for this 40x160-ft. building aid in supporting the second floor by means of 1½-in. dia. rod hangers. Gusset plates are of plywood and split ring connectors are used.

The simplified graphical analysis outlined in the author's mimeographed lectures *Graphical Methods of Analyzing Statically Indeterminate Structures;* University of California, Berkeley, Calif., 1940-1941, was followed in designing the rigid-frame layout. This design called for support of the second floor by hangers from the rigid roof bents and stiffening of the floor by unsupported ties. Rigidity at the joints of the frames was obtained by double plywood gusset plates $2\frac{3}{8}$ in. thick.

Lumber needs cut in half

On the basis of a complete study of both schemes the rigid-frame roof design required but 50 percent of the timber needed for the truss construction. Rigid frames also were more suitable for the conditions encountered. Materials needed for one bent of each design are given in Table I. Lumber for the first floor is not listed, since this quantity was the same for both schemes. Neither are the 4-in. dia. split ring connectors listed, as 112 connectors and 56 bolts were required for each layout. A further economy, other than that shown in Table I, results from the fact that there is about a 20 percent saving in the corrugated sheet metal siding with the rigid-frame building due to its lower height.

The nine 39-ft. span rigid-frame bents for the building were assembled at the site by a six-man crew in three days. An equal time was spent in the erection work, which required the use of one truck crane with a 40-ft. boom.

At the same shipyard a number of smaller rigid-frame buildings were constructed. These structures are 25 ft. wide, from 9 to 17 ft. high, and have gable roofs pitched one on eight and covered with the corrugated metal roofing. This type of building,

February 15, 1946

Mr. Frank Lloyd Wright
Taliesin, Wis.

Dear Mr. Wright:

I am writing as an old admirer of you and your work which doesn't mean very much to you because, I am sure, you are getting such letters by thausands, and this letter probably will be overlooked.

I am admiring you as an engineeralthough, according to a quotation in the last Forum issue,these engineers are complete damn fools.

You maybe right since the engineers in their structural conceptions are very seldom guided by eternal laws of the Nature. Take for example cob wehs of a spider which definitely should be studied by an engineer whose specialty is to build suspension bridges and two- or three- dimensional structural network.

The average engineer knows only slabs, beams, girders, columns etc. and any deviation from this every day tools is considered as unusual, crazy or dangerous.

For many years I was grappling with this prejudice. Your work confirms and fortifies my ideas and that's why I am so grateful to you.

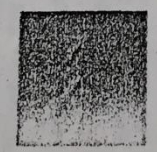
Very sincerely yours,

J J Polivka

DR.J.J.POLIVKA:1150 ARCH STREET:BERKELY 8

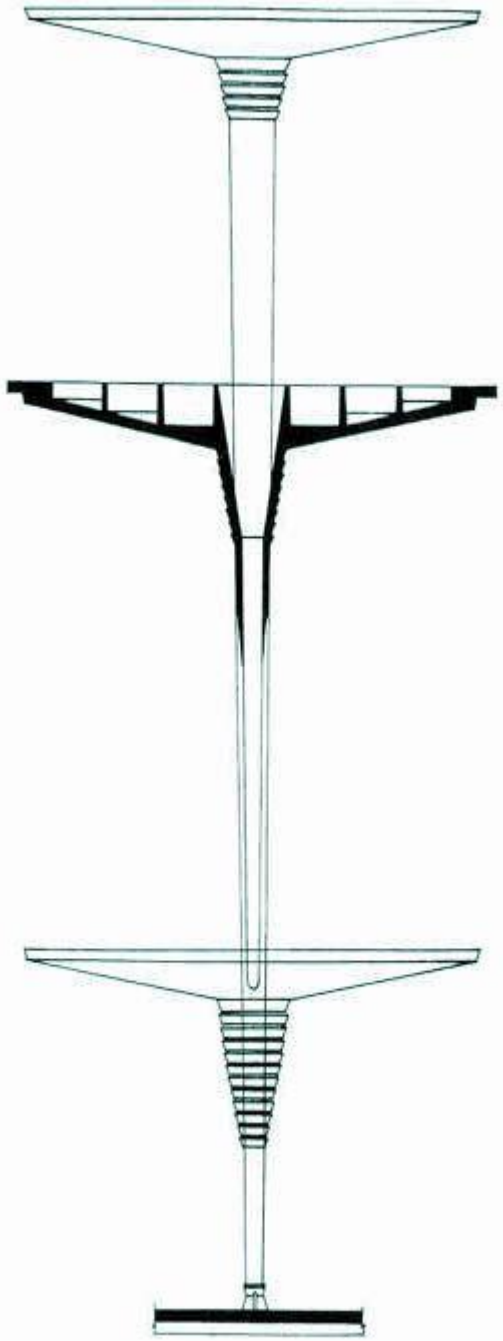
Dear Dr. Polivka: Why don't you come over here to see us?

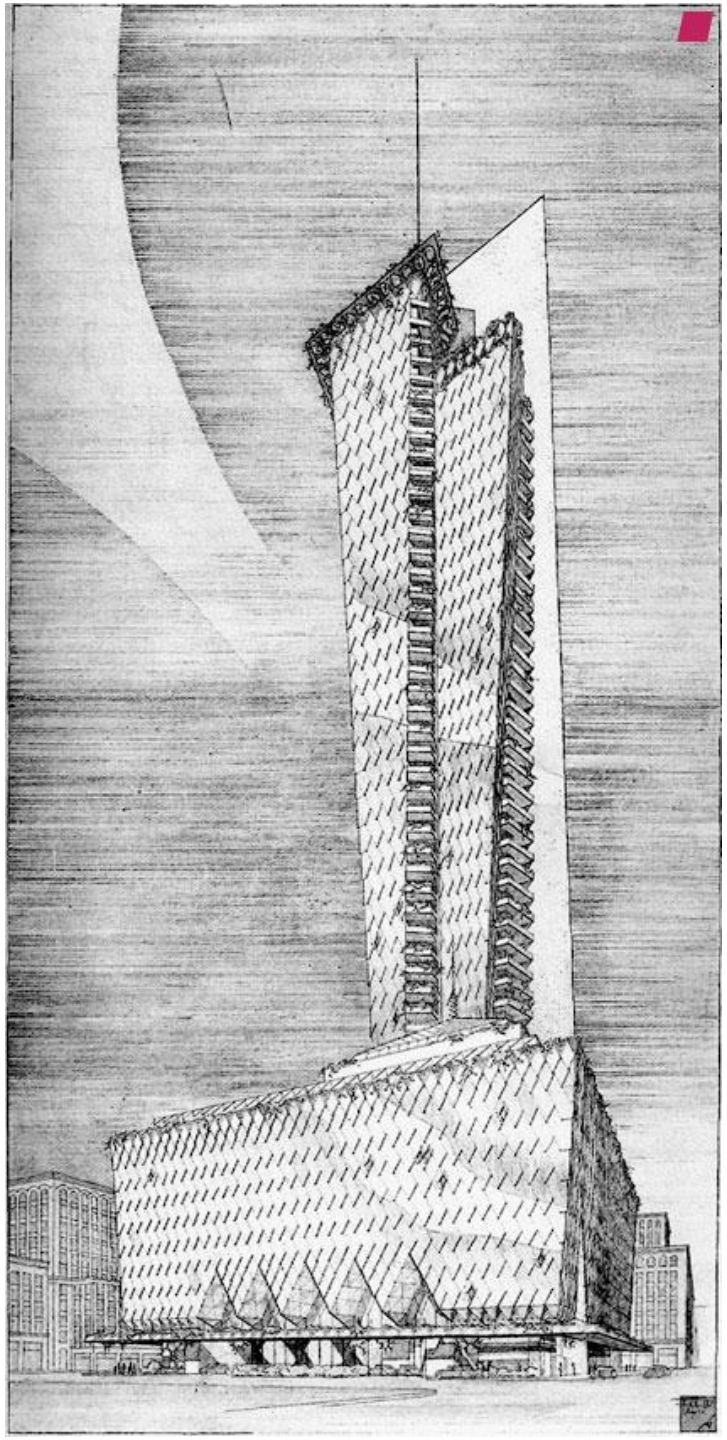
We will be here until May 1st and you will be welcome any time. I should like to talk to you -



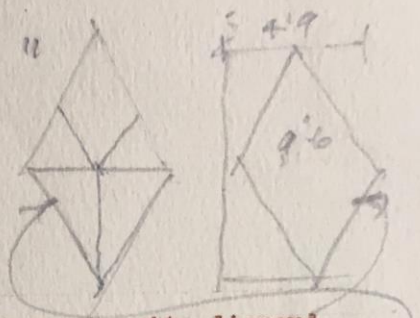
Sincerely yours,
Frank Lloyd Wright
Frank Lloyd Wright
Taliesin West
Scottsdale
Arizona

