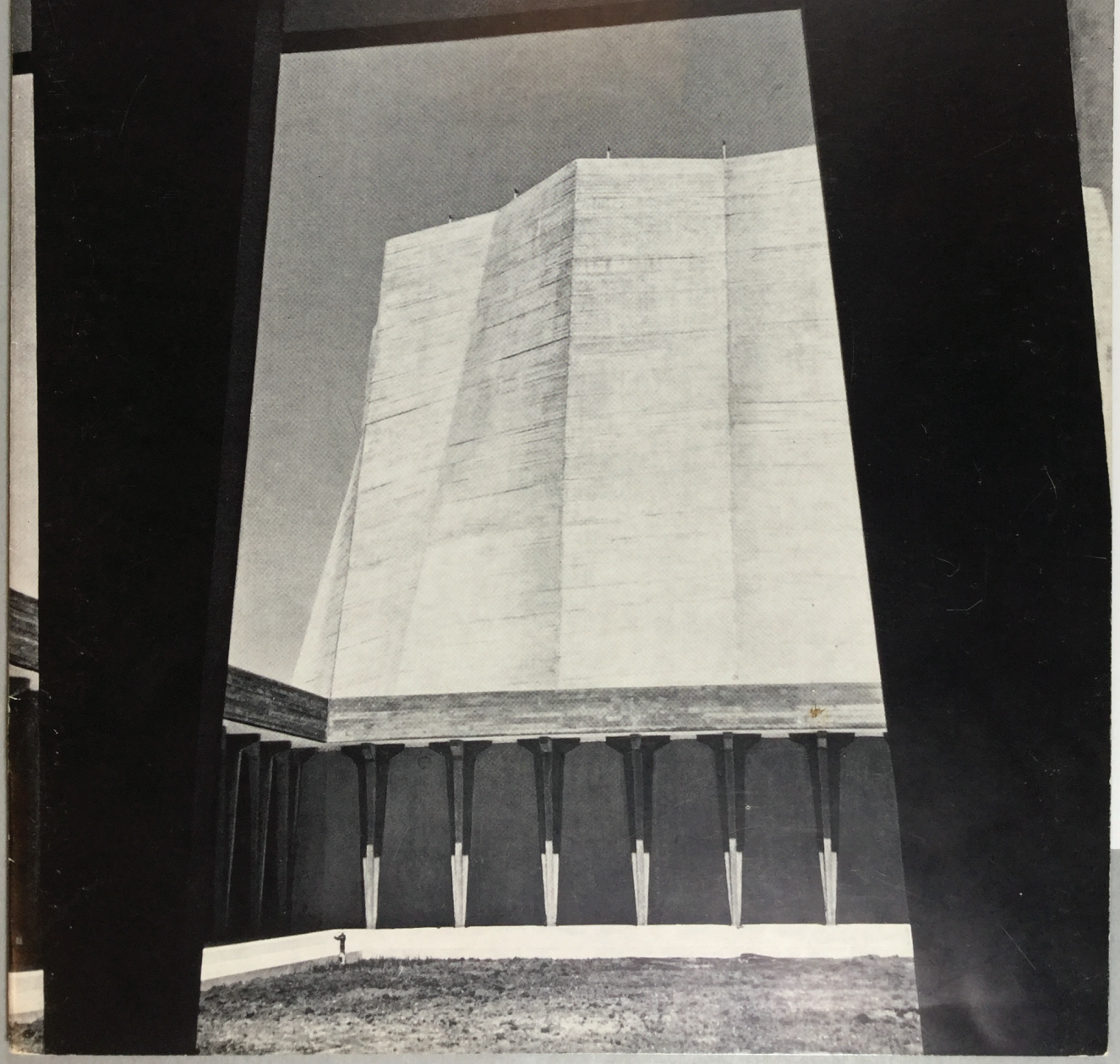
Nuclear Reactor Israel
1957-'60
22

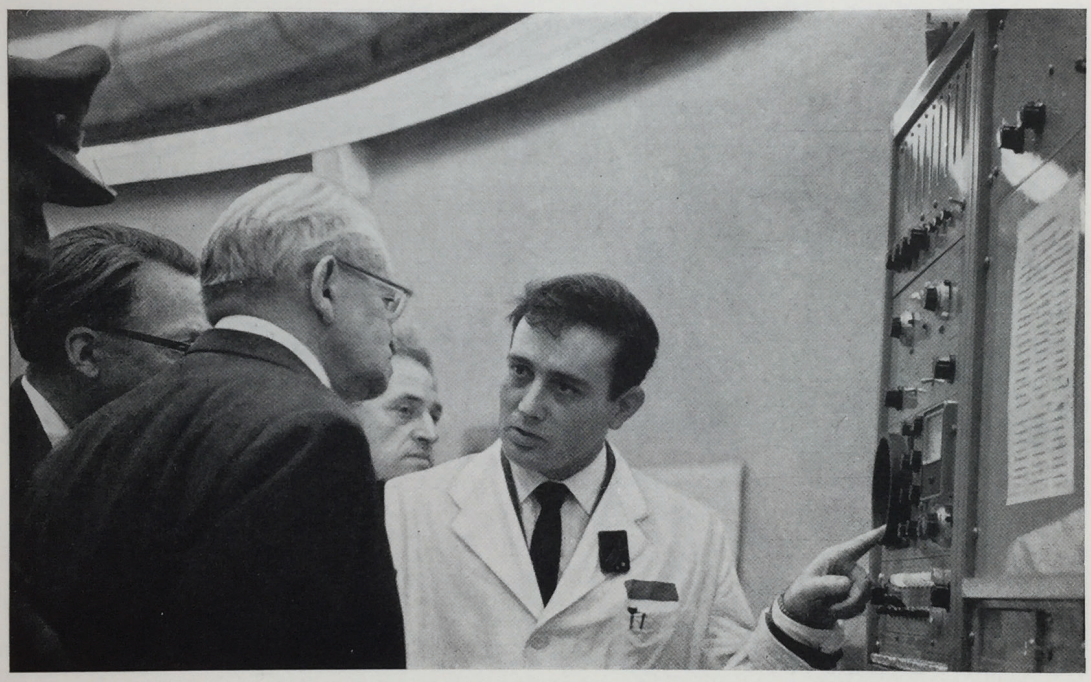
THE NAHAL SOREQ RESEARCH REACTOR IRR-I



THE NAHAL SOREQ RESEARCH REACTOR IRR-I

MINISTRY OF DEFENCE, ISRAEL ATOMIC ENERGY COMMISSION

APRIL 1962



The President, Mr. Ben Zvi, on his visit to the IRR-I, 20th December, 1960

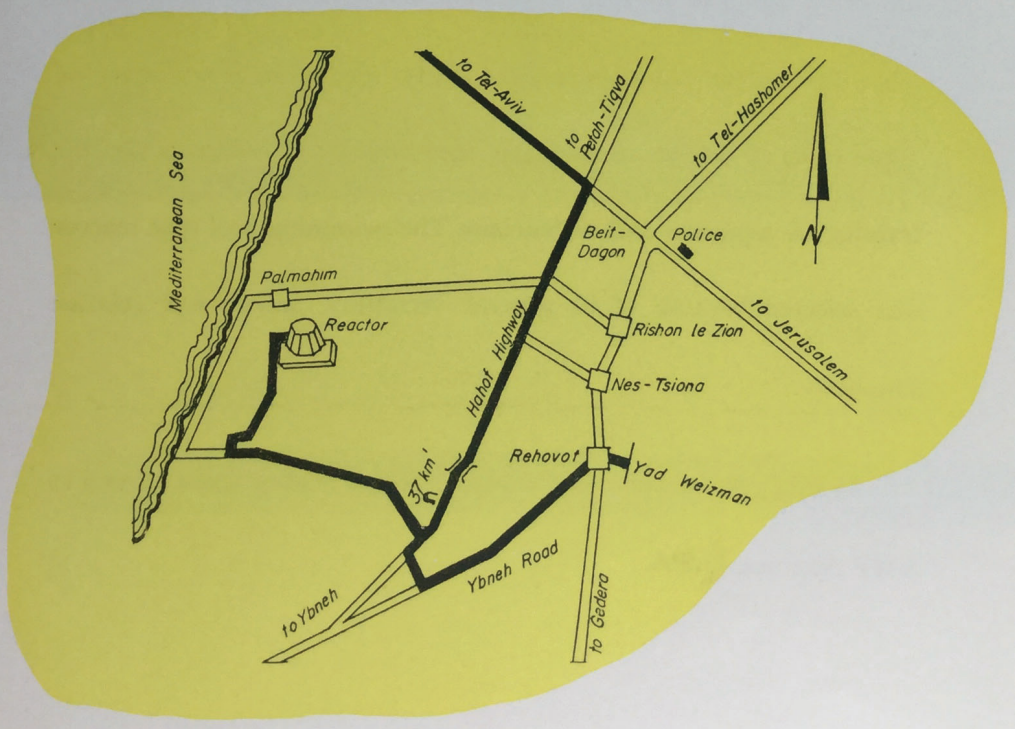
An agreement was signed in 1955 between the State of Israel and the United States of America pledging co-operation in the peaceful uses of atomic energy. Following on this, it was decided to construct a research reactor. A Committee was appointed by the Prime Minister in 1956 to examine and decide upon the most suitable type for the country's needs, namely, fundamental research, the application of isotopes in medicine, agriculture and industry, and the training of engineers and technicians. The swimming pool type reactor was selected because of its general versatility, safety and relative simplicity.

In 1958, the contract for the supply of this reactor was awarded to AMF Atomics, U.S.A.

The Israel Research Reactor

is situated on the sand dunes of Nahal Soreq. The design of the reactor building, by architect Philip Johnson of New York with the assistance of a young Haifa architect, Gideon Ziv, is such that without loss of its functional character, the austere beauty of the construction blends well with its semi-desert setting. The reactor has been awarded a prize by the American Association of Architects as one of the seven most pleasing designs by American architects brought to fulfilment in 1960.

Detailed planning and construction of the structure and installation was undertaken by the Building and Property Department of the Ministry of Defence. The main contractor was Solel Boneh which executed the work with the assistance of many subsidiary contractors.



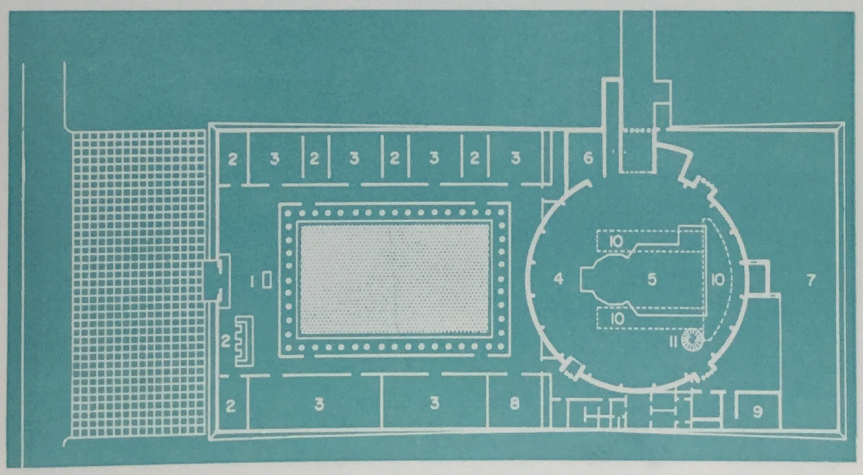
Local labour was employed throughout and the work was completed in 19 months from the breaking of the first ground in November, 1958, a record achievement.

Costs of construction together with the ancillary laboratories was about IL. 6 million, of which some quarter of this sum represents the expenditure for preparation of the site.

The cost of the reactor itself, $ 800,000, of which $ 350,000 was donated by the U.S. Government under its Atoms for Peace Program, is included.

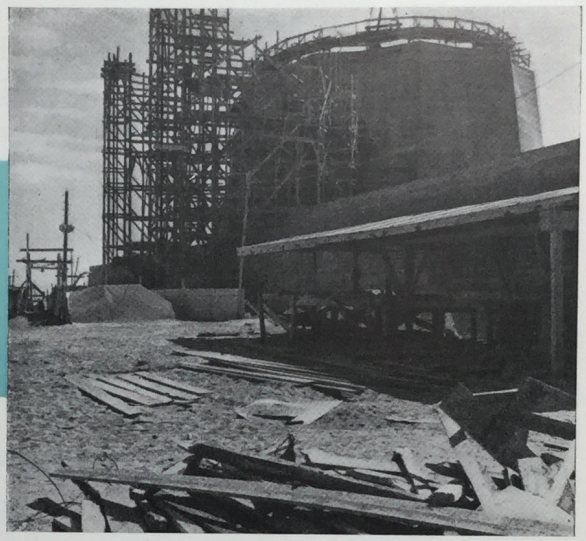
The U.S. Government also leased to Israel the enriched uranium fuel, provided assistance in the training of scientists and engineers and advice at all stages of the project.