April 13th, 1946





Dr. J. J. Polivka
1150 Arch Street
Berkeley

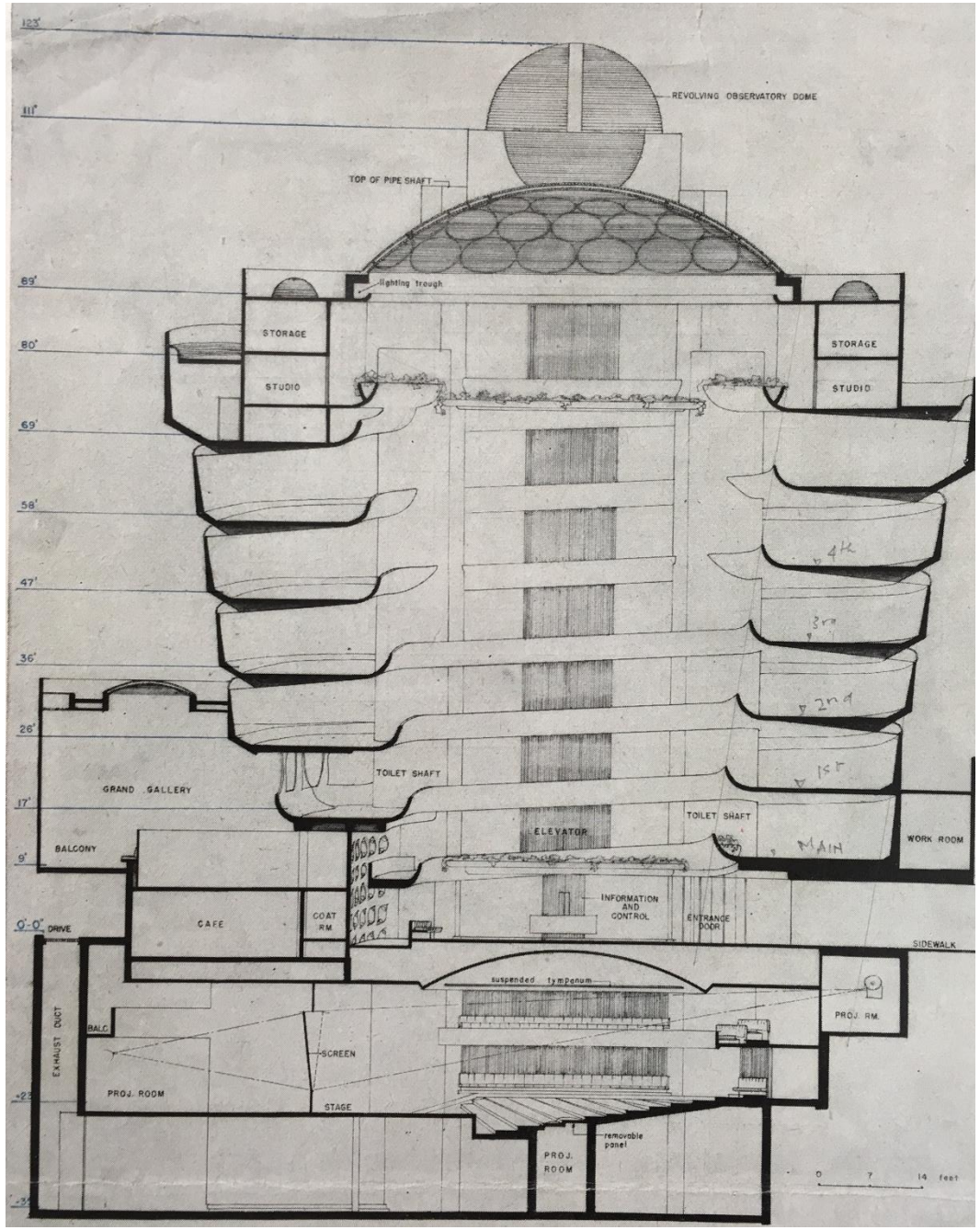


Dear Dr. Polivka: Glass size - largest units diamond, 9'6" x 4'9". Every other unit subdivided into five pieces. Enormous quantity will be required. Could you send a sample to show client.

TALIESIN

Sincerely yours,
Frank Lloyd Wright

August 29th, 1946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89'
80'
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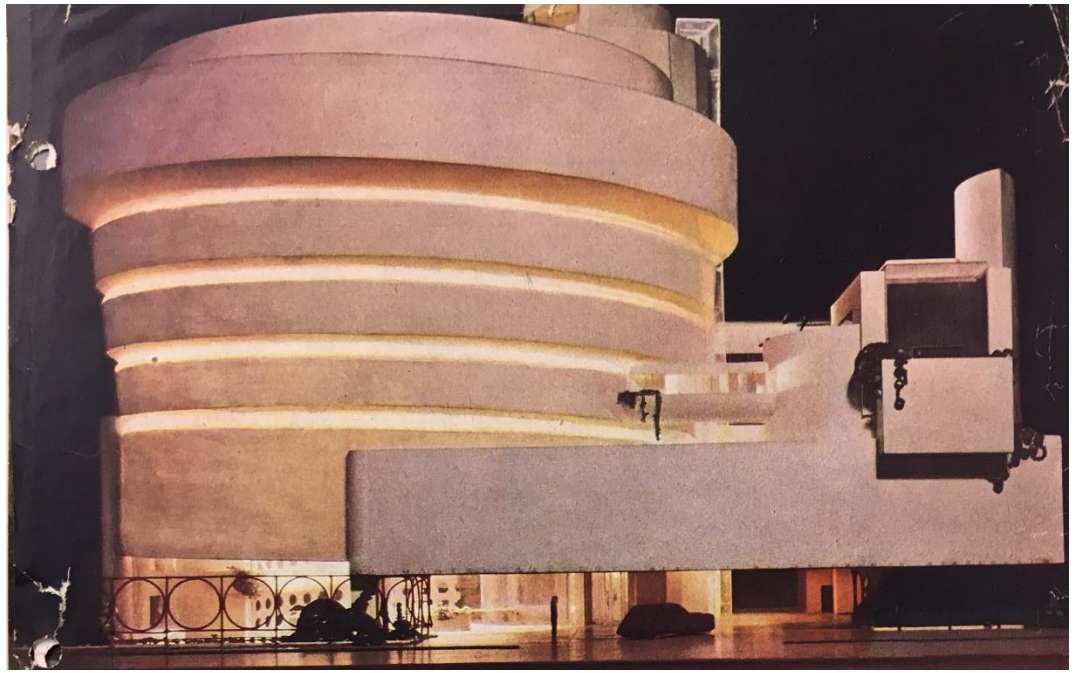
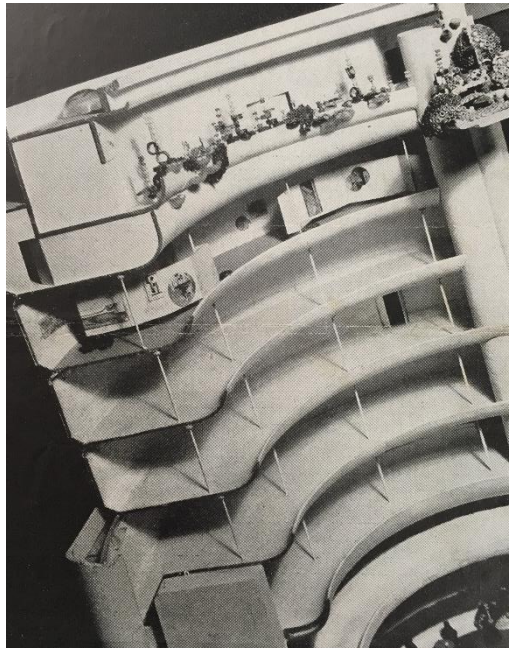
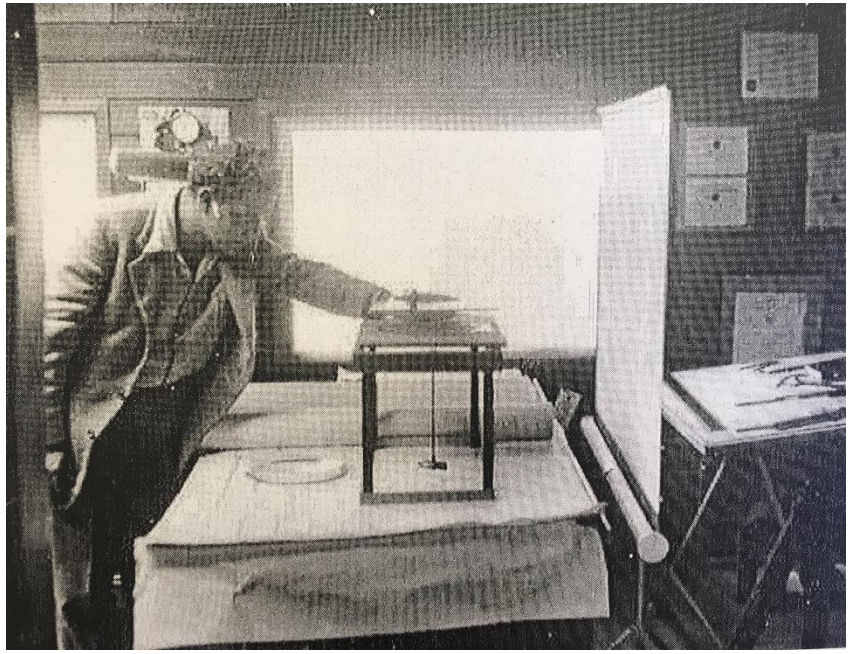
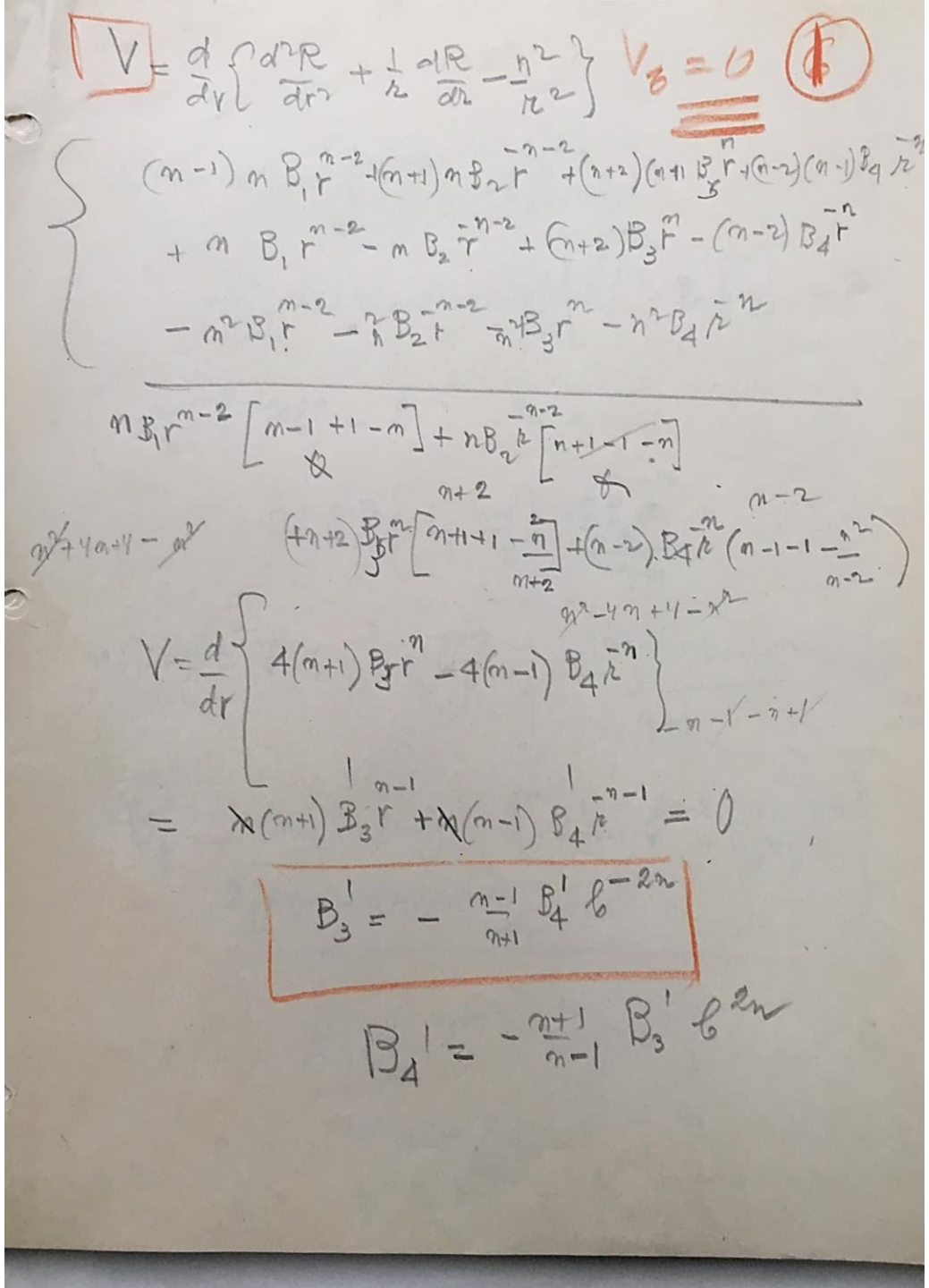
47'
36'
26'
17'
9'
0'-0'
-23'
-33'
REVOLVING OBSERVATORY DOME
TOP OF PIPE SHAFT
lighting trough
STORAGE
STUDIO
STORAGE
STUDIO
4th
3rd
2nd
1st
MAIN
TOILET SHAFT
GRAND GALLERY
TOILET SHAFT
ELEVATOR
BALCONY
WORK ROOM
INFORMATION AND CONTROL
ENTRANCE DOOR
DRIVE
CAFE
COAT RM.
SIDEWALK
suspended tympanum
PROJ. RM.
EXHAUST DUCT
BALC.
SCREEN
PROJ. ROOM
STAGE
removable panel
PROJ. ROOM
0
7
14 feet









$$V = \frac{d}{dr}\left\{\frac{d^2R}{dr^2} + \frac{1}{r}\frac{dR}{dr} - \frac{n^2}{r^2}\right\} \qquad V_3 = 0$$

$$\left\{ \begin{aligned} &(n-1)\,n\,B_1 r^{n-2} + (n+1)\,n\,B_2 r^{-n-2} + (n+2)(n+1)\,B_3 r^{n} + (n-2)(n-1)\,B_4 r^{-n} \\ &+ n\,B_1 r^{n-2} - n\,B_2 r^{-n-2} + (n+2)B_3 r^{n} - (n-2)\,B_4 r^{-n} \\ &- n^2 B_1 r^{n-2} - n^2 B_2 r^{-n-2} - n^2 B_3 r^{n} - n^2 B_4 r^{-n} \end{aligned} \right.$$

$$n B_1 r^{n-2}\left[n-1+1-n\right] + n B_2 r^{-n-2}\left[n+1-1-n\right]$$

$$(n+2) B_3 r^{n}\left[n+1+1-\frac{n^2}{n+2}\right] + (n-2) B_4 r^{-n}\left(n-1-1-\frac{n^2}{n-2}\right)$$

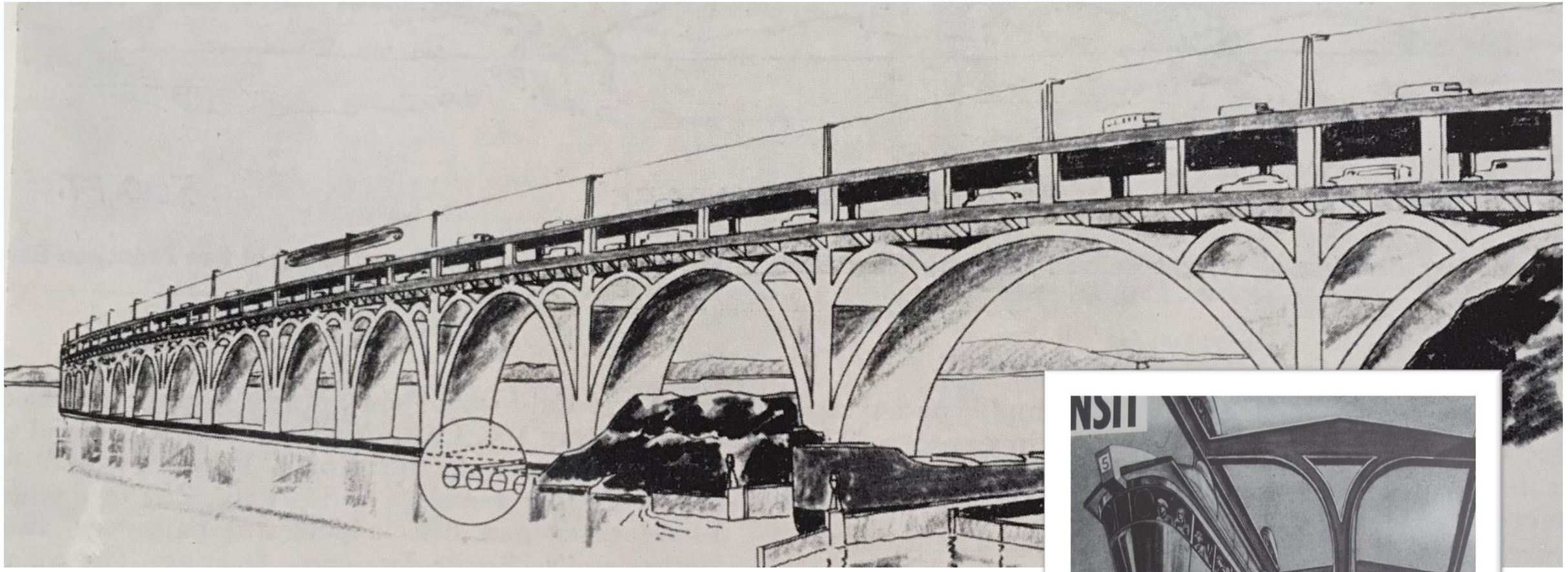
$$V = \frac{d}{dr}\left\{ 4(n+1) B_3 r^{n} - 4(n-1) B_4 r^{-n} \right\}$$

$$= n(n+1) B_3 r^{n-1} + n(n-1) B_4 r^{-n-1} = 0$$

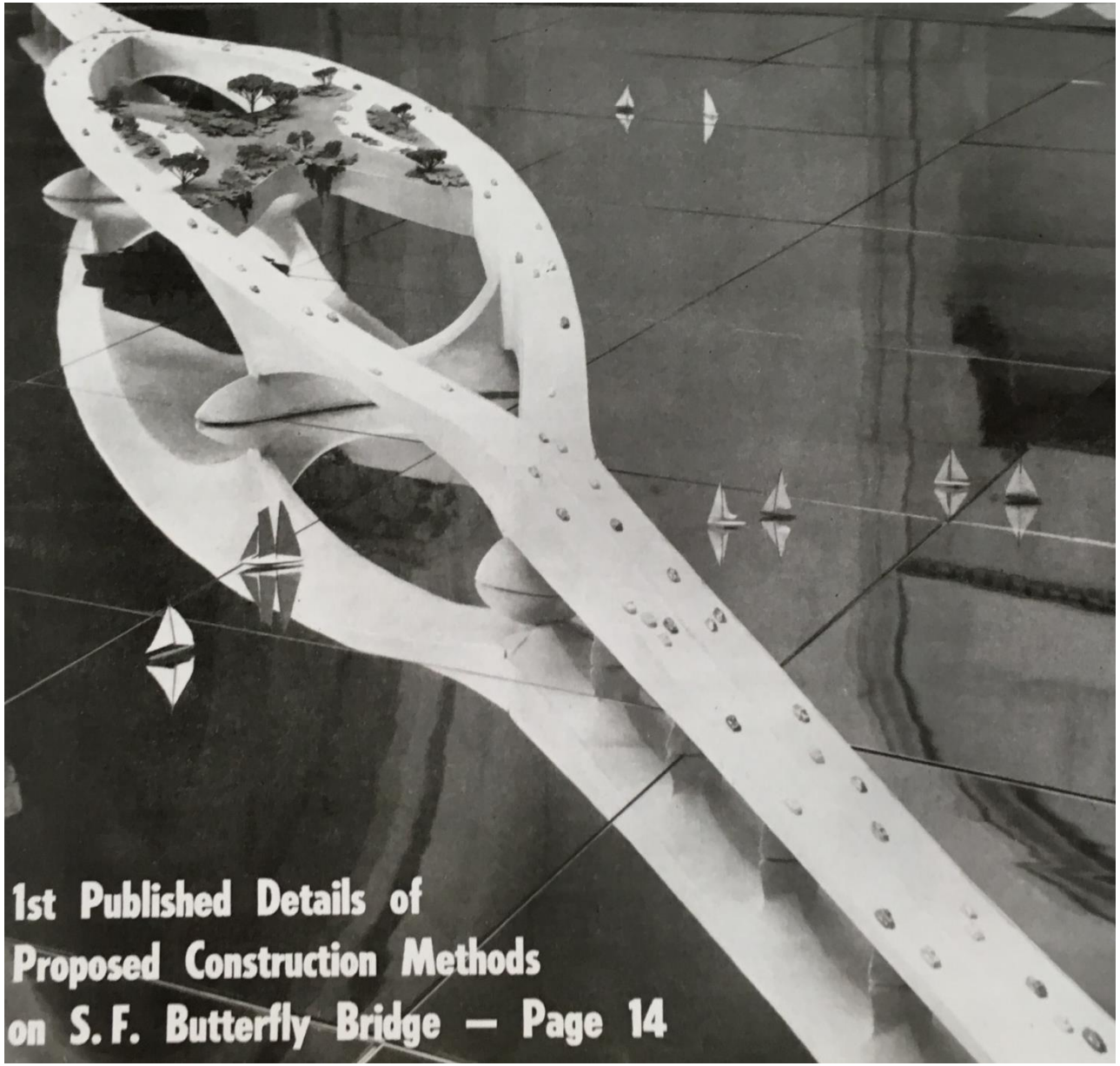
$$B_3' = -\frac{n-1}{n+1} B_4' b^{-2n}$$