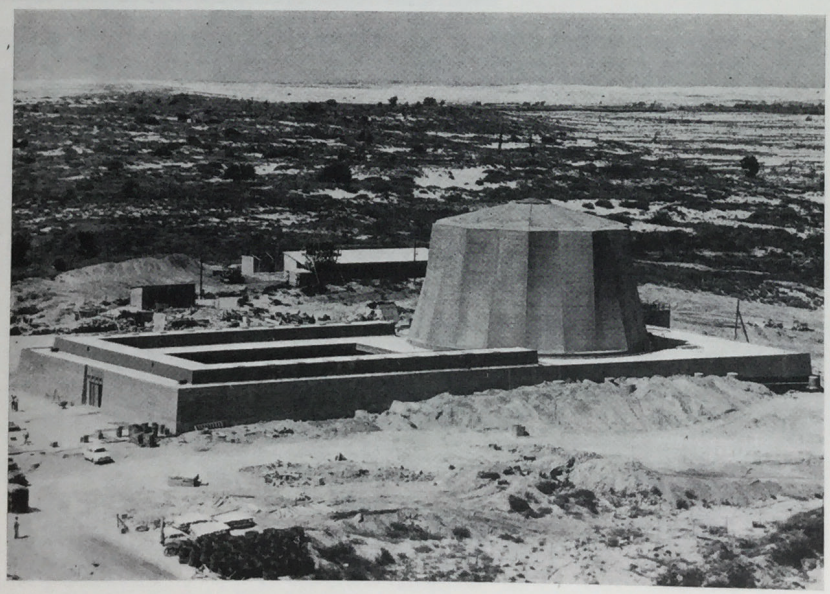
The IRR-I — Schematic plan of hall and laboratories



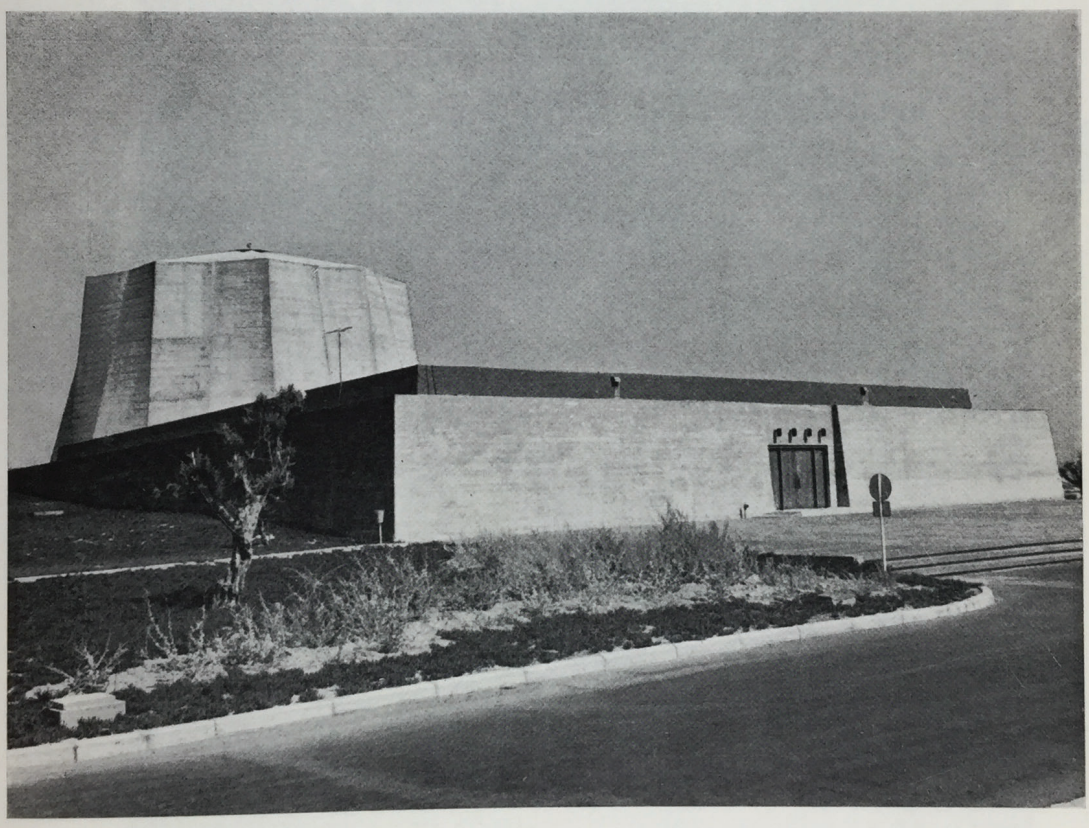
1. Entrance Lobby
2. Office
3. Laboratory
4. Reactor Hall
5. Reactor Pool
6. Radiochemical Laboratory
7. Machine Room
8. Mechanical Workshop
9. Counting Room
10. Platforms
11. Spiral Staircase, Containment Area

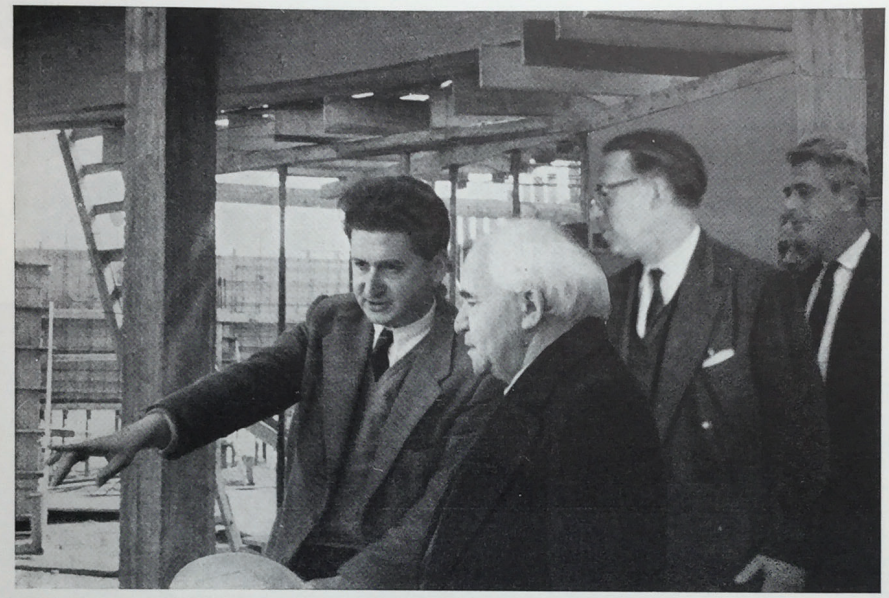
The Nahal Soreq Reactor under construction. Right—erection of the dome, November, 1959. Below — the main building nearing completion, June, 1960





The completed construction, July, 1960.
View of entrance to the laboratories





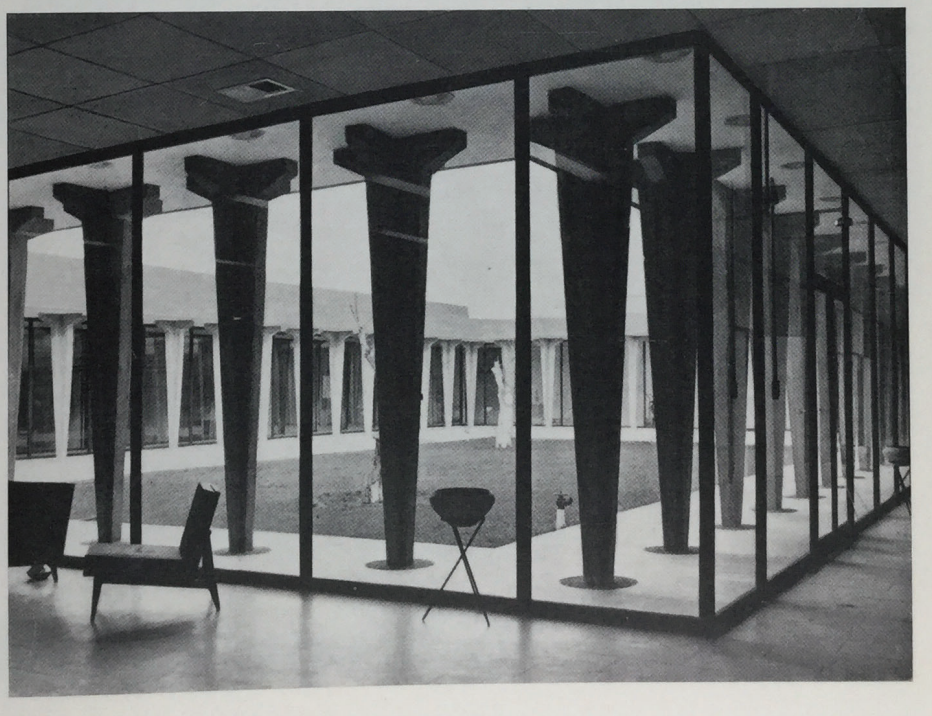
Distinguished visitors to the reactor during 1960-61 included Prime Minister Mr. David Ben-Gurion and Foreign Minister Mrs. Golda Meir

Above : I. E. Streifler (Engineer), Mr. Ben-Gurion, Prof. E.D. Bergman (Chairman, IAEC), Dr. I. Pelah (Director of the Reactor).

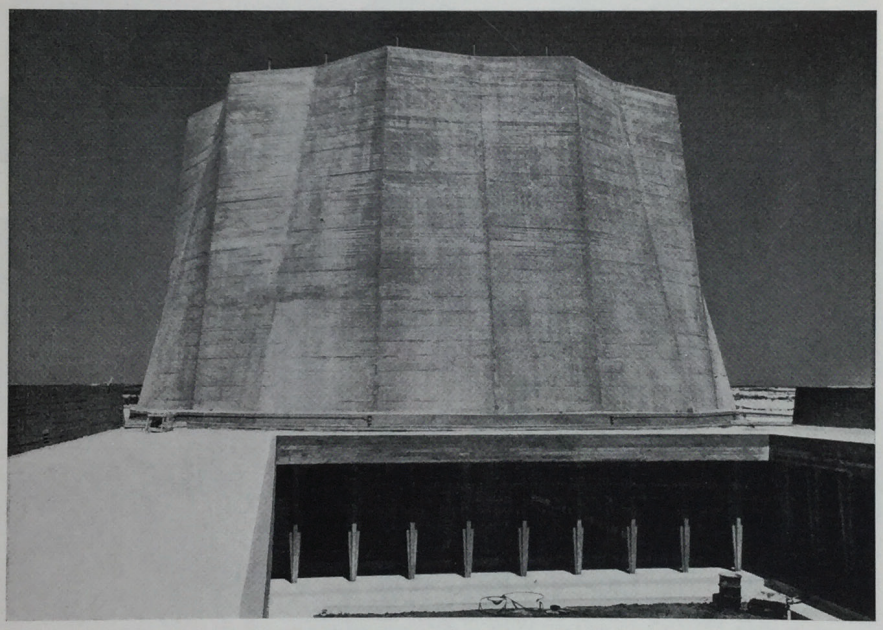
Left : Prof. I. Dostrovsky (Scientific Director, Soreq Research Establishments, Mrs. Meir, Mr. I. Haimovic (former Director, Soreq Research Establishments), Dr. Pelah and Mr. Shimon Peres (Deputy Minister of Defence).

The reactor building is divided into two parts, one of which surrounds a quadrangle from which light diffuses into the building through translucent walls. This area contains the laboratories, offices and workshops and is air-conditioned, as is also the reactor hall itself which forms the second part of the structure.

The inner quadrangle, laboratory area

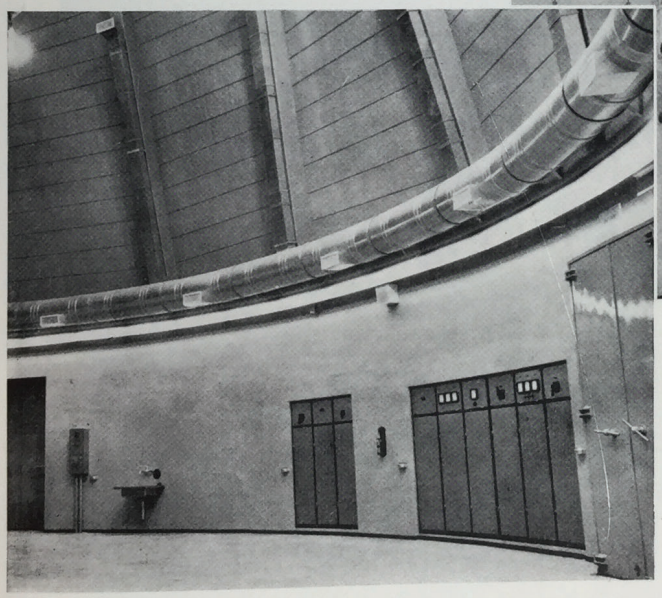


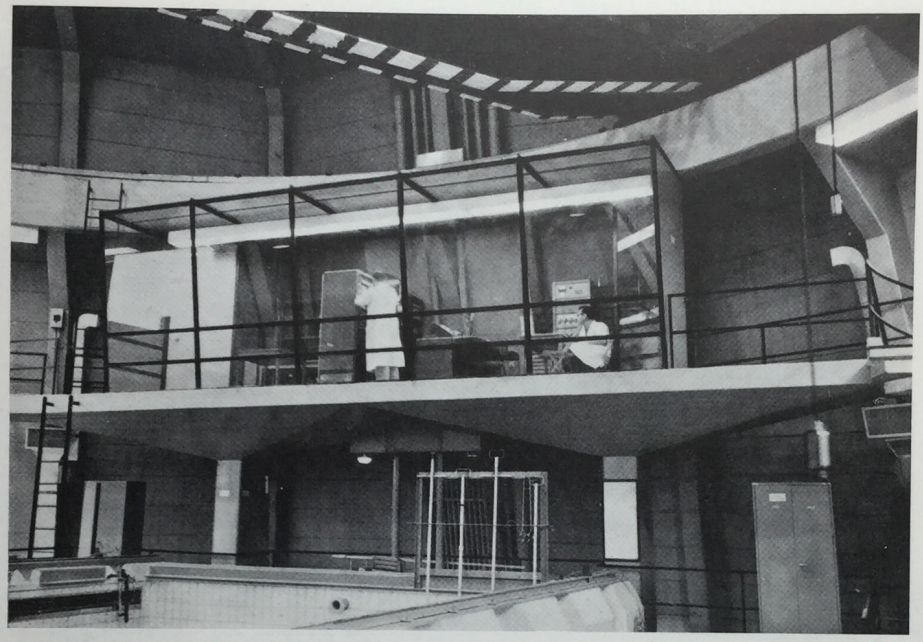
This latter area is covered with a high dome (22 metres), having 20 faces on a polygonal base.