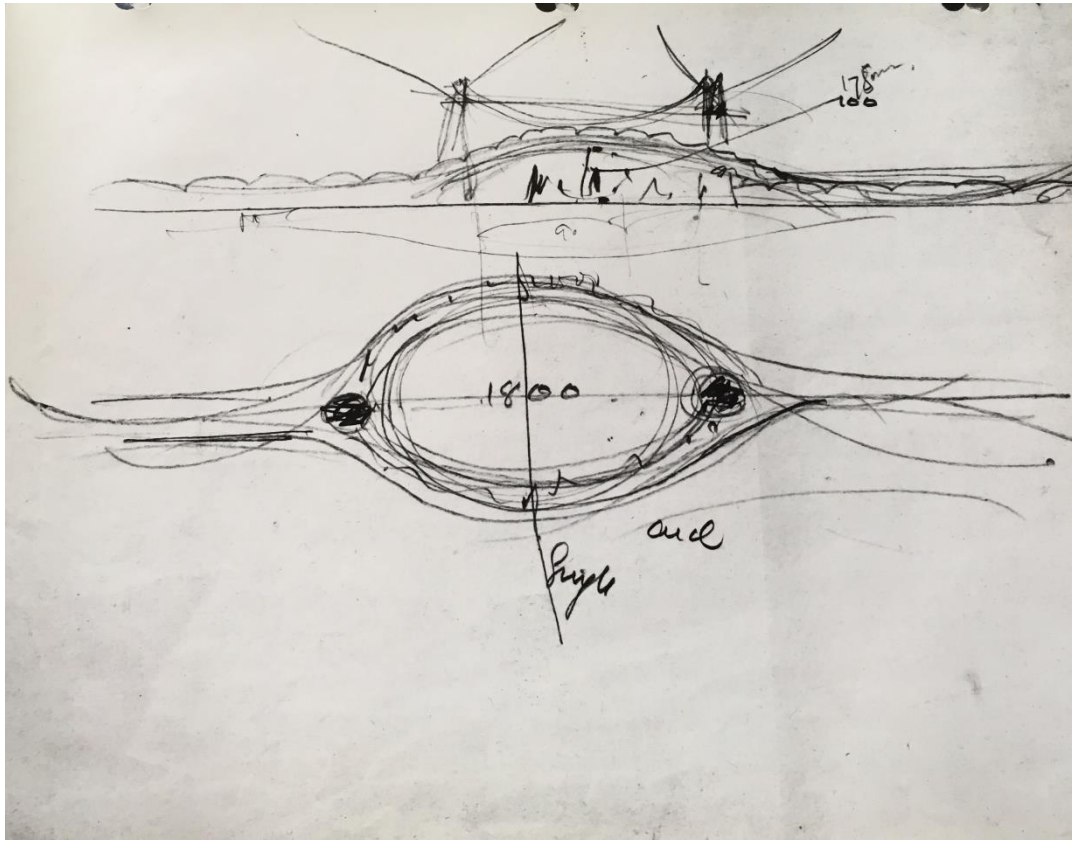
$$B_4' = -\frac{n+1}{n-1} B_3' b^{2n}$$

Polívka‘s calculations for the Guggenheim museum ramp



Polívka‘s design for the Bay bridge


1st Published Details of
Proposed Construction Methods
on S. F. Butterfly Bridge — Page 14


1800

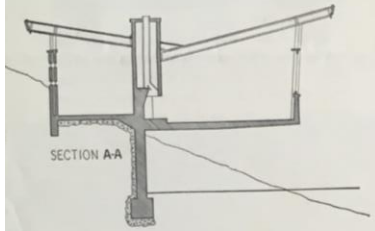
Eugéne Masselink

Frank Lloyd Wright‘s assistant

William Patrick‘s „Midglen“ house

CELESTYN WISNIEWSKI (30), WILLIAM ARTHUR PATRICK (31), ANTHONY CAPPUCCILLI (30) and SEAN O'HARE (31) were all apprenticed to Frank Lloyd Wright.

View of living room looking east is at right. Below is picture of interior garden court which forms entrance to house from lower level.



John H. Howe

TALIESIN,

OCT. 10, 1949

DEAR DR. POLIVKA:

I SHOULD HAVE WRITTEN YOU LONG AGO TO THANK YOU FOR THE NEWSPAPER ABOUT THE BRIDGE WHICH YOU SO KINDLY SENT ME, ALSO THE REPRINT FROM "THE ARCHITECTURAL RECORD" AND THE SNAPSHOTS OF ME IN THE DESERT.

I HOPE YOU WILL PARDON MY

May 12, 1957

r. Wesley W. Peters
Taliesin
Spring Green
Wisconsin

Dear Wes:

I am enclosing a copy to Mr. Wright for your information. To be sure of our structural design for the Belmont Sports Pavilion, in Elmont, New York, I checked the assumed live load with the Building Code of the Town of Hempstead which we have to consider for the final building permit, and we have to stick to the assumed live load of the roof 40 lb/sq.ft.

I also let check the dimensions of the cables for the gneral layout of Mr. Wright's structural type by one of my colleague, specialized in suspension structures, and our preliminary design was aproved, not only the dimensions of the cables but also the enormous masses of concrete bastions, due to the anchored cables exerting tremendous bending and torsion.

You may better explain these circumstance to Mr. Wright than I.

I believe that my suggestion to see the construction site of the Museum in New York is justified. We all are human beings and can overlook this and that, and in this case of such an unusual structure we should be more careful.

Confidentially, several years ago, I discovered errors in structural formulas published in one of the most popular Engineering Handbooks (by G'R), reported confidentially to the professor-editor, and he expressed to me his thanks and puolished the corrections in the next edition. Another characteristic case occurred to me. Another professor published his paper in the Journal of the Amrican Society of Civil Engineers. Since that article was in one of my special fields, I wrote a discussion. Comparing the results of an example, I discovered considerable errors. In accordance with fairness and the Code of Ethics of the Society I couldn't mention the errors in my discussion, and asked professor H. to report the corrections himself. He started to correspond with me regarding this suggestion, did not agree with me, and was sending me many pages of his substantiations. I went through them once more very carefully, however, unfortunately, I was not able to change my opinion. - Finally he approved my corrections, and - to my surprise (and I said to my Mircia: " Look , this is a great country, that wouldn't happen in Europe") - and, instead to report the errors himself as ' author's corrections', he mentioned my name in his ' Conclusion of the author', confessing that he is grateful to me that I suggested the corrections.- Anyway, I am suggesting to Mr. Wright to let me check the spectacular structure without any fee, if only traveling expenses are covered. On this occasion I could discuss with you the final design of the Belmont Sports Pavilion, as I am suggesting to Mr. Wright in my letter.

With best regards and thanks,

Cordially yours,

N. B.

It was my understanding in the case of the Bridge that the design being wholly mine (existing before the S. F. came up) that you would receive an engineer's fee for preparing all detailed reinforcing drawings and a superintendent's fee under construction. Also you, being on the ground, were to do all in your power to promote the commission to build the bridge.

F. Ll. W.

DR. J. J. POLIVKA: 1150 ARCH STREET BERKELEY 8

My dear J. J. Polivka: Due to Aaron Green's report of your statement to him that "I owed you money", some clearing up of our relationship seems imperative and necessary. To my knowledge, if any money is due it is the other way around.

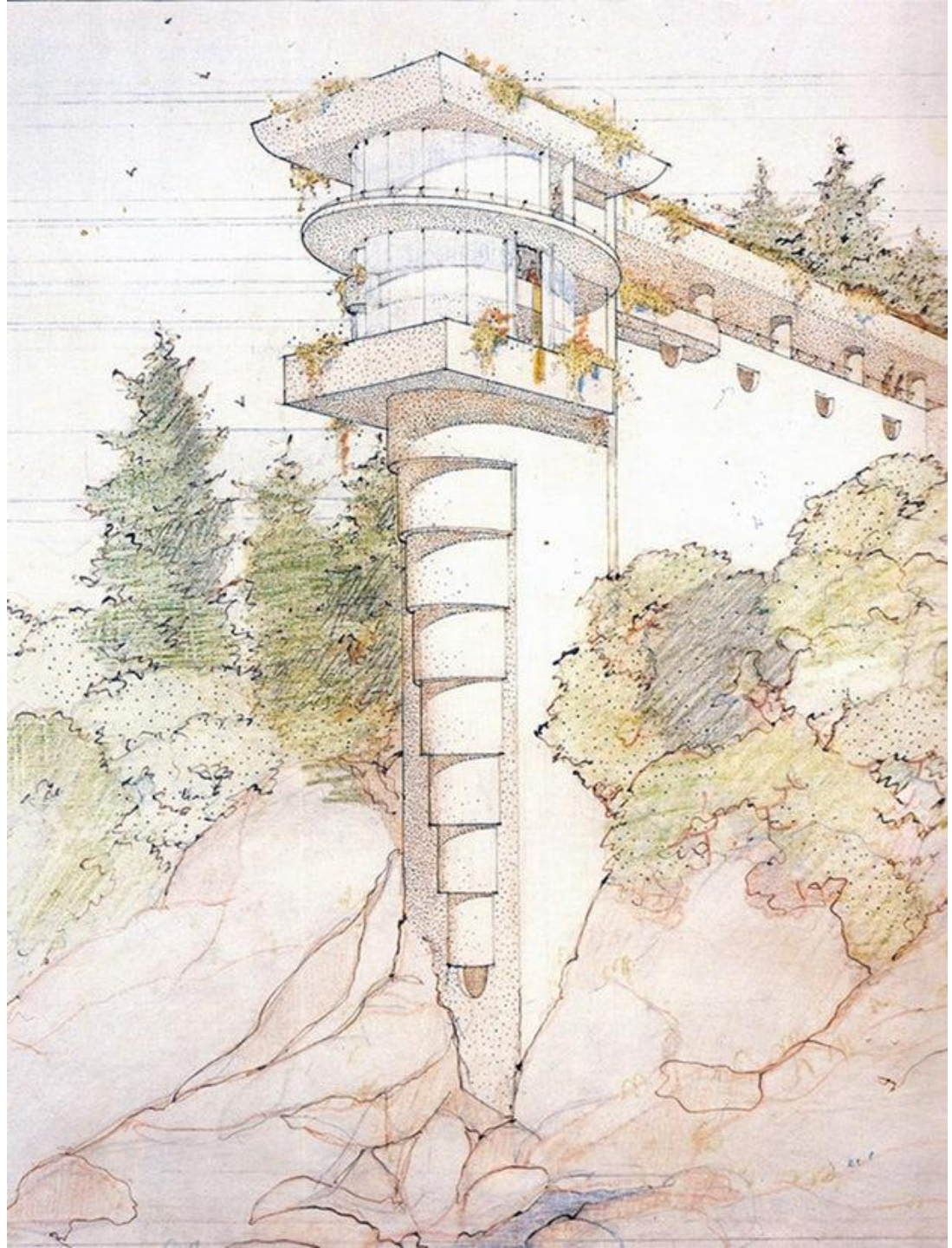
Also, the Abey Fellowship model is a Fellowship affair paid for by us. I entrusted it to him to deliver to my office in San Francisco. How it got into your hands is a mystery to me for I never authorized any such proceeding. The model belongs to The Frank Lloyd Wright Foundation as a matter of course. What work you have done upon it without my sanction is questionable. I have not approved it.

Questionable also is your retention of the Morris plans which I loaned you as you wanted the privilege of making an estimate on that job with a view to taking a contract to build it. Perhaps I am wrong in attributing undue assumptions to you as I have not seen you for a long time. If so, I will thank you to write and say so.