Reactor dome showing polygonal faced construction

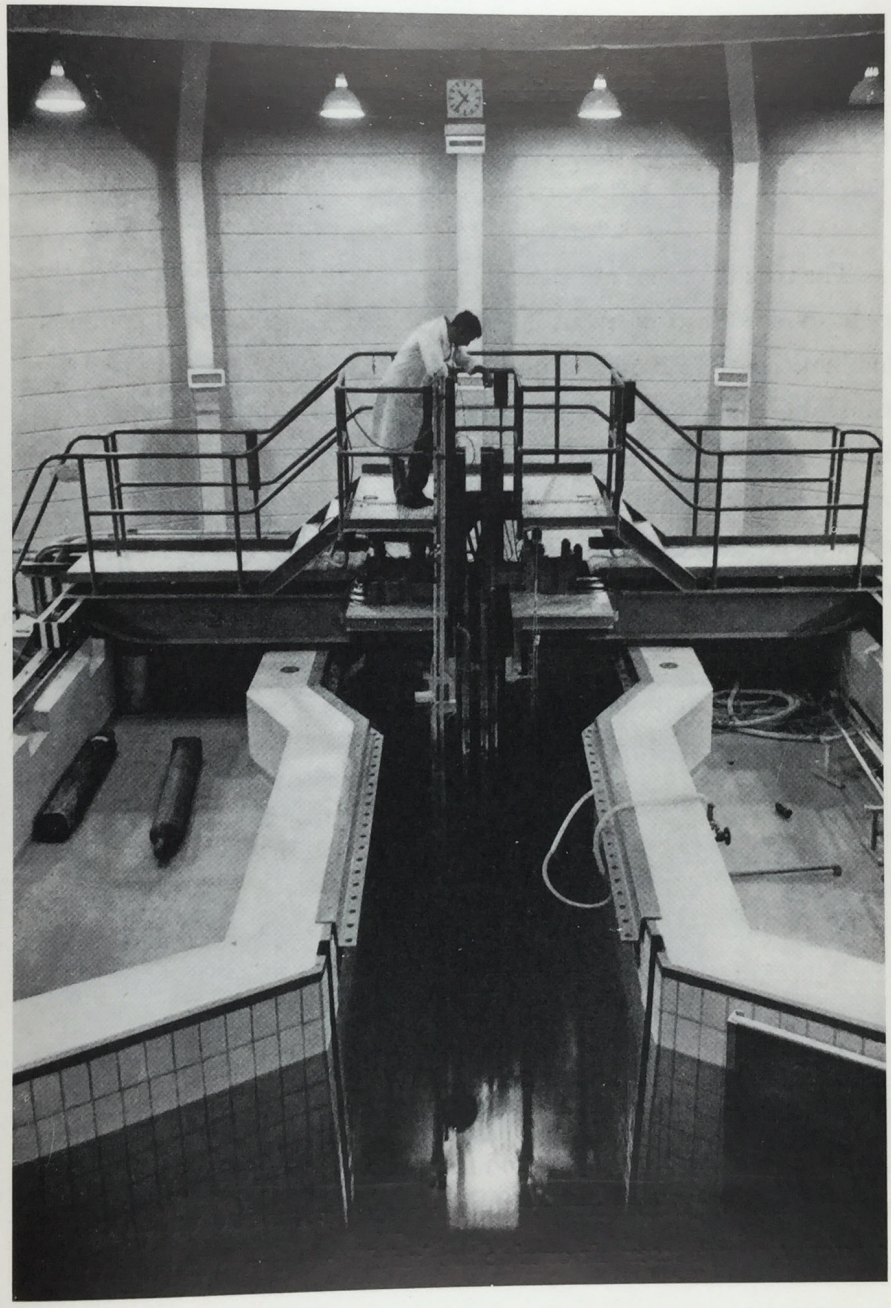
Interior views of the reactor hall, showing (right) staircase and (bottom) entrance area





Control room seen from the pool area

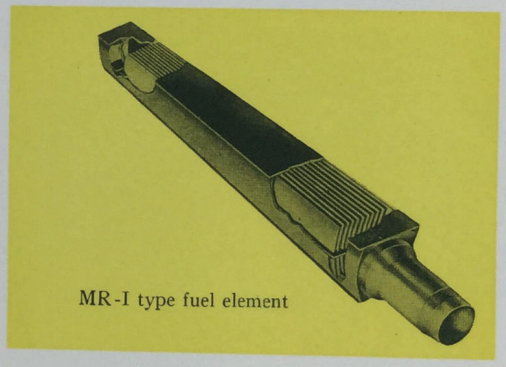
In the centre of the 25 metre diameter reactor hall, a water pool - not unlike a small swimming pool - contains the reactor, which thus derives its name. The pool contains demineralised water ; it is spanned by a movable steel bridge from whence an aluminium structure reaching to the bottom of the pool supports the reactor core.



View of the pool and movable steel bridge supporting the reactor core

The IRR-I employs uranium enriched to a concentration of 90% in its U-235 isotope. Thus the total weight of fuel required is quite small, about 5 kg.

The reactor core is quite small, about 40 cm in width and 60 cm in height, and consists of about 30 separate fuel elements on a common aluminium base. The fuel elements contain the fuel - uranium metal - as an aluminium alloy in the form of thin, aluminium-coated strips. Each fuel element contains 18 such strips mounted in parallel at narrowly spaced intervals. The pool water fills the intervening spaces and serves as neutron moderator.



MR-I type fuel element

The uranium fission chain reaction is controlled by the control rods which contain the neutron absorbers cadmium and boron. Electrically-driven motors situated on the bridge above the pool govern their insertion and withdrawal, according to the need to speed up or decrease the reaction.

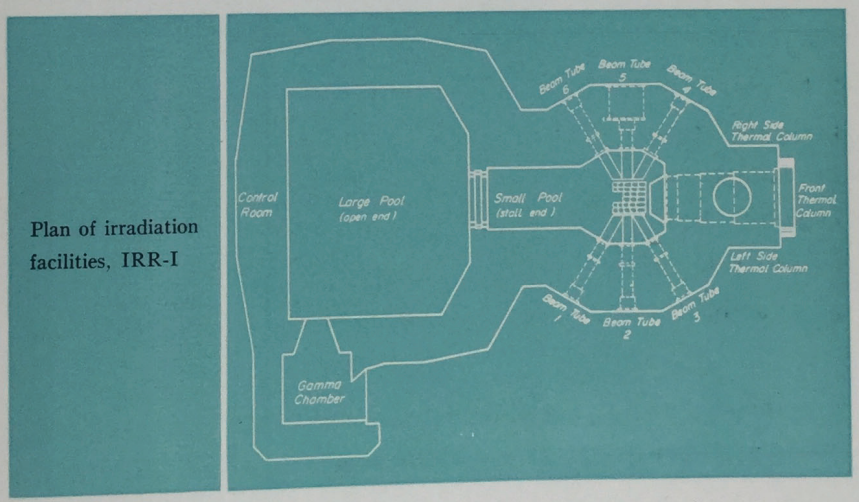
Although research reactors are in general designed so as to produce minimal heat, quite large quantities are generated as the chain reaction proceeds. It is dissipated by introducing cooling water into the spaces between the fuel element components, in a continuous flow which passes to an underground reservoir outside the building, whence it is pumped

back to the reactor pool through a special cooling device (heat exchanger). The maximum thermal capacity of the reactor is 5 MW.

The irradiation facilities consist of six ordinary irradiation tubes, two pneumatic irradiation tubes, a cell for slow neutron irradiation and another for gamma irradiations.

The ordinary irradiation tubes are used for lengthy exposures, or for directing radiation beams to experimental systems outside the pool, and the pneumatic ones, for short irradiations of relatively small samples.

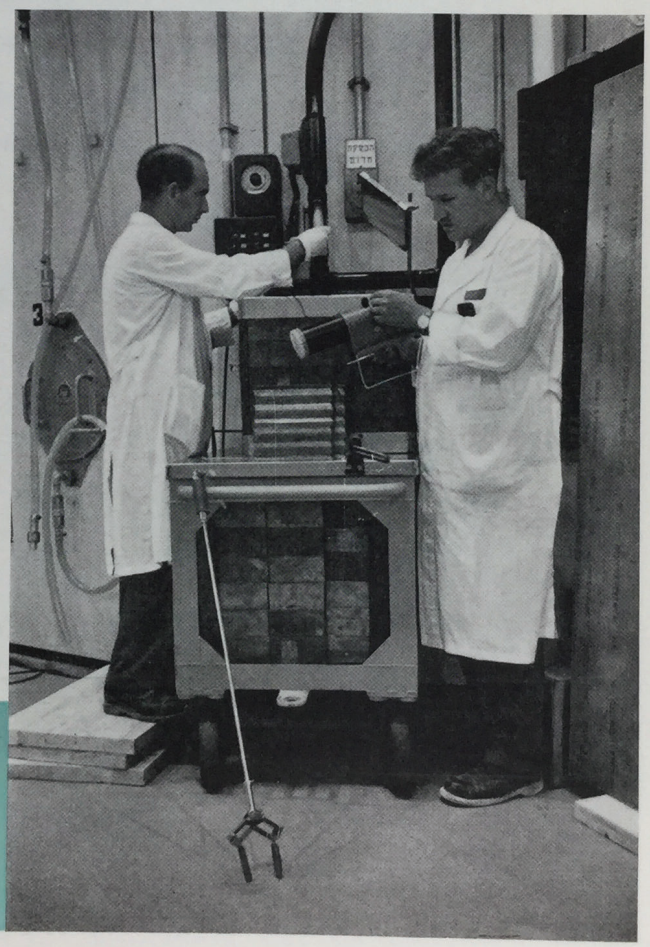
The tubes and other openings lead from the pool to exits in the reactor walls.



Plan of irradiation facilities, IRR-I

The two cells are designed for special use when only pure neutron and gamma fluxes are desired.

The material for irradiation is introduced into the reactor at a point of high neutron density, either by lowering it into the pool water close to the core, or into the irradiation tubes. Alternatively, air pressure is used in the pneumatic tubes to thrust the samples, suitably contained, through a winding pipeline to the required radiation position; the samples are recovered by suction. This enables charge or discharge of the material while the reactor is in operation, as radiation travels in straight lines and therefore is not transmitted through this tube from the reactor core.



The Health Physics monitor checks the radiation level as a "rabbit" is inserted into the pneumatic tube

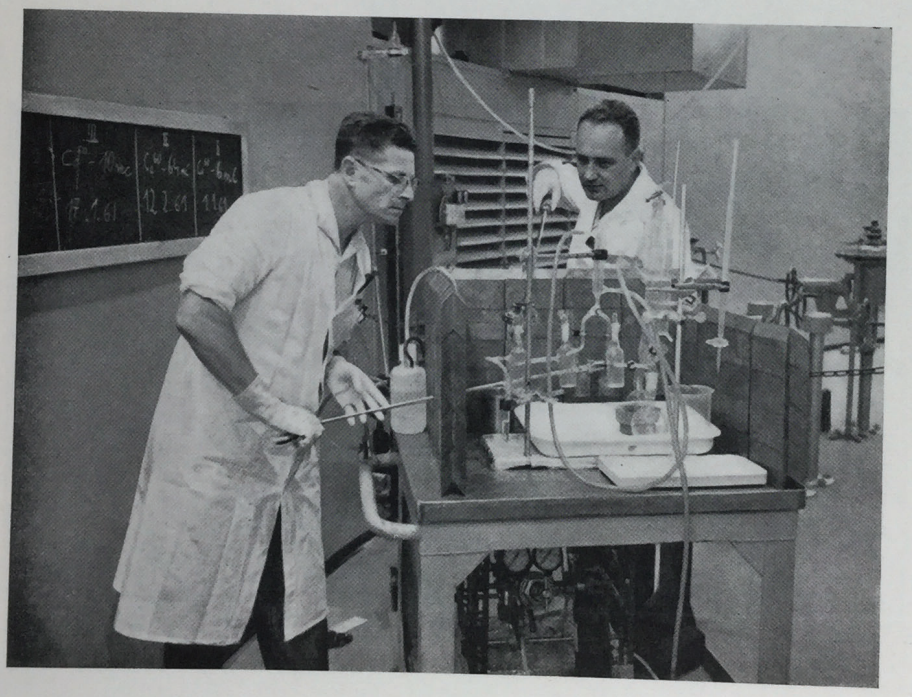
Measurements of the various radiations, particularly the neutron flux at several locations, are recorded by the electronic control system. Readings of the various instruments are transmitted to the central control room, to be scrutinized by the reactor operator, who can then direct the reaction according to the information received.

Other automatic instruments also transmit information on the proper functioning of the various auxiliary systems of the reactor.

Operator at the control console

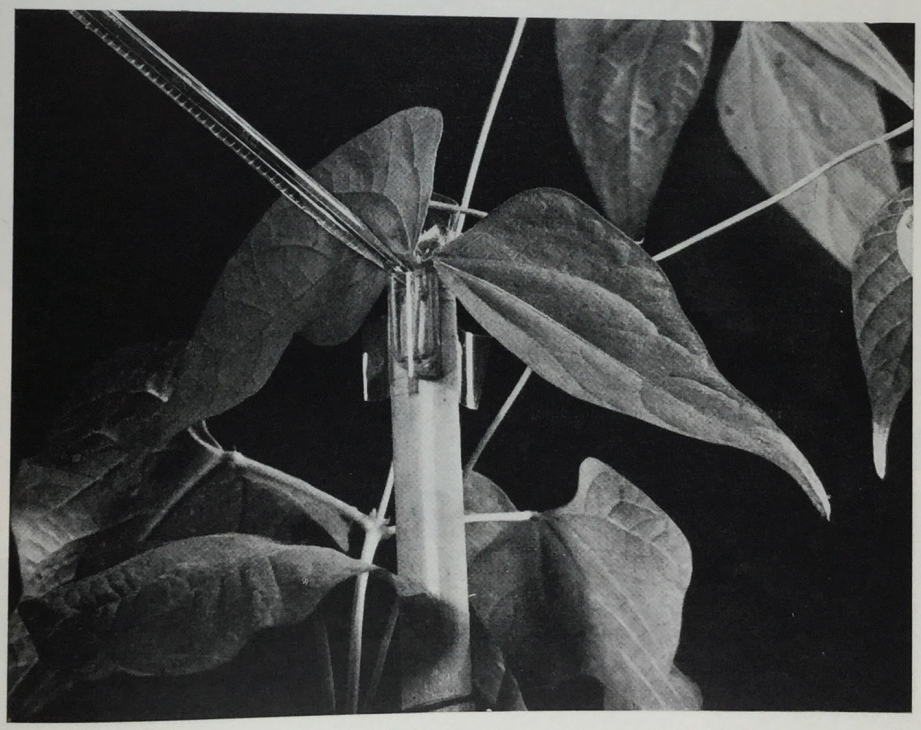
The neutron flux of the reactor is used for the production of artificial radioactive isotopes : most natural elements become unstable after absorption of neutrons and emit various radiations.

An especially useful application is the production of short-lived radioisotopes, which cannot be imported because of their fast decay rate. These already find many uses in medicine, agriculture and research.

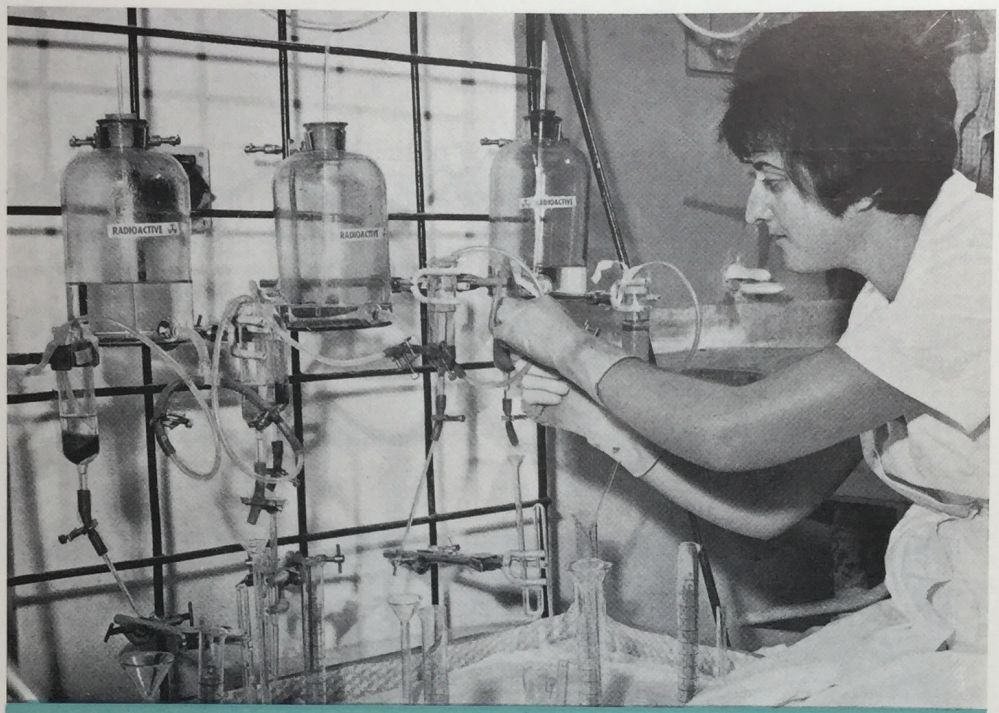


Production of short-lived F^{18} at the IRR-I

Among users of the present production of the IRR-I are the principal hospitals, learned institutions including the Hebrew University, the Haifa Institute of Technology, the Weizmann Institute of Science and the National and University Institute of Agriculture, and concerns such as Tahal (Water Planning for Israel) Ltd.



At the National and University Institute of Agriculture, carbon-14 is administered to plant leaves in order to trace the movement of photosynthesis products



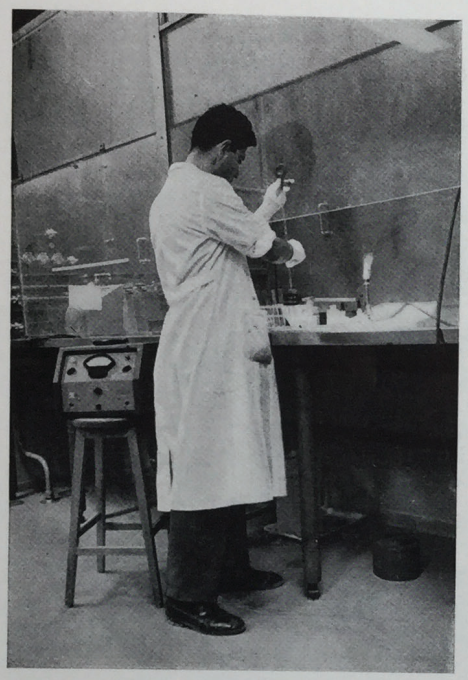
IRR-I-made Na^{24}, Rb^{86} and Br^{82} are utilised for studies of kinetics and exchange equilibria in unsaturated soils at the National and University Institute of Agriculture

Radioactivity of blood cells is measured for a study of deiodination of thyroxine in tumour-bearing rats (IAEC research project)

A group of research workers of the IAEC collaborate with other Institutes in utilising the local radioisotope production for studies in animal physiology and cancer research.

Methods are being developed to employ short-lived radiosotopes in clinical tests, using at present F^{18}, Cl^{38}, Mn^{56}, I^{128} and Dy^{165}. It is hoped that the IRR-I will eventually be able to supply all the short-lived isotopes required by the major hospitals in Israel, which use them extensively both for diagnosis and therapy.

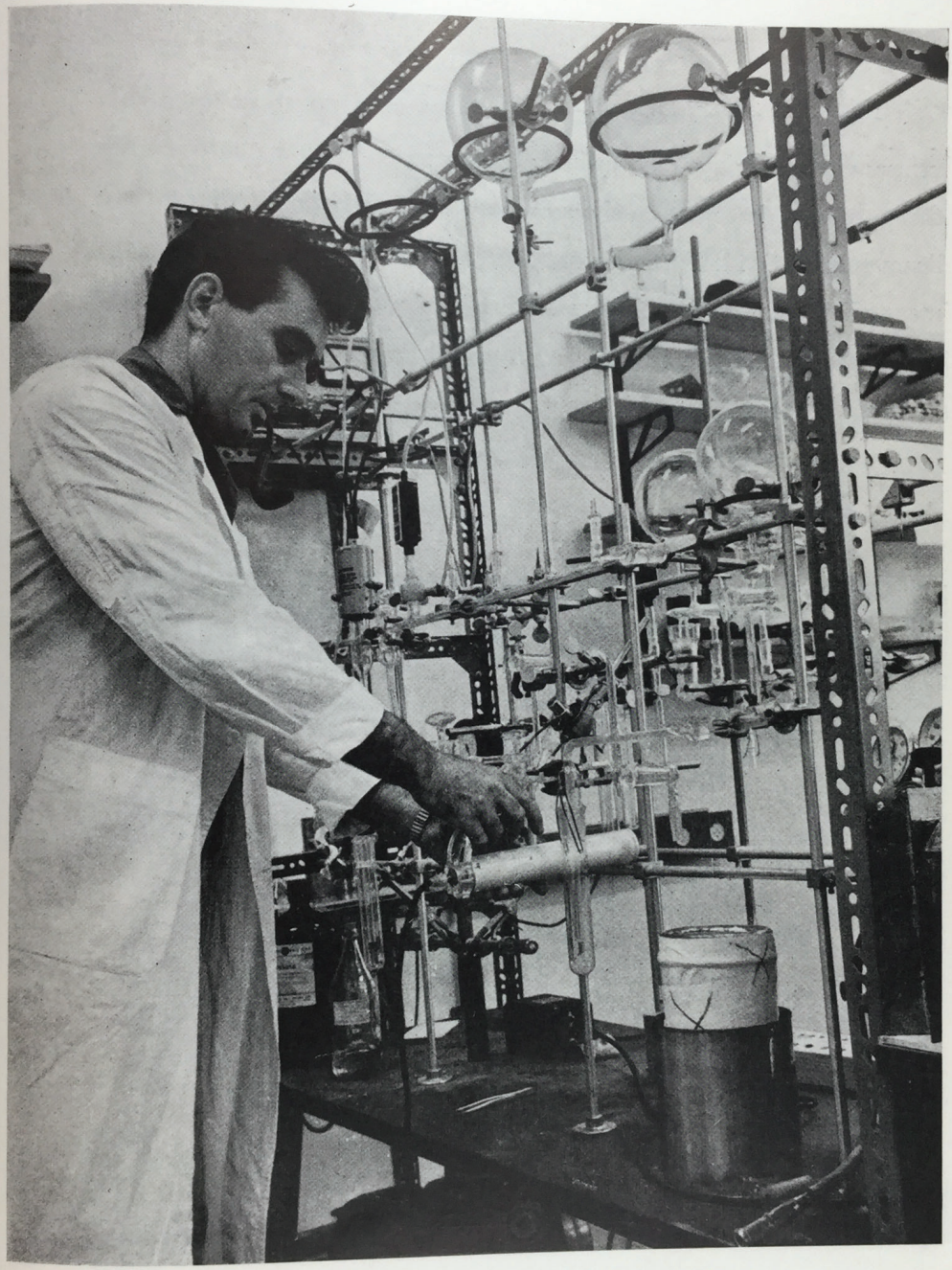
IAEC workers carry out experiments on the uptake of radioactive tracers by cancerous tissues



In addition to isotope production, IAEC chemists are engaged in many research projects. For example, the emission of delayed neutrons from fissionable elements has been applied for the analysis of uranium and thorium, resulting in a rapid and sensitive method. Activation analyses, whereby minute quantities of elements are identified by their characteristic radioactivity after irradiation, are carried out : the whole range of chemical operations has been considerably expanded by the availability of the IRR-I facility.

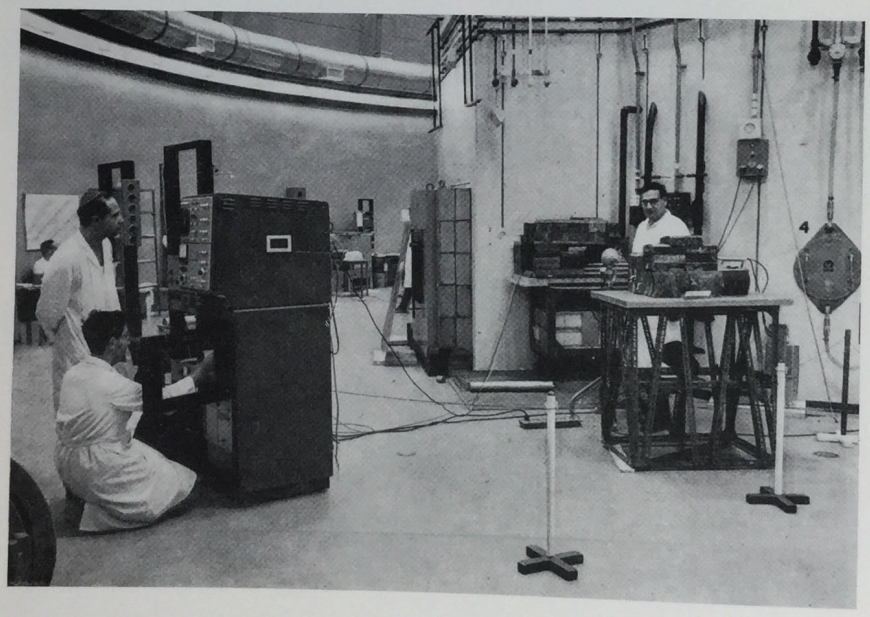
Above : Chemical operations with radioactive materials are carried out in glove boxes.

Left : Preparing samples for uranium analysis by delayed neutron emission



Measurement of short-lived gaseous fission products

As part of the physics research programme, a group of the IAEC utilises the reactor to study the inelastic scattering of slow neutrons. For this purpose a slow neutron chopper has been installed adjacent to beam tube No. 12. Further experiments in progress include development of new isotopes for use in resonance scattering experiments (Mossbauer effect), neutron capture experiments and studies of the fission process in fissionable nuclei.



Studying the spectrum of neutron capture gamma rays at the IRR-I

Another of the prime fuctions of the reactor is the training of operators and engineers. The physical principles of operation are common to all reactors, and operating personnel for any future industrial reactor to produce heat and electricity may be trained at the IRR-I.

A full-time course for reactor operators was held during the three months period from October, 1959 to January, 1960. About 250 lectures on mathematics, general and atomic physics, reactor physics, electronics and reactor operation were supplemented by experiments and demonstrations.

Professor E. D. Bergman presents graduation certificates to successful candidates of the reactor operators' training course, October 1959 — January 1960. Present at the award-giving ceremony : left to right — Mr. M. Morahg (Regberg), Prof. N. Rosen, Prof. E. D. Bergman, Prof I. Dostrovsky, Mr. S. Peres, Mr. I. Haimovic.

The facilities of the IRR-I

The American Institute of Architects

are available to all scientific and industrial institutions in

1961 Honor Award Program

Israel.

First Honor Award

It is the hope of the Israel Atomic Energy Commission

To the Nuclear Reactor

that the IRR-I will make a real contribution to the progress

Rehovot, Israel

of science, and will assist in the development of industry in this country.

Government of Israel
Owner

Philip Johnson, AIA
Architect

The Octagon
Washington, D.C.

President

Secretary

AVAILABILITY

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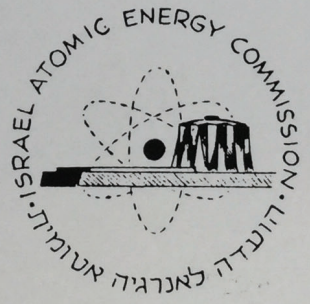


Israel Atomic Energy Commission

avec mes meilleurs
vœux pour 1963

Hamai Haber.

Particolare del fianco dell'edificio centrale.

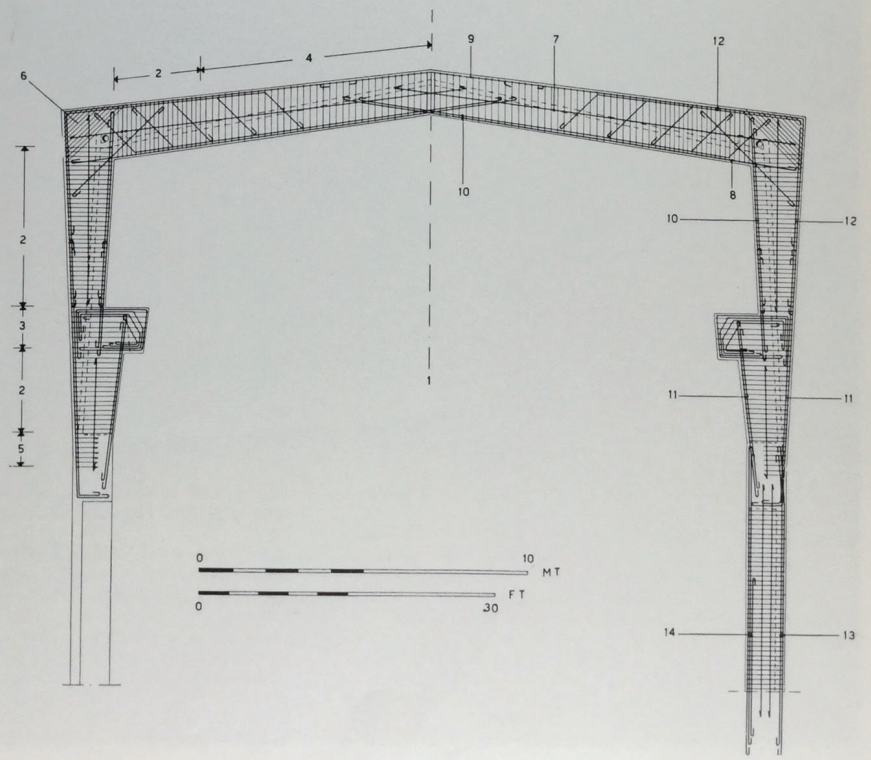
A detail of the power station building side.