Sincerely yours,
Frank Lloyd Wright
Frank Lloyd Wright

March 15th, 1952

(over)



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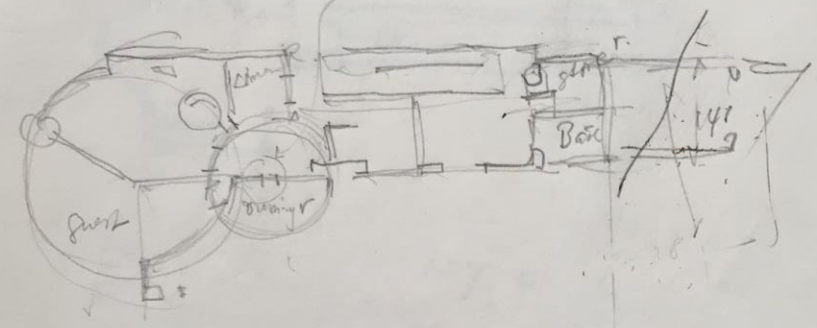
4

THIRD FLOOR

open to above



$14^2 \div 3.14 =$ 328 □'

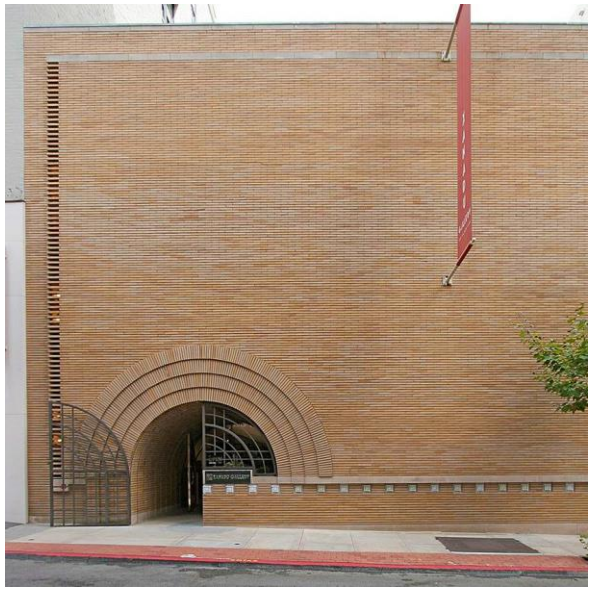
14 x 20.5 575 □'

29.5 x 15.5 460 □'

~~Storage 6 x 14~~ 84 □'

14 377 □'

1477 □'



V.C. MORRIS
CHINA . GLASS . LINEN
SILVER . GIFTS
140 MAIDEN LANE
SAN FRANCISCO 8
EXBROOK 2-5502

SAN FRANCISCO, CALIF.
APR 11
4:30PM
1951

BUILD YOUR FUTURE
WISELY, SAFELY
U.S. SAVINGS BONDS

Dr. J. J. Polivka
1150 Arch Street
Berkeley 8, California

N. B.

It was my understanding in the case of the Bridge that the design being wholly mine (existing before the S. F. came up) that you would receive an engineer's fee for preparing all detailed reinforcing drawings and a superintendent's fee under construction. Also you, being on the ground, were to do all in your power to promote the commission to build the bridge.

F. Ll. W.

DR. J. J. POLIVKA: 1150 ARCH STREET BERKELEY 8

My dear J. J. Polivka: Due to Aaron Green's report of your statement to him that "I owed you money", some clearing up of our relationship seems imperative and necessary. To my knowledge, if any money is due it is the other way around.

Also, the Abey Fellowship model is a Fellowship affair paid for by us. I entrusted it to him to deliver to my office in San Francisco. How it got into your hands is a mystery to me for I never authorized any such proceeding. The model belongs to The Frank Lloyd Wright Foundation as a matter of course. What work you have done upon it without my sanction is questionable. I have not approved it.

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Sincerely yours,
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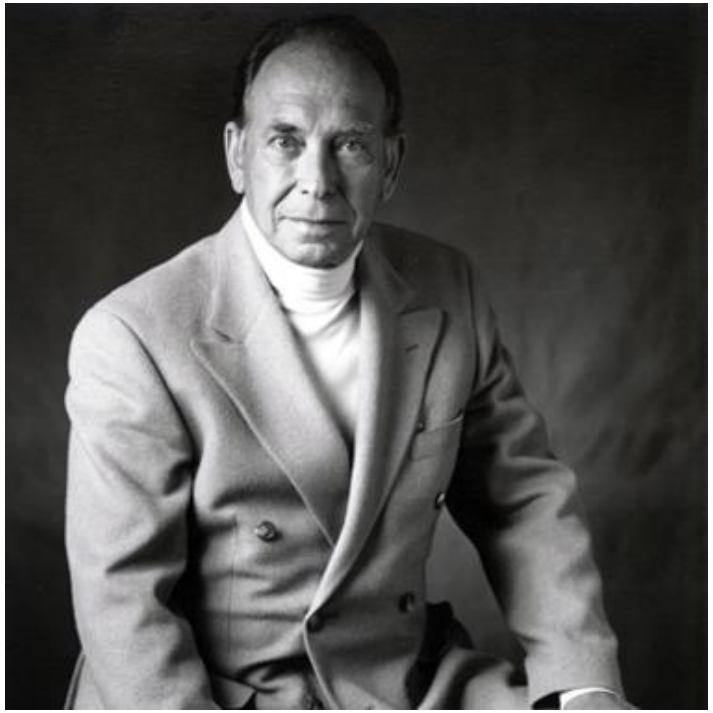


Aaron Green

April 29, 1959

Mr. Aaron G. Green
Architect, AIA
319 Grant Ave.
San Francisco 8, Calif.

Dear Aaron:

you probably attended the funerals of our master, so I am little late to express my sympathy. - I hope that the FLlW's Foundation will continue its successful activity, and you certainly will have important role in it.

Please let me know, since not long ago, as you know, Mr. Wright invited me to work on his unprecedented design of the Belmont Sports Pavilion (some reprints enclosed herewith), and I had to submit to him some alternate changes which may still save abt. $ 1 mil. of the originally estimated costs $ 18 mil.

Mr. Wright, exceptionally, asked me to put my name on the drawings(I work now with my both sons, Polivka & Sons), and also to write the reports and calculations on my stationary.

I certainly am very proud to get the recognition of this great architect (his last book- THE TESTAMENT - he gave me has his signature with the flattering words:" To the good doctor Polivka with esteem and appreciation- Frank Lloyd Wright, 1958").

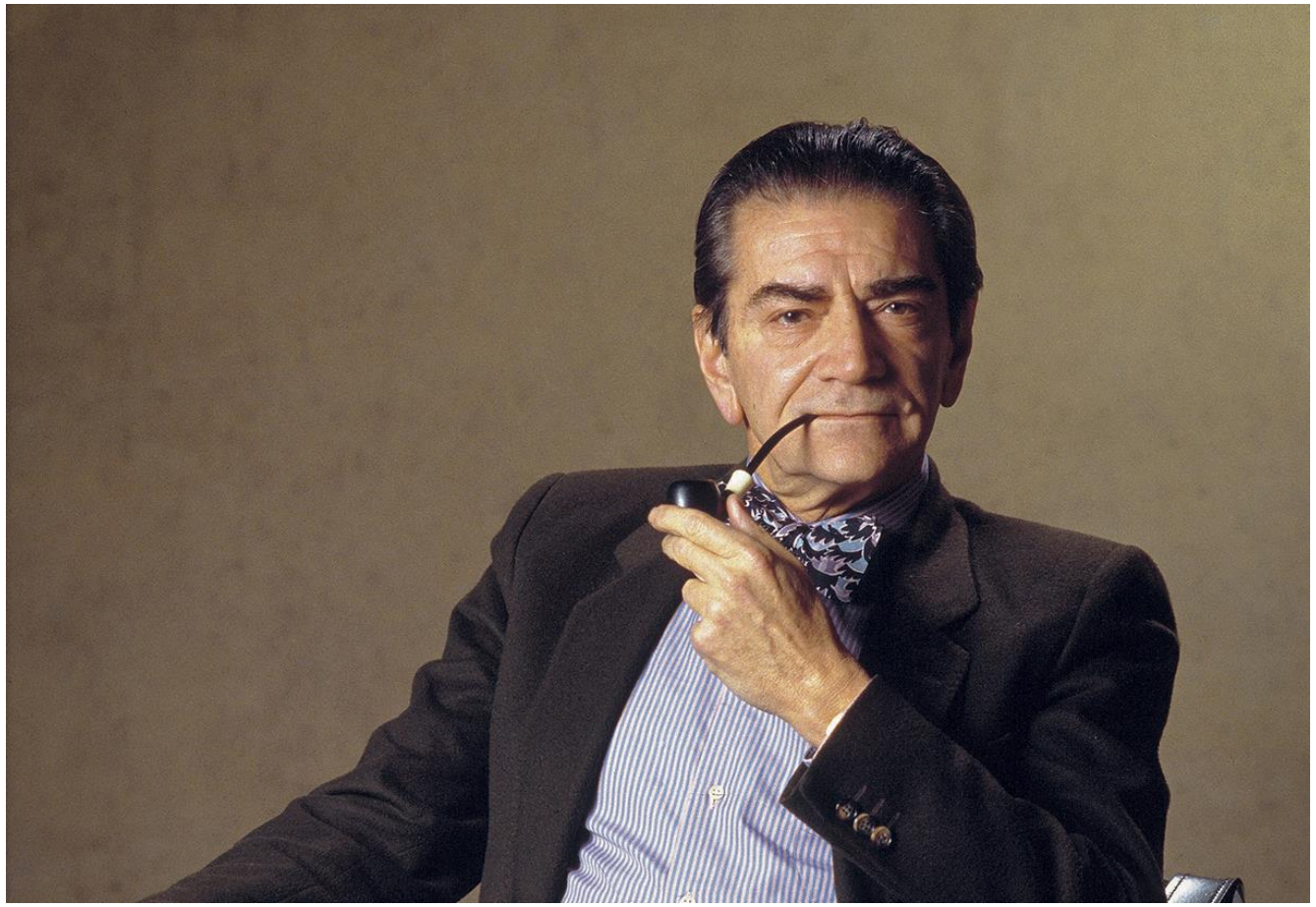
The Butterfly-Wing Bridge and the Belmont Sports Pavilion are also described and illustrated in E. Torroja's book PHILOSOPHY OF STRUCTURES, recently published by the University of California Press.

My other son, Jan, just got a job in New York(he lives there), $ 1 1/2 Mil. building, with pretty good fee. However, as in many such cases, after delay, the design should be completed in very short time, and I wonder whether you would be able to assist us. Would it be possible for you to get also the New York license? I may get in touch with you when the general layout, with alternated, are approved by the owners.

With best regards,

Sincerely,

Roger Corbetta,
his wife and
Mrs. Polivka



Bruno Zevi

Taliesin West, February 17, 1957

Prof. Arch. Bruno Zevi
Editor of L'ARCHITETTURA
Via Nomentana 150
Roma, Italy

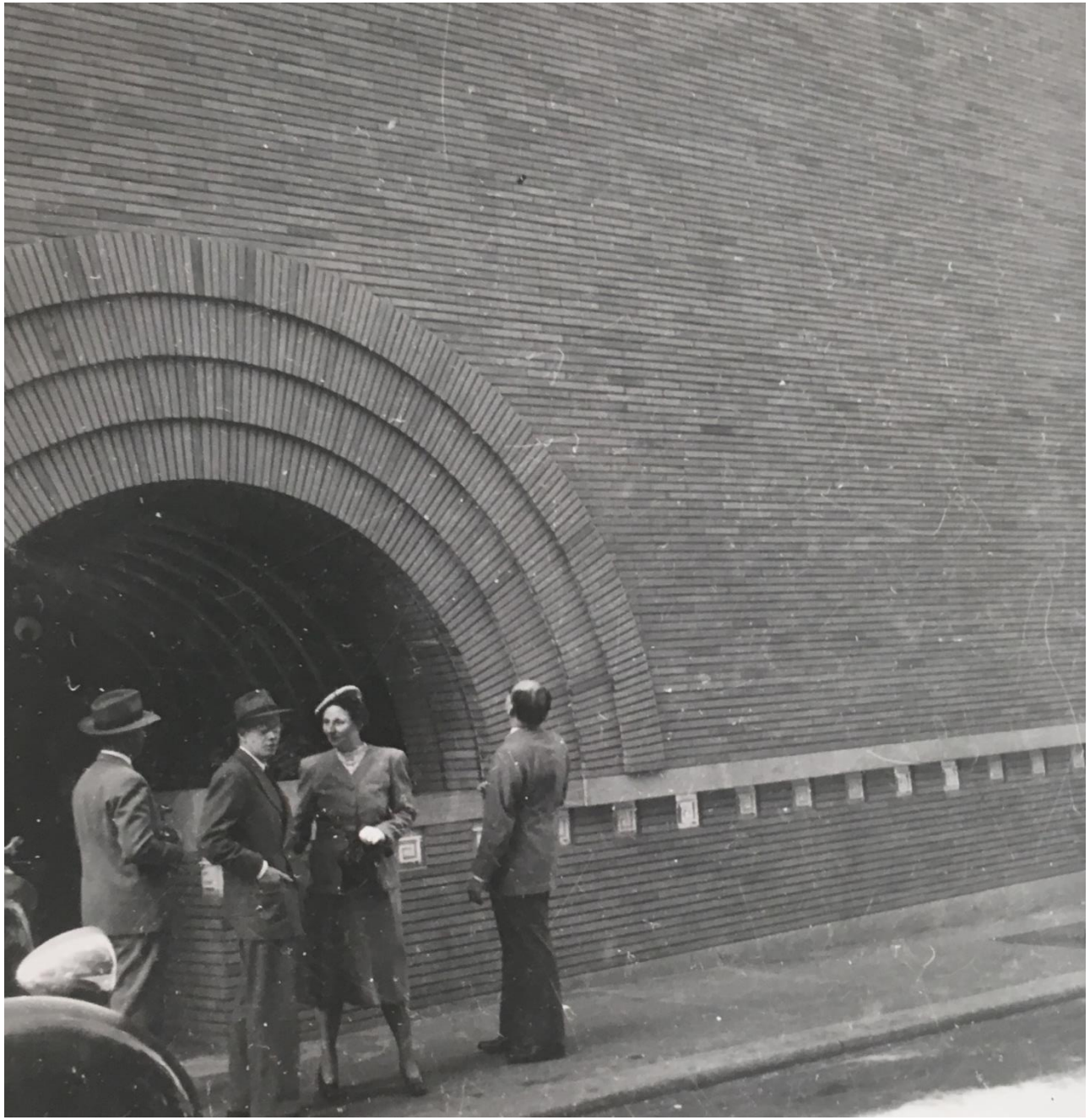
Dear Profes or Zevi:

As I wrote you already I am here now with Mr. Frank Lloyd Wright who invited me to work on his new spectacular project of the Race-track Pavilion at Belmont, New York that he is designing for Harry Guggenheim, the nephew of Sal. Guggenheim and hos friends. Althou Mr. Wright mentioned in his correspondence fifteen mil ion dollar, he thinks now that it will cost abt. $ 13,000,000.- We are discussing the basic design and I am estimating the costs. I am confident that we might stick to the original sum of $ 15 mill., or still less, however, the monney in this case is not very important.

I have for you very interesting news and shall write you as soon I will back in Berkeley. I should be back in Berkeley soon, since, as always in such cases, the work is piling up. I am here discussing with Frank Lloyd Wright only his basic ideas, and finis the structural work in Berkeley.

With best regards,

Sincerely yours,



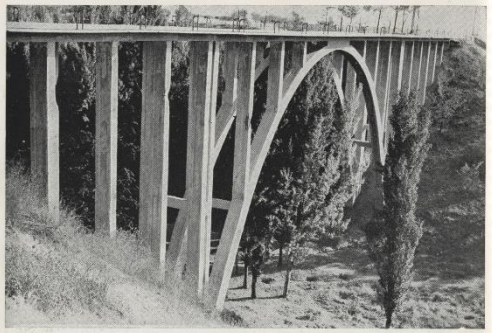


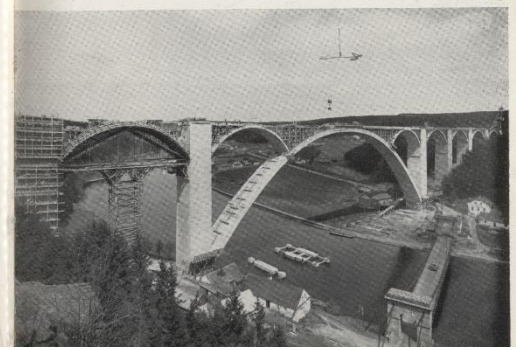
Fig. 14:10*a*

Fig. 14:10*a*. Aire Viaduct, Madrid. Engineer, E. Torroja. Photograph, M. García Moya.
Fig. 14:10*b*. Podolsko Bridge over the Vltava River, Czechoslovakia. Design, Ministry of Public Works. Experimental (photoelasticity) stress analysis, J. J. Polívka.

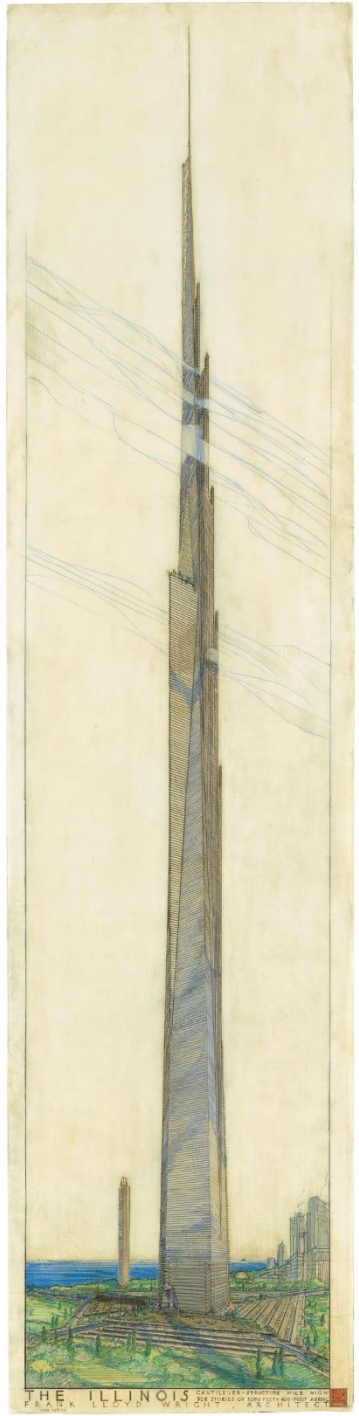
The most logical solution of this problem, one which involves no articulation, is the lightening of the spandrel walls, thus achieving greater simplicity and better appearance. The open arch, surmounted by a smaller row of arches, or (even more simple and recent development) by a series of columns supporting the deck, has been repeated hundreds of times in a more or less elegant style (fig. 14:10*a*). The rhythmic arrangement of spandrel arches (fig. 14:10*b*) can be extended farther into the valley or canyon banks.* If wider individual arches are provided, the transverse spandrel walls can be replaced by lighter columns rigidly connected with the beams of the superstructure or directly supporting the roadway slab with capitals. Larger spandrel arches, especially in long-span arches where the very high spandrel columns require special bracing to safeguard against the danger of bulging, will be even lighter.

* Podolsko Bridge over the Vltava River, Czechoslovakia, longest concrete arch in Central Europe. See J. J. Polívka, "Contractor Meets Close Design Tolerances in Building Long-Span Concrete Arch Bridge," *Civil Engineering* (Jan., 1949).

Fig. 14:10*b*



Frank Lloyd Wright and Eduardo Torroja in Phoenix



THE ILLINOIS

MILE-HIGH CANTILEVER SKY-CITY TO HONOR THE STATE OF ILLINOIS AND CITY OF CHICAGO

528 FLOORS FROM GRADE TO LANDING OF TOP FLOOR ELEVATOR

MEMORIAL TO

LOUIS H SULLIVAN SON OF CHICAGO
FIRST MADE THE TALL BUILDING TALL

ELISHA OTIS
INVENTOR OF THE UPENDED STREET

JOHN ROEBLING
FIRST STEEL IN TENSION ON THE GRAND SCALE. THE BROOKLYN BRIDGE

LIDGERWOOD NAVAL ARCHITECTS
FIRST OCEAN LINER KEEL, MAKES IT WHAT IT IS TODAY.