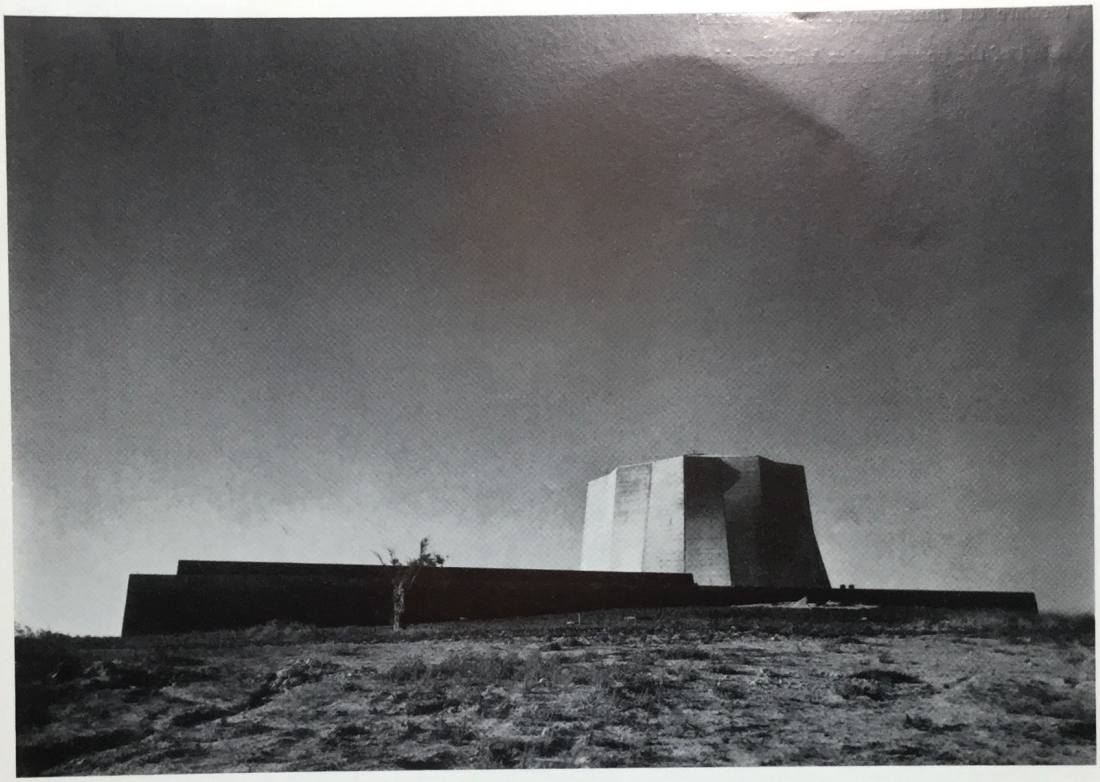
Armatura dei telai di copertura dell'edificio centrali

1 *asse di simmetria* – 2 7 *staffe* ⌀ 10 *al metro lineare* – 3 7 *staffe* ⌀ 14 *al ml* – 4 5 *staffe* ⌀ 10 *al ml* – 5 7 *staffe* ⌀ 8 *al ml* – 6 1 *staffa* ⌀ 10 *ogni* 10 *cm* – 7 2 ⌀ 14 – 8 2 ⌀ 30 – 9 3 ⌀ 30 – 10 6 ⌀ 30 – 11 7 ⌀ 30 – 12 8 ⌀ 30 – 13 10 ⌀ 30 – 14 20 ⌀ 30.

Reinforcing rods for roof covering frames of station

1 *axis of symmetry* – 2 7 *stirrups* 3/8″ ⌀ *each* 3.28 *ft.* – 3 7 *stirrups* 9/16″ ⌀ *each* 3.28 *ft.* – 4 5 *stirrups* 3/8″ ⌀ *each* 3.28 *ft.* – 5 7 *stirrups* 5/16″ ⌀ *each* 3.29 *ft.* – 6 1 *stirrup* 3/8″ ⌀ *each* 3.93 *in.* – 7 *two* 9/16″ ⌀ – 8 *two* 1.1/8″ ⌀ – 9 *three* 1.1/8″ ⌀ – 10 *six* 1.1/8″ ⌀ – 11 *seven* 1.1/8″ ⌀ – 12 *eight* 1.1/8″ ⌀ – 13 *ten* 1.1/8″ ⌀ – 14 *twenty* 1.1/8″ ⌀.





REATTORE NUCLEARE A REHOVOT, ISRAELE.

Philip Johnson, architetto.

Collaboratori: per i calcoli strutturali, Lev Zetlin, ingegnere; Guy B. Panero, ingegnere meccanico; per la direzione lavori, Gideon Ziv, architetto.

Si tratta di un reattore nucleare progettato per il governo di Israele e situato a Rehovot.
I suoi muri di cemento grezzo, senza finestre, conferiscono all'organismo una staticità che si oppone alla rugosa severità della pianura circostante.
La sua forma che suggerisce l'idea di un tempio sembra riflettere caratteri regionali, quelli degli antichi Israele ed Egitto.
Al visitatore si presenta, entrando, una corte orlata da colonne cruciformi rastremate dal basso all'alto, corte su cui si affacciano, sui lati lunghi, i corridoi vetrati che disimpegnano laboratori, officine ed uffici.
Il reattore, contenuto in una grande cupola in c.c.a. a larghi piani inclinati, comporta una serie di servizi, docce, spogliatoi ecc. che sono distribuiti ai suoi fianchi.

Area coperta dall'edificio 2.764 m² - struttura, copertura, scale, muratura esterna in c.c.a. - pavimenti in c.c.a. e mosaico alla palladiana - soffitti: pannelli fonoassorbenti - balaustrata delle scale in acciaio - rivestimenti interni: sala reattore: piastrelle; uffici: intonaco a gesso; servizi: blocchi di calcestruzzo - pavimenti: sala reattore: piastrelle; uffici: piastrelle viniliche; servizi: piastrelle ceramiche - serramenti esterni in acciaio - serramenti interni: laboratori: acciaio; uffici: profilati metallici - scultura di Shamai Haber - anno di costruzione 1961.

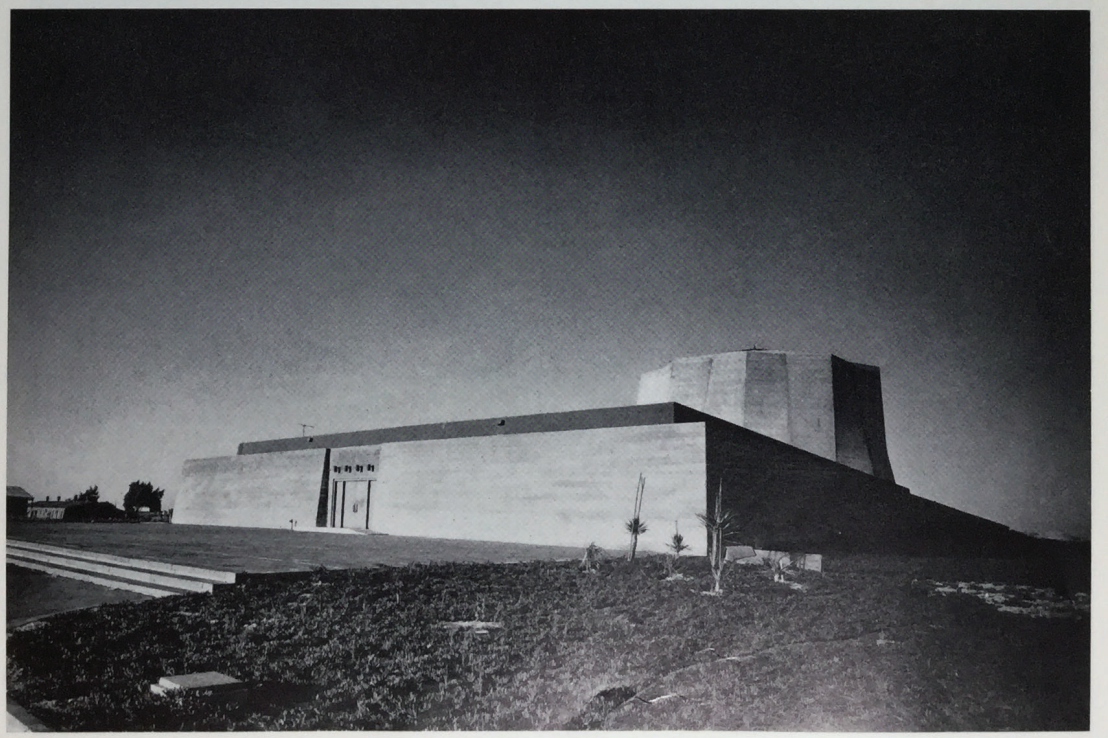
NUCLEAR REACTOR AT REHOVOT, ISRAEL.

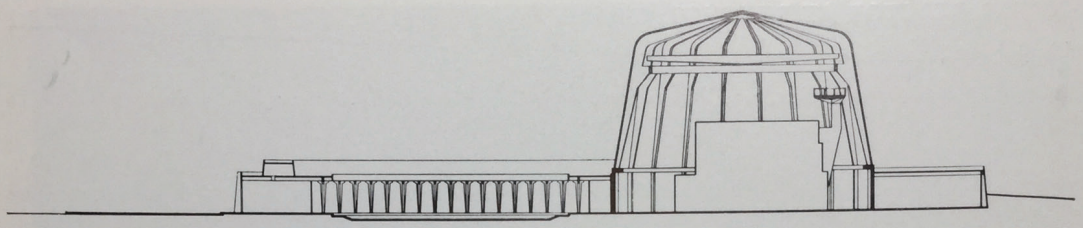
Philip Johnson, architect.

Consultants: for structural calculations, Lev Zetlin, engineer; mechanical engineer, Guy B. Panero; for work direction, Gideon Ziv, architect.

This is a nuclear reactor designed for the government of Israel and situated at Rehovot.
The raw concrete walls without windows confer a static state on to the organism which is quite opposed to the rugged severity of the surrounding open plain.
Its form, suggesting the idea of a temple, reflects regional characteristics of ancient Israel and Egypt.
On arrival the visitor is presented with a courtyard bordered by cross-shaped columns diminishing in size in an upward direction. The courtyard is faced on the long sides by the glass corridors which divide the laboratories, workshops and offices. The reactor, housed in a large r.c. dome of wide surfaces, includes a series of services, showers, changing facilities etc. distributed at its sides.

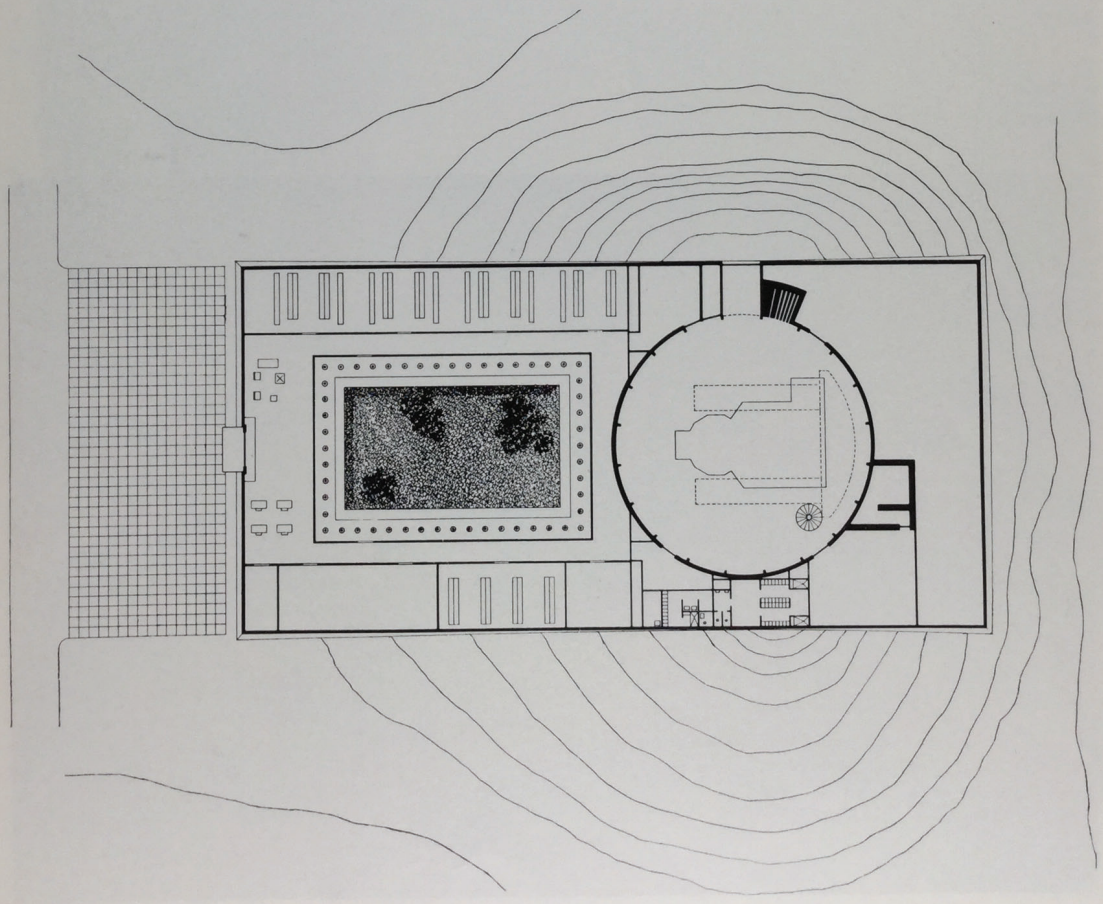
Area covered by the building, 29,750 sq. ft. - structure, roof, stairs and external masonry of r.c. - floors of r.c. and terrazzo - ceilings: sound absorbent panels - stairs balustrade of steel - internal facings: reactor hall, tiles; offices, plaster and chalk; services, concrete blocks - flooring: reactor hall, tiles; offices, vinyl tiles; services, ceramic tiles - external door and window frames of steel - internal door frames: laboratories, steel; offices, metallic sections - sculpture by Shamai Haber - year of construction 1961.

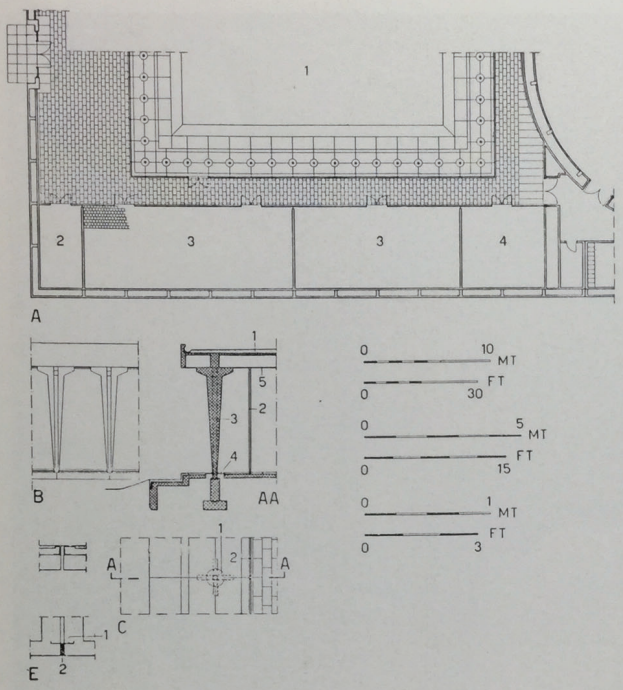




Sezione longitudinale. – Longitudinal section.