COIGNET & MONIER OF FRANCE
REINFORCED CONCRETE
THE BODY OF OUR MODERN WORLD

SALUTATIONS

EDUARDO TORROJA
ENGINEER, SPAIN

PROFESSORS BEGGS-CROSS
SCIENCE OF CONTINUITY

PROFESSOR PIER LUIGI NERVI
ENGINEER, ITALY

DR. J.J. POLIVKA ENGINEER
UNIVERSITY OF CALIFORNIA

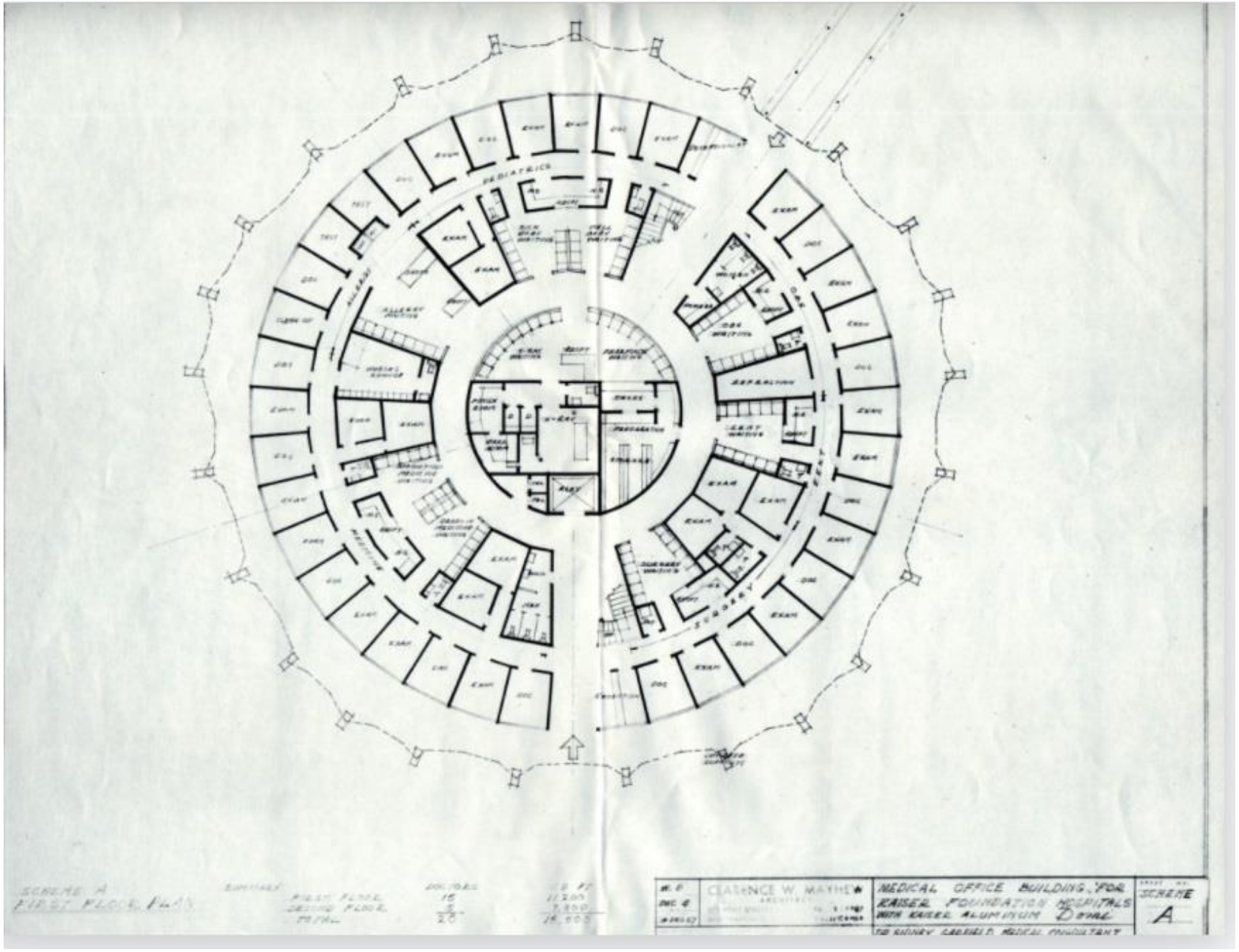
MAILLART ENGINEER
SWITZERLAND

FRANK LLOYD WRIGHT SON OF CHICAGO
HONORARY DEGREE OF ENGINEERING
TECHNISCHE HOCHSCHULE OF DARMSTADT, GERMANY
HONORARY DEGREE OF ENGINEERING
TECHNISCHE HOCHSCHULE OF ZURICH, SWITZERLAND

FIRST SUCCESSFUL APPLICATION OF PRINCIPLE OF CONTINUITY HORIZONTAL DERIVED FROM STEEL IN TENSION APPLIED TO EARTHQUAKE-PROOF CONSTRUCTION. THE PRINCIPLE OF THE CANTILEVER VERTICAL APPLIED TO THE TALL BUILDING. THE FIRST TAPROOT FOUNDATION.

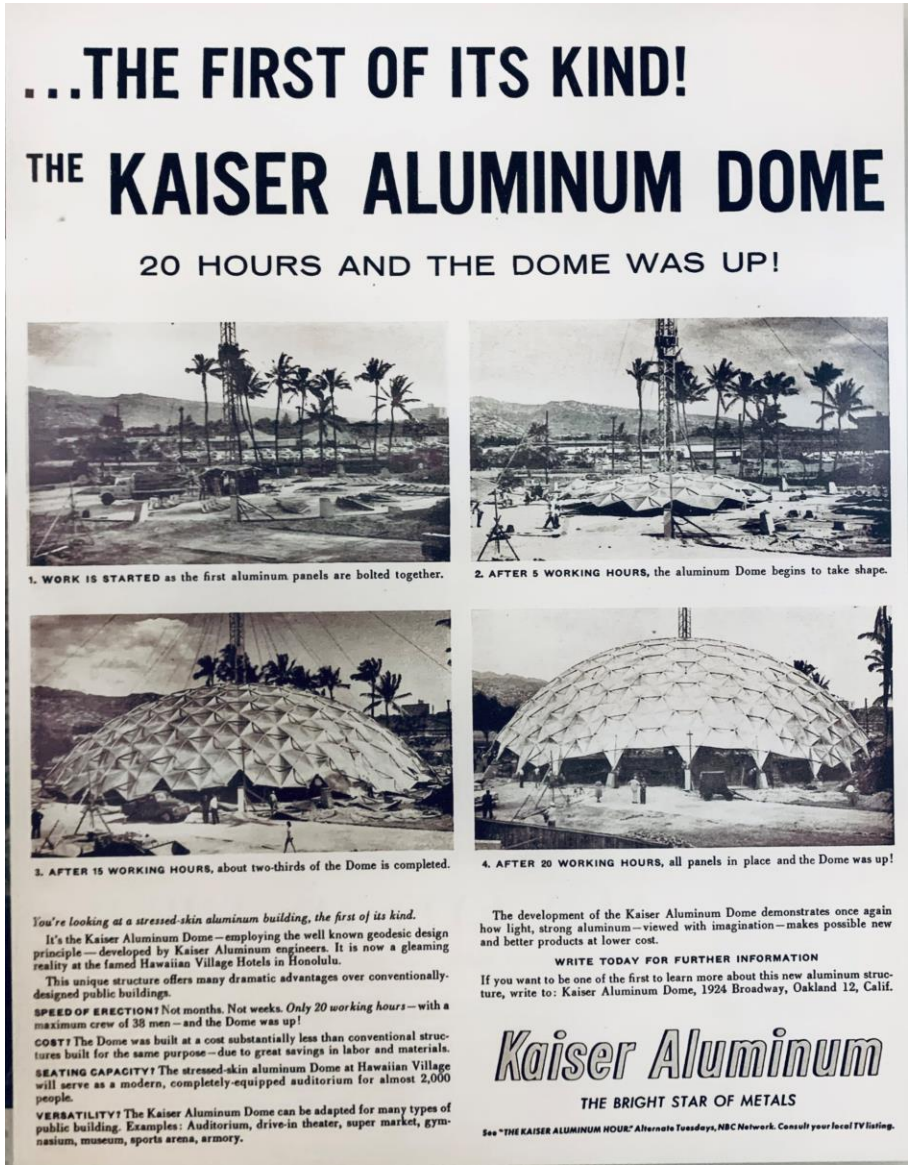
STATISTICS:

GROSS AREA . . . 18,462,000 sq ft.



Kaiser dome hospital

R. Buckminster Fuller, Frank Lloyd Wright and henry Kaiser



...THE FIRST OF ITS KIND!

THE KAISER ALUMINUM DOME

20 HOURS AND THE DOME WAS UP!

1. WORK IS STARTED as the first aluminum panels are bolted together.

2. AFTER 5 WORKING HOURS, the aluminum Dome begins to take shape.

3. AFTER 15 WORKING HOURS, about two-thirds of the Dome is completed.

4. AFTER 20 WORKING HOURS, all panels in place and the Dome was up!

You're looking at a stressed-skin aluminum building, the first of its kind.

It's the Kaiser Aluminum Dome—employing the well known geodesic design principle—developed by Kaiser Aluminum engineers. It is now a gleaming reality at the famed Hawaiian Village Hotels in Honolulu.

This unique structure offers many dramatic advantages over conventionally-designed public buildings.

SPEED OF ERECTION? Not months. Not weeks. *Only 20 working hours*—with a maximum crew of 38 men—and the Dome was up!

COST? The Dome was built at a cost substantially less than conventional structures built for the same purpose—due to great savings in labor and materials.

SEATING CAPACITY? The stressed-skin aluminum Dome at Hawaiian Village will serve as a modern, completely-equipped auditorium for almost 2,000 people.

VERSATILITY? The Kaiser Aluminum Dome can be adapted for many types of public building. Examples: Auditorium, drive-in theater, super market, gymnasium, museum, sports arena, armory.

The development of the Kaiser Aluminum Dome demonstrates once again how light, strong aluminum—viewed with imagination—makes possible new and better products at lower cost.

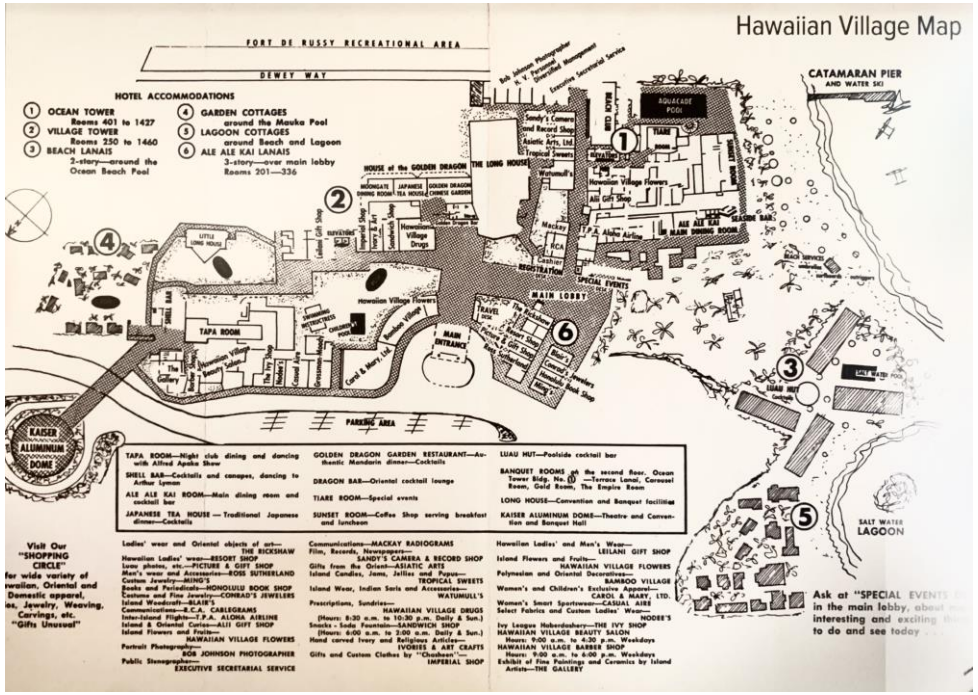
WRITE TODAY FOR FURTHER INFORMATION

If you want to be one of the first to learn more about this new aluminum structure, write to: Kaiser Aluminum Dome, 1924 Broadway, Oakland 12, Calif.