Pianta generale. – General plan.





A Pianta parziale del primo piano
1 *corte aperta* – 2 *ufficio* – 3 *laboratorio* – 4 *officina.*

B Fronte del pilastro tipo – C pianta del pilastro tipo
1 *graniglia di marmo* – 2 *vetro.*

E Giunto di espansione nel pavimento – E giunto di espansione nel muro
1 *ferma - acqua metallico* – 2 *mastice.*

A-A sezione
1 *vermiculite* – 2 *vetro* – 3 *pilastro prefabbricato di calcestruzzo* – 4 *graniglia di marmo* – 5 *soffitto di intonaco.*

A Partial first floor plan
1 *open court* – 2 *office* – 3 *laboratory* – 4 *workshop.*

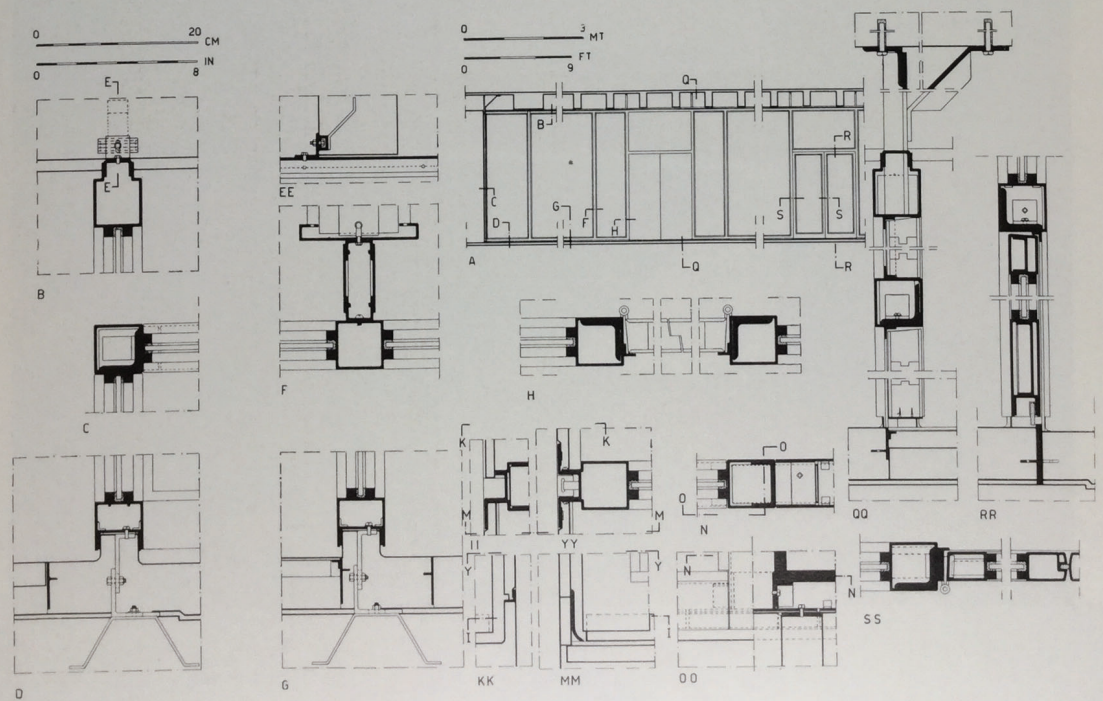
B Typical column elevation – C typical column plan
1 *marble chips* – 2 *glass.*

E Floor expansion joint – E wall expansion joint
1 *metal waterstop* – 2 *mastic fill.*

A-A section
1 *vermiculite fill* – 2 *glass* – 3 *precast concrete column* – 4 *marble chips* – 5 *plaster ceiling.*

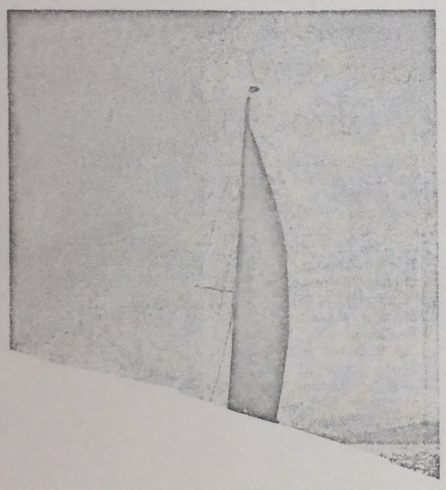
A Schema di alzato di pannelli tipo e porte delle pareti finestra interne ed esterne – B, C, D, E-E, F, G, H, I-I, Y-Y, K-K, M-M, N, O, Q-Q, R-R, S-S particolari.

A Diagrammatic elevation of typical panels and doors of exterior and interior window walls – B, C, D, E-E, F, G, H, I-I, Y-Y, K-K, M-M, N, O, Q-Q, R-R, S-S details.



THE DALLAS MORNING NEWS

Sunday, June 12, 1966



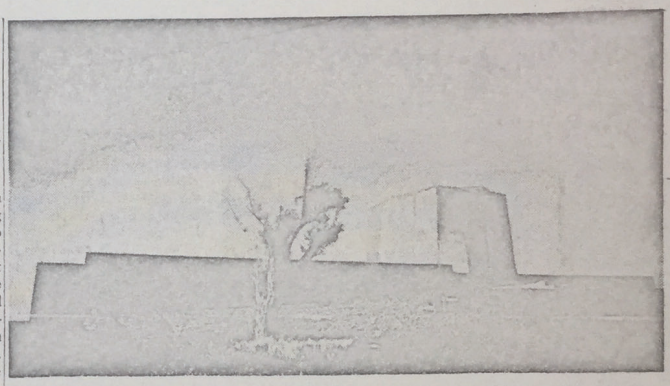
Ranching's Boom, Bust

BANKERS AND CATTLEMEN. *By Gene M. Gressley. New York: Alfred A. Knopf. $6.95.*

By WAYNE GARD

Even in the era of the open range, successful cattle raising called for more than cowboys who could twirl a rope, handle a branding iron, croon a lullaby and shoot from the hip. Lack of horse sense and sound management could bring any cattle spread to disaster, especially at a time when nature frowned on the ranges. When that happened to the cattle industry in the spring of 1887, one of America's biggest business bubbles burst with a resounding bang.

THE BOOM AND BUST of frontier ranching, from Texas to Montana, in the 1870-1900 period is ably traced in this economic history by a teacher at the University of Kansas, Gene Gressley, who is a descendant of ranch

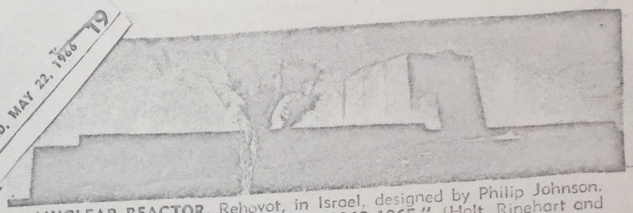


Nuclear Reactor in Rehovot, Israel

Designed in 1961 by famed architect Philip Johnson, this starkly simple building is one of many pictured in a new book devoted to his works: "Philip Johnson, Architecture 1949-1965" (Holt, Rinehart & Winston).

Poetry Belongs to the Young

THE BOSTON SUNDAY HERALD, MAY 22, 1966 19



NUCLEAR REACTOR, Rehovot, in Israel, designed by Philip Johnson. From **"Philip Johnson, Architecture, 1949-1965."** (Holt, Rinehart and Winston. 51 color photos, 31 drawings. $15).

McCLURGS BOOK NEWS
CHICAGO, ILL.
MONTHLY/IRC. N. AVAIL.

APR 1966

Johnson, Philip
ARCHITECTURE 1949-1965
Illustrated—This volume contains 51 full-color reproductions, and 31 drawings and plans, of Johnson's most famous buildings. It also contains an historical essay by Henry Russell Hitchcock, a complete chronology of Johnson's buildings, and a bibliography of writings by and about Johnson.
May Holt 176) $15.00

Kampelis, Robert
LEARNING TO DRAW
Illus. in black and white—This lively introduction to drawing reflects the dynamic new ways which modern art educators have discovered to teach creative drawing. *Indexed. 7¾x10¾. 144 pages. April 20 (W. Avon-Gabriel 388) $8.50.*

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THE PLAIN DEALER, SATURDAY, MARCH 26, 1966

By Folger

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In an advance copy of his book, *Architecture 1949-1965*, which Holt, Rinehart and Winston will publish May 25, Philip Johnson showed us photographs of his all-glass house in a secluded, wooded area outside New Canaan, Conn. It has curtains that can be pulled, he said, "but we seldom pull them—we have no need to."

The book, handsomely bound and printed, has been produced in Zurich, and contains 51 full-color reproductions and 31 drawings and plans of Johnson's most famous buildings, which include the New York State Pavilion at the World's Fair, the New York State Theater at Lincoln Center and the new wings of the Museum of Modern Art on 53rd Street.

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Dallas Times Herald

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JUN 19 1966

Philip Johnson's Career in Pictures

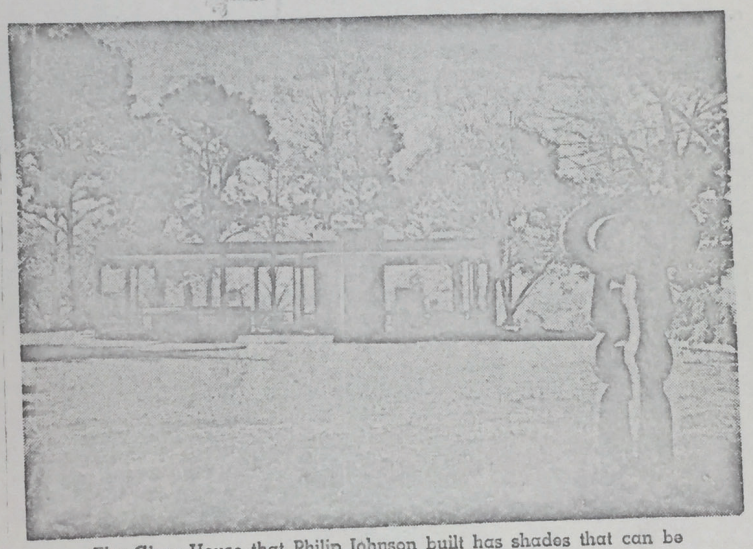
PHILIP JOHNSON, Architecture 1949-1965 (Holt, Rinehart & Winston, $15)

A stunning color camera presentation of the major homes, offices and pavilions done by the American architect who is currently working on the national memorial to President Kennedy.

Two Texas commissions (in Houston) are pictured and one Dallas residence designed by Johnson is listed. The quality of the pictures is sharply above average and conveys as few such books have the excitement of an architects' ideas as expressed in finished areas.

THE PLAIN DEALER
CLEVELAND, OHIO
D. 370,698 SUN. 522,391

MAY 29 1966



The Glass House that Philip Johnson built has shades that can be drawn, but seldom are.

Camera Views Philip Johnson

By Stuart Abbey

When, in 1949, Philip Johnson designed and built his home in New Canaan, Conn., with exterior walls of glass, the 43-year-old author, critic and director of the department of architecture at New York's Museum of Modern Art was beginning his career as an architect and designer.

Architecture 1949-1965—Philip Johnson (Holt, Rinehart & Winston, Inc., $15) is a celebration of the mid-point of the Cleveland-born designer's accomplishments. An introductory essay by Henry-Russell Hitchcock, art historian, is accompanied by 51 color photos and 31 drawings of Johnson's most famous buildings.

Johnson's attempt to be good rather than original has been the driving force behind many of his designs: the interior of the Four Seasons restaurant in New York, the annex of the Museum of Modern Art in New York, the Kneses Tifereth Israel Synagogue in Port Chester, N.Y., and his roofless church in New Harmony, Indiana.

Architecture, to Johnson, is the organization of procession in which the viewer moves up to, through and around a building. All the elements of his buildings, structure, design and decoration, lead the viewer through ever-increasing avenues of beauty and clarity.

For those who know Johnson and his work, the book is a well-deserved acknowledgment. For those who wish to know Johnson, the book is revealing, interesting and an asset to any collection.

stockbrokers, bankers and lawyers.

Los Angeles Times CALENDAR. SUNDAY. JUNE 12, 1966

Philip Johnson--Critique of Critic-Architect

On a recent visit to Philip Johnson's Dumbarton Oaks wing (which houses the exquisite Bliss Collection of pre-Columbian art), I was struck by the quiet luxury and sumptuousness evoked by the pavilion - like structure and by the extreme contrast it provided to the eminent architect's own Glass House, built 15 years earlier.

"Architecture 1949-1965 —Philip Johnson" (Holt, Rinehart and Winston: $15) with an illuminating essay by Henry Russell Hitchcock, offers us in splendid color photographs and succinct plans the work of one of the world's leading architects. Johnson was nearly 40 years old when he turned his attention from being a foremost architectural critic and historian (a role he fulfilled as the director of the Museum of Modern Art's department of architecture from 1932-1954) to practicing the profession on which he had commented so brilliantly.

Mies Van Der Rohe, that modern purist in the art of architecture, was Johnson's master and inspiration. The most notable early buildings designed by Johnson himself were decidedly Miesian. A prime example is the Glass House which he built as his own residence in that showcase of 20th Century American architecture known as New Canaan, Conn.

Johnson continued in the past decade—the period in which he was to develop a distinctive Johnsonian style of architecture—to heed Mies' advice that it is "better to be good than to be original." But Johnson's taste for a sensuous sumptuousness which balanced his understanding of ascetic austerity was already evident in the structural design and rich interior of the guest house he built on his place. It contrasted sharply with the pristine elegance of the glass house. And his penchant for playful elegance is evident in the pondside Pavilion he later erected on the same property.