Kaiser Aluminum

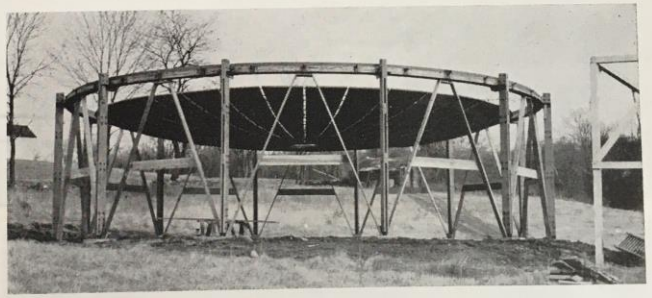
THE BRIGHT STAR OF METALS

See "THE KAISER ALUMINUM HOUR," Alternate Tuesdays, NBC Network. Consult your local TV listing.

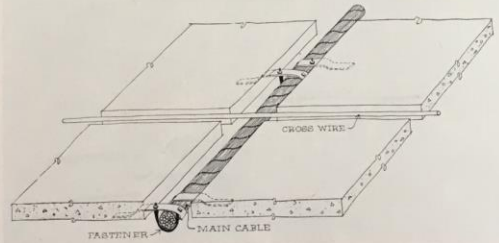


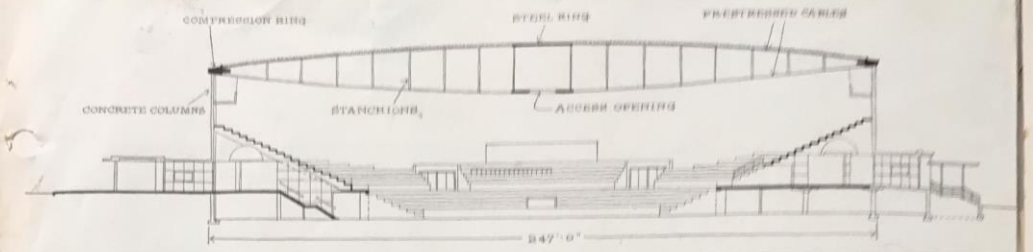
Aluminium geodesic dome in Waikiki

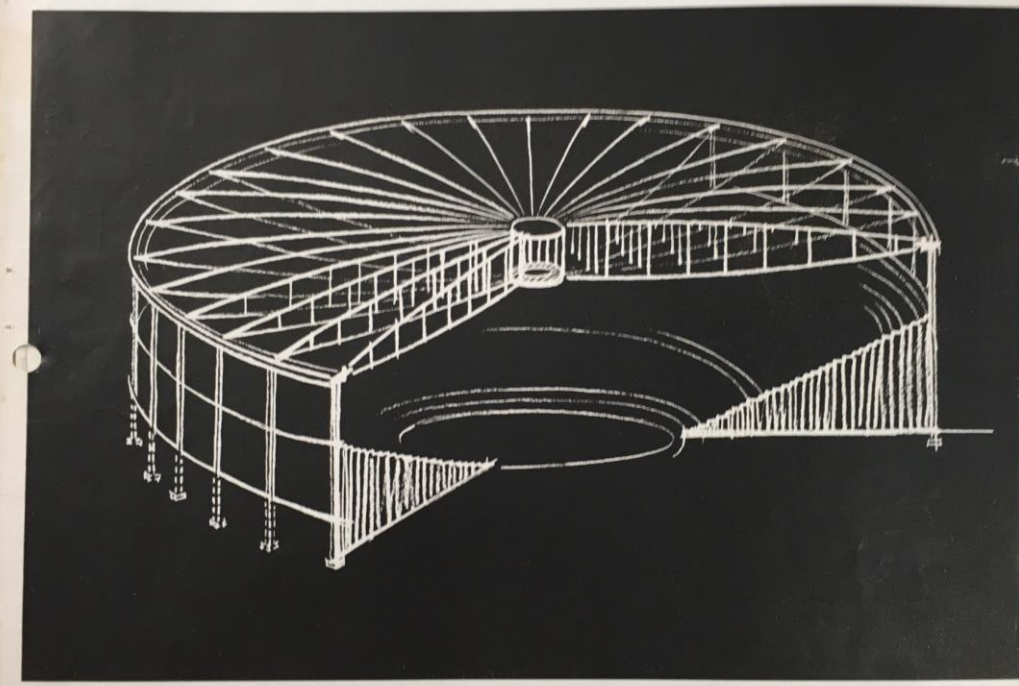
Miniature of Montevideo roof system 50′ in dia., using 36 cables, was designed and built last summer in Columbia University camp at Litchfield, Conn., by architecture and engineering students under supervision of Bruno Funaro and Mario Salvadori. Compression ring is laminated wood stiffened by steel. Temporary overloading was with sandbags. Drainage here is simply into pool below open oculus; normally it would be handled by sump pump. Salvadori says snow and ice accretion would be no problem.



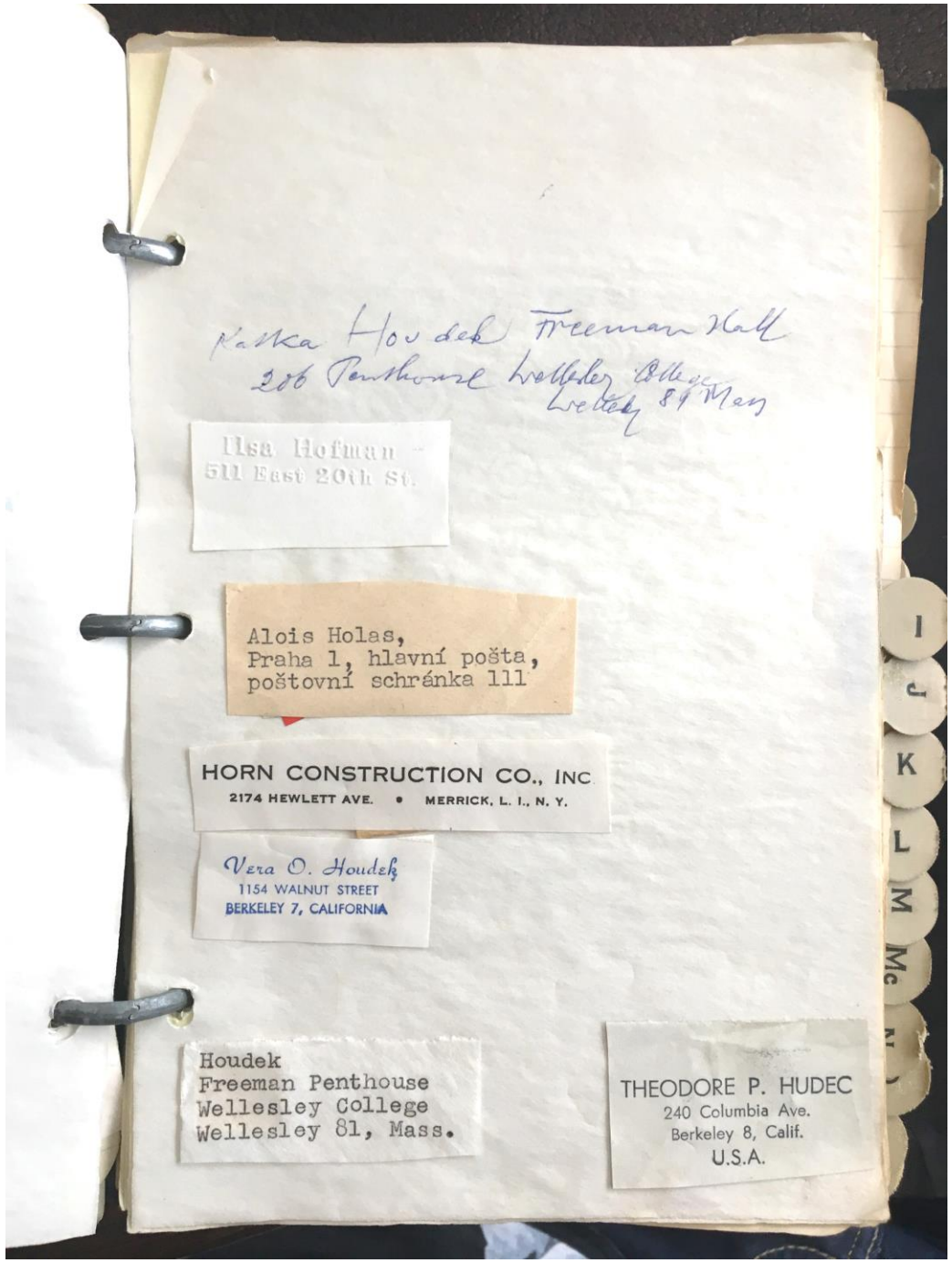
Cable-hugging prestressed concrete slabs for suspension roof of Berlin conference hall (AF, Sept. '55) now under construction, use ingenious U-bolt fastening devised by Engineer Fred N. Severud. Slabs for the roof will combat flutter by weight and by serving as transverse ties like strands that tie together long cables of a spider web. Hugh Stubbins, architect; Severud-Elstad-Kruger, engineers.







Wheel-like roof designed for 240′-dia. municipal auditorium in Utica, N.Y., consists of two paired layers of pretensioned cables, separated by vertical studs. The 72 cables of each layer are anchored to the inner steel tension ring and outer reinforced concrete ring which, being under constant compression, needs no expansion joint. Flutter is eliminated and unsymmetrical or upward forces self-canceled by compensating response from partner cables. Engineer Lev Zetlin cites these other advantages: Simple drainage; little waste cubage because lower surface drops only 1′ for every 30′ horizontally; lightness (the covering is light metal decking with cables themselves doubling as purlins). Exhaust fans go inside steel ring, ducts between cable layers. All cables and fittings are identical. One erection tower is needed to raise inner ring; the two rings give working area for pretensioning of the cables. Much larger spans are possible without increased cost per sq. ft. because steel per sq. ft. and erection work would be about the same. Gehron & Seltzer, architects; roof design by Consulting Engineer Lev Zetlin and Tyge Hermansen, associate.



Thank you for your attention!

Jaroslav J. Polívka‘s address book, 1940s/1950s