Hitchcock, who collaborated with the young Johnson on their famous book "The International Style" (1932) and who, along with Alfred Barr, is cited by the architect as a principal influence on him, remarks in his present essay that Johnson has become "thoroughly, if selectively, eclectic." One hesitates to quibble with this great veteran critic but, having visited more than half of the Johnson buildings illustrated in this exemplary book, I have been struck by the catholicity of Johnson's creations and by his fundamental classicism, rather than by any overt eclecticism.

All of his life Johnson has been close to painters and sculptors. And it may be from these associations that he derives his great and hyper-sensitive involvement with the textural aspects of his architecture. No wonder his production of the last 10 years includes the design of a number of public galleries and museums, most notably the handsome, isolated structure of the Amos Carter Museum of Western Art in Ft. Worth, Tex. and the individualistic, yet integrated example of urban architecture that the Museum of Modern Art's new wing represents.

In recent years, Mies' collaborator on the stern and immensely successful Seagrams Building—the best structure designed for Manhattan during its postwar building boom—has turned toward the use of stone and concrete in preference to a predominance of glass and steel. But if the photographs in this book reveal the increasing virtuosity of texture and elaboration that can be found in recent Johnsonian creations, the plans reproduced demonstrate clearly that Johnson's basic designs continue to hold to a fundamental simplicity which is the product of great sophistication.

A late starter in the practice of architecture, Johnson at 60 is just entering the mature phase of a seasoned artist. It would be a pleasure if the conglomeration of eclectic and non-descript architecture that dominates in Los Angeles could be relieved by a Philip Johnson building soon.

—HENRY J. SELDIS

ART BOOKS

Philip Johnson---Critique of Critic-Architect

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Worcester Mass Telegram 5/29/66

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Edited By IVAN SANDROF

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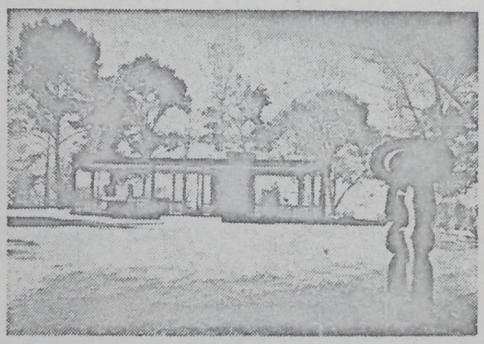

One of the striking glass houses, in New Canaan, Conn., designed and built by the famous architect, Philip Johnson, whose magnificent works are thoroughly revealed in a handsome book just published.

The Man of Glass Houses

PHILIP JOHNSON, Architecture 1949-1965; Holt, Rinehart and Winston, Inc., $15.

Reviewed by
Will Romer

People who live in glass houses shouldn't throw rocks. Philip Johnson, an architectural genius, doesn't throw rocks at glass houses, but he does design them. But he does shatter conventions and believes fundamentally that only what is beautiful is comfortable.

To match Johnson's beautiful buildings, his publishers in their 100th anniversary year have designed a spectacular and lavish book. It begins with an introductory essay by Henry-Russell Hitchcock which defines Johnson in place and time. Scattered through the book like brilliant peacock tails are 51 superbly-reproduced color plates with plans that cover all of Johnson's major buildings.

Relevant plans and drawings, a thorough chronology of all of Johnson's architecture and a bibliography cap the whole.

The eminent architect reached a zenith of eminence in 1964 when within a few days of each other in New York, three of his spectaculars were opened — the New York State Pavilion at the World's Fair, the New York State Theater at Lincoln Center and the new wings of the Museum of Modern Art.

The book matches the splendor of his structures.

Novel Exotic and Tough

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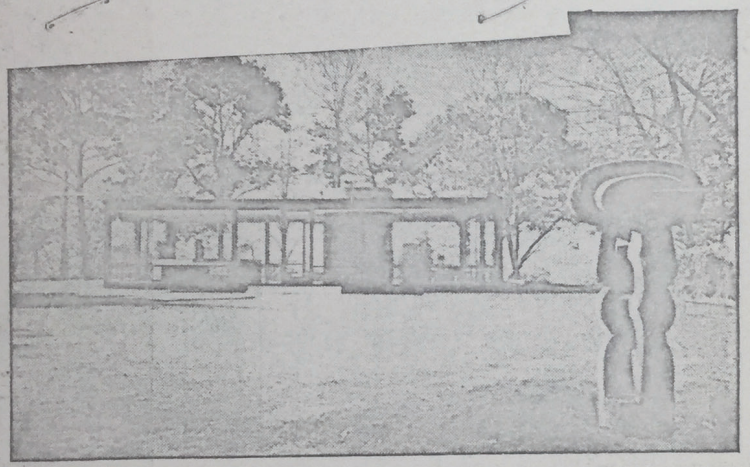
Los Angeles Times CALENDAR, SUNDAY, JUNE 5, 1966



Picture of glass house in New Canaan, Conn., is illustration from "Philip Johnson, Architecture 1949-65," published by Holt, Rinehart & Winston. Johnson designed structure.

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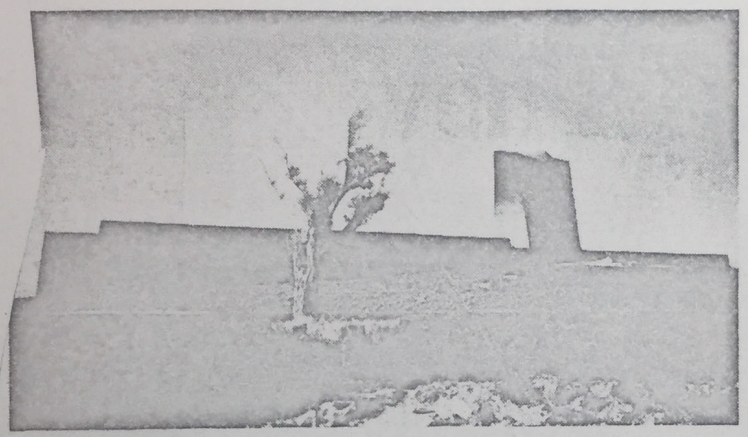
San Antonio Express



BY PHILIP JOHNSON—Nuclear reactor at Rehovot, Israel, 1961. Photo by Arnold Newman from "Philip Johnson: Architecture 1949-1965," reviewed on this page.

BOOKS AND ART

News • Reviews • Edited by Gerald Ashford

Sunday, June 5, 1966 Page 2-H

Book Recogniz' Creative Arc'

By GERALD ASHFORD

Though he did not become a practicing architect until relatively late in life, receiving his architectural degree 16 years after his A.B. at Harvard, Philip Johnson has by now been deservedly recognized as one of the f genuinely creative fig his field.

The latest reco in the form of ly illustrate JOHNSON 1965 (P of a gra ma wr c

Philip Johnson's Career in Pictures

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A stunning color camera presentation of the major homes, offices and pavilions done by the American architect who is currently working on the national memorial to President Kennedy.

Two Texas commissions (in Houston) are pictured and one Dallas residence designed by Johnson is listed. The quality of the pictures is sharply above average and conveys as few such books have the excitement of an architects' ideas as expressed in finished areas.

sity of North Carolina Press will issue a revised edition of **"Church and State in Latin America"** by Dr. J. Lloyd Mecham, now a University of Texas emeritus who wrote the book in 1934 . . . from Athenaeum July 18, **"The Abdication of King Edward VIII,"** by Lord Beaverbrook (found among his personal papers after death.)

Paperbacks

HAMLET, A Reading and Playing Guide (Schocken, $1.95)—Ten critics and actors give their ideas of the meaning and playing of "Hamlet."

THE BACH READER, Revised Edition, edited by Hans David and Arthur Mendel (Norton Library, $2.45)—A life of J. S. Bach in letters and documents.

Dallas Times Herald 6/5/66

EXPRESS and NEWS
SAN ANTONIO, TEXAS
C.T. 99,030 SUN. 102,470

JUN 5 1966

By GERALD ASHFORD

Though he did not become a practicing architect until relatively late in life, receiving his architectural degree 16 years after his A.B. at Harvard, Philip Johnson has by now been deservedly recognized as one of the few genuinely creative figures in his field.

The latest recognition comes in the form of a big, lusciously illustrated book, PHILIP JOHNSON: Architecture 1949-1965 (Holt). The book consists of a series of splendid photographs of Johnson's work — many in color — with a foreword by Henry Russell Hitchcock.

A former disciple and still an admirer of Mies Van der Rohe, Johnson has traveled far from the glass boxes for which his master is known (and which when designed by Mies are far less monotonous than the work of his imitators). Johnson's New York State Theater has classic dignity in the modern mode, while his nuclear reactor in Israel offers the solidity of Frank Lloyd Wright or Juan O'Gorman. And by all evidence he is still developing at the age of nearly 60 . . .

The release of the Texas Water Development plan this week gives especially timely interest to the always timely subject of water conservation. Evaluation of the plan as proposed may be aided by a perusal of DEATH OF THE SWEET WATERS, a vigorous call to action climaxing an informal history of water pollution and conservation. Carr points out that the world always has plenty of water. What we often lack is PURE water, when and where it is needed . . .

Some of America's relatively undespoiled beauty spots are pictured in color in AMERICA'S WONDERLANDS: The National Parks, a new enlarged edition of a long popular publication of the National Geographic Society

BOOK BUYER'S GUIDE
HILLSIDE, N. J.
MONTHLY 6,300

MAY 1966

ARCHITECTURE 1949-1965 **$15.00 G**
Philip Johnson *Holt, Rinehart & Winston*
The most complete book on the work of one of the most influential architects of our time, with an introductory essay by Henry Russell Hitchcock. It includes 51 full-color plates and 29 building plans. 116 pages.

ARIEL **$4.00 G**
Sylvia Plath *Harper & Row*
Forty poems written between the publication of the author's first book, "The Colossus," in 1960 and her death in 1963. "Tulips," the emotional response of a patient in a hospital, gives the tone of these poems of deep feeling and thought but no easy sensuousness. 86 pages. 66-15738

THE PLAIN DEALER, SATURDAY, MARCH 26, 1966

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The book, handsomely bound and printed, has been produced in Zurich, and contains 51 full-color reproductions and 31 drawings and plans of Johnson's most famous buildings, which include the New York State Pavilion at the World's Fair, the New York State Theater at Lincoln Center and the new wings of the Museum of Modern Art on 53rd Street.

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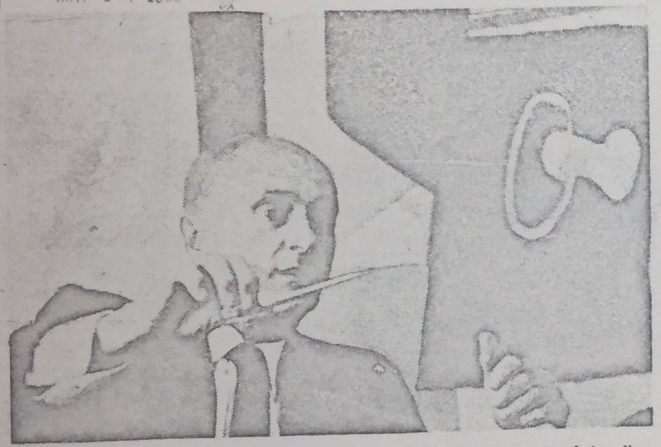
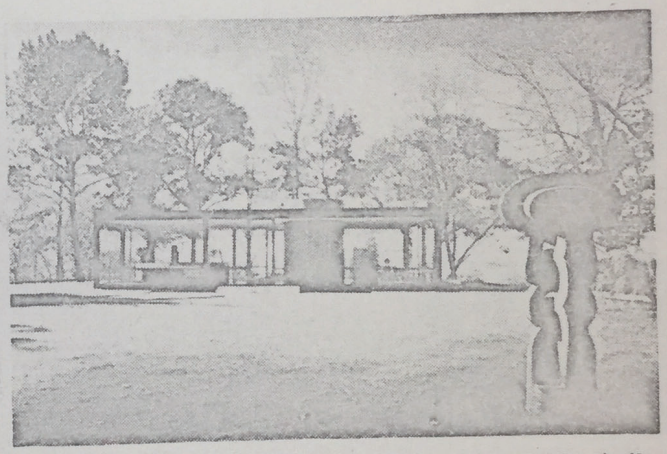
The Knickerbocker News
ALBANY, N. Y.
D. 55,162

MAY 14 1966



THE MAN: Philip Johnson began the active practice of architecture after being director of the department of architecture at the Museum of Modern Art and after writing "The International Style: Architecture Since 1912" and "Mies van der Rohe," an appreciation of that fellow architect. Mr. Johnson has a particular appreciation of elegance, as is revealed in "Architecture 1949-1965—Philip Johnson," which is for the most part a collection of beautifully reproduced photographs of his works. (Holt, Rinehart & Winston) $15.



HIS WORKS: Johnson is best known, perhaps, for his Seagram Building, the New York State Theater at Lincoln Center and the Glass House, his residence in New Canaan, Conn., a photograph of which is reproduced above. The book of photographs of his works includes a chronology plus a critical essay by Henry Russell Hitchcock. The Munson Williams Proctor Institute in Utica is one of Mr. Johnson's works and exhibits his belief that only what is beautiful can be comfortable and that usefulness is primarily the responsibility of the engineer, not the architect.

Philip Johnson's Career in Pictures

PHILIP JOHNSON, Architecture 1949-1965 (Holt, Rinehart & Winston, $15)

A stunning color camera presentation of the major homes, offices and pavilions done by the American architect who is currently working on the national memorial to President Kennedy.

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Press
Dallas Times Herald 6/66

THE BLADE
TOLEDO, OHIO
D. 130,833 SUN. 186,074

JUN 19 1966

Holt, Rinehart, and Winston can take pride in its "Philip Johnson: Architecture 1949-1965," a review of the works of the distinguished Cleveland-born architect. The book, produced in Switzerland, reviews the designs of an artist strongly influenced by Mies van der Rohe. The volume contains many magnificent photographs, including 51 superlative color plates.

THE PLAIN DEALER
CLEVELAND, OHIO
D. 352,007 SUN. 536,757

MAR 26 1966

Wes Lawrence

Brooke Mutes Racial Bit

Manhattan Book Notes

NEW YORK — *The Challenge of Change*, by Massachusetts Atty. Gen. Edward W. Brooke, which Little, Brown will publish next month, will probably be one of the most outspoken books yet written by a serious candidate for public office.


WES LAWRENCE

In a press conference with book reviewers at the Princeton Club here, Brooke said that when he wrote the book he had no intention of running for Republican nomination for the U.S. Senate or any other office, and now that he is running for the Senate his political supporters are very concerned about the book.

If Brooke is nominated and elected, he will be the first Negro member of the U.S. Senate since reconstruction days, but said he: "I am not trying to be the first Negro to sit in the Senate since reconstruction days—I am simply trying to sit in the Senate."

HIS BOOK, BROOKE SAID, will be a strong plea for two-party government.

"I wouldn't want to see the demise of the Democratic party any more than I would the Republican party," he said. "But what I object to about the Democrats is that they treat the symptoms of our diseases instead of getting at their roots. People have to be on relief temporarily when they are without food and shelter, but we must not put them on relief permanently. We must develop programs to put them on their own feet."

* * *

Just back from a long trip through South America, John Gunther reported that he had seen "all thirteen of the ten South American presidents," and that he had found Argentina had 220 political parties. His next book, he said, is "about fifteen twenty-sevenths" completed, and he hopes to have it finished by midsummer.

"I find writing a most agonizing and fiendish torture," he said, "but I couldn't live without it."

* * *

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The Dallas Morning News
DALLAS, TEXAS
D. 237,192 SUN. 295,441
JUN 12 1966

Nuclear Reactor in Rehovot, Israel

Designed in 1961 by famed architect Philip Johnson, this starkly simple building is one of many pictured in a new book devoted to his works: "Philip Johnson, Architecture 1949-1965" (Holt, Rinehart & Winston).

THE BOSTON HERALD
D. 173 [illegible] 226,021

MAY 22 1966

NUCLEAR REACTOR, Rehovot, in Israel, designed by Philip Johnson. From **"Philip Johnson, Architecture, 1949-1965."** (Holt, Rinehart and Winston. 31 color photos, 31 drawings. $15).

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RÉACTEUR NUCLÉAIRE A REHOVOT, ISRAËL

PHILIP JOHNSON, ARCHITECTE
GIEDION ZIV, ARCHITECTE D'OPÉRATION DÉSIGNÉ PAR LE GOUVERNEMENT D'ISRAEL
LEV ZETLIN, INGÉNIEUR

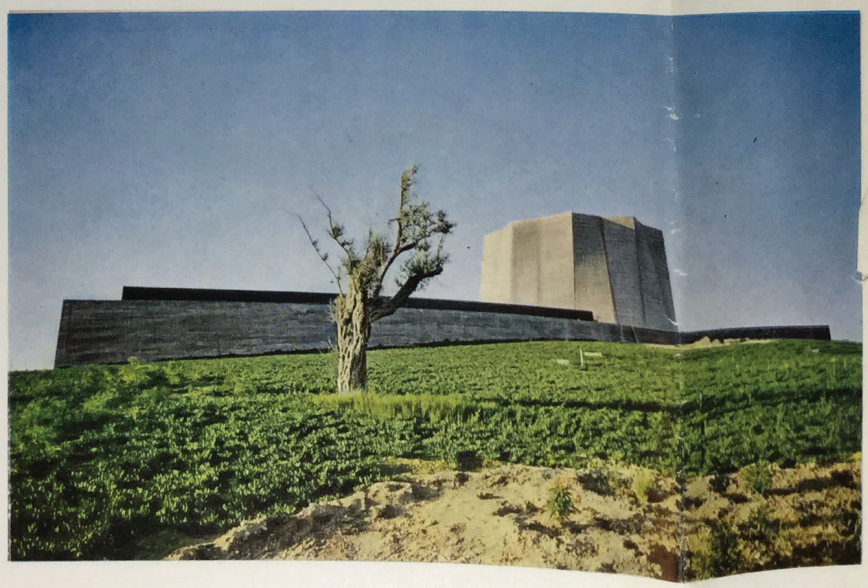
Photos Arnold Newman.

3

Le réacteur nucléaire que Johnson a réalisé récemment pour le Gouvernement Israélien, a reçu une récompense de l'Institut Américain des Architectes. Il se caractérise par une monumentalité et une force très affirmées.

Ses murs en béton brut dont la rudesse n'est atténuée par aucune perforation extérieure entourent une cour intérieure sur laquelle ouvrent les bureaux et le hall, largement vitrés, comme sur un oasis. Cet aspect sans concession s'accorde bien avec l'âpreté du paysage désertique, et avec les travaux qui doivent se dérouler au sein de ce bâtiment.

Le réacteur domine l'ensemble, dans un style qui n'est pas sans rappeler les temples anciens d'Israël et d'Egypte, comme un monument élevé à la gloire des religions nouvelles : la Science et la Technique. Il a été réalisé en voiles de béton armé. En lui donnant par les facettes du voile légèrement en accordéon, un aspect dynamique, l'architecte a su créer une animation, une tension, qui expriment bien le souci de la puissance de contrôle de l'homme d'aujourd'hui sur la matière sous toutes ses formes.



A. PLAN D'ENSEMBLE.
1 et 3. Le réacteur dans le paysage. 2. La façade d'entrée.

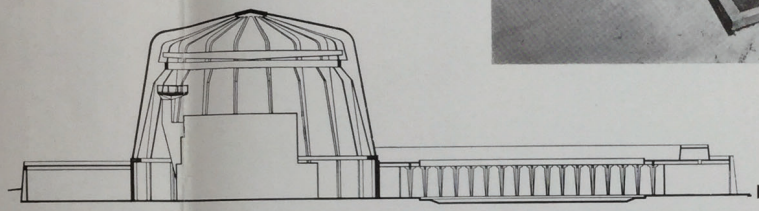
4. Vue d'ensemble depuis le toit-terrasse recouvrant les bureaux et salles techniques, vers le réacteur. 5. 6. Deux vues du patio avec les colonnes cruciformes évoquant les palmiers du désert.

B. COUPE TRANSVERSALE.

REACTEUR NUCLEAIRE A REHOVOT

4

Photos Arnold Newman.



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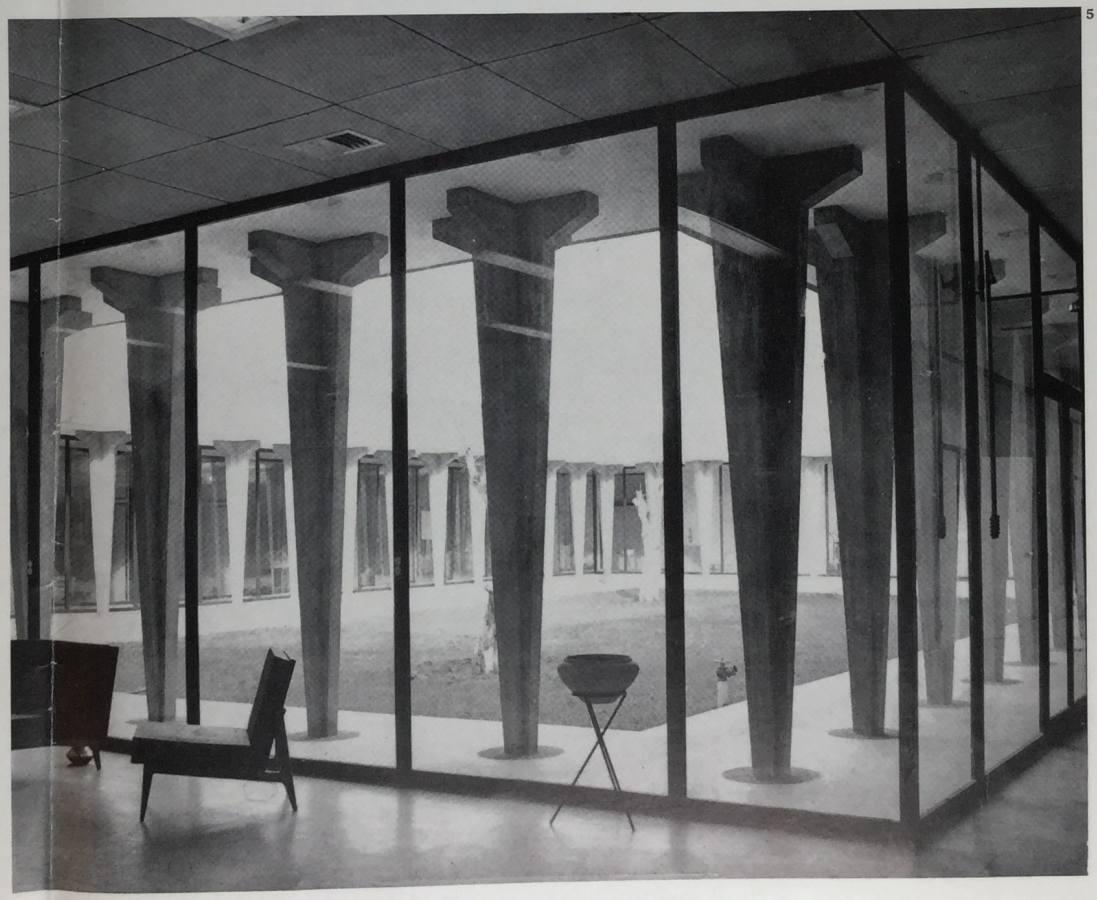

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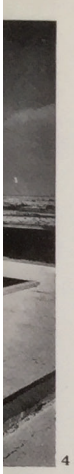

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Newman.

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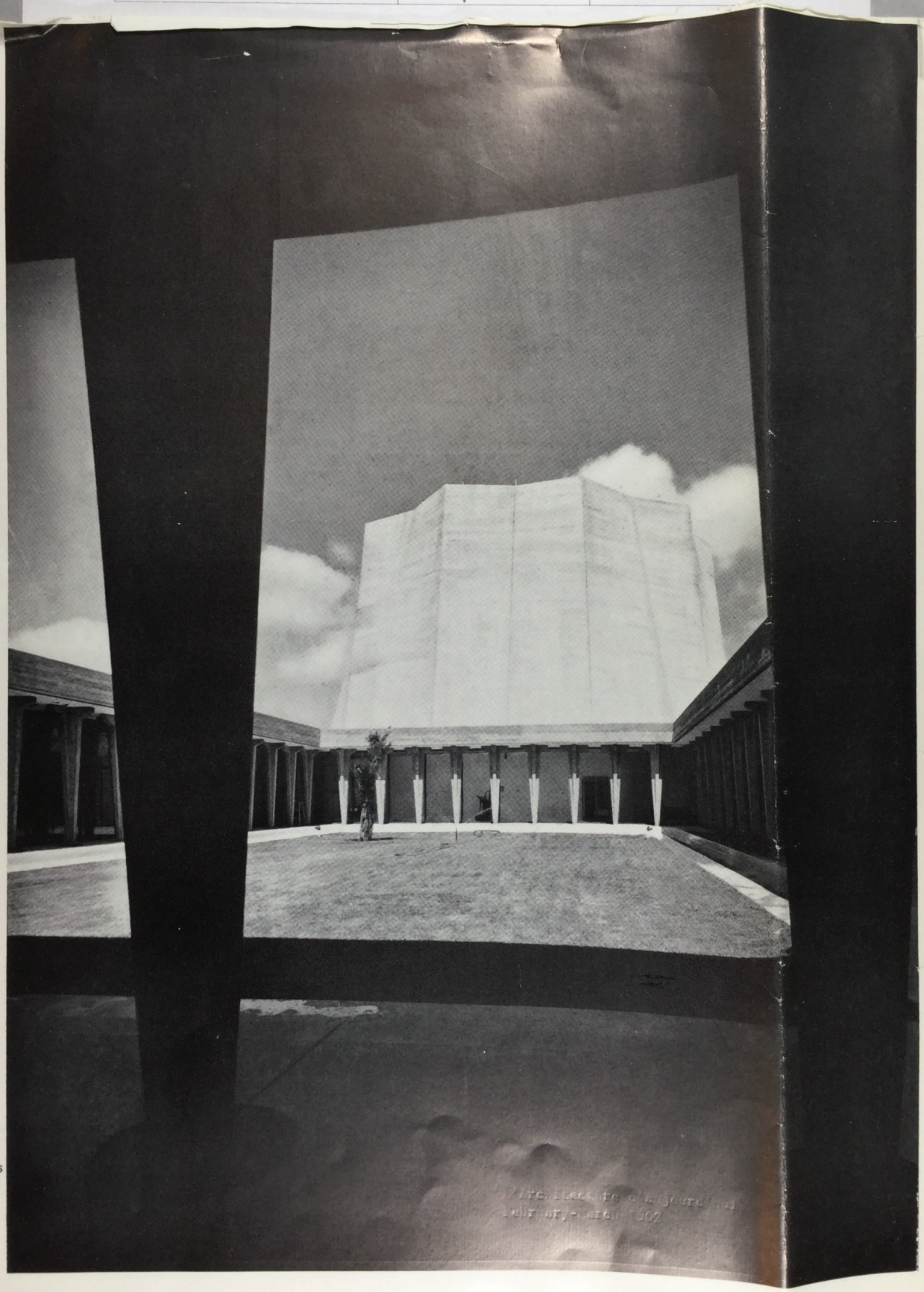


6

1

NOUVEAUX BATIMENTS A L'UNIVERSITÉ DE BRANDEIS. BOSTON, ÉTATS-UNIS

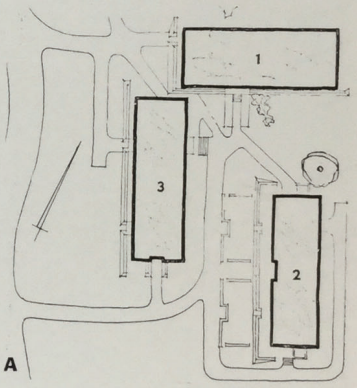
THE ARCHITECTS COLLABORATIVE, ARCHITECTES
BENJAMIN THOMPSON, ARCHITECTE CHARGÉ DU PROJET
TERRY RANKINE, LAWRENCE GARVIN, ARCHITECTES D'OPÉRATION

Commencée voici treize ans, la construction des bâtiments de l'Université de Brandeis, située près de Boston, dans le Massachusetts, se poursuit régulièrement, et un ensemble de trois nouveaux bâtiments vient d'être réalisé : le Centre Judaïque Golding, le Centre des Humanités Shiffman, et le Centre de Civilisation Américaine Olin-Sang.

Rappelons que le programme général de l'Université avait été établi par Harrison et Abramovitz, chargés du plan masse (1), qui ont su laisser aux architectes chargés des différents groupes de bâtiments, une grande liberté de style, tout en veillant à l'unité de l'ensemble.

Les trois nouveaux bâtiments s'élèvent sur un terrain très accidenté dont les architectes ont su tirer parti pour créer des différences de niveaux qui ont permis d'aménager de façon vivante les espaces verts, avec des jeux d'escaliers et de murs bas.

(1) Ils avaient réalisé les trois temples universitaires (protestant, israélite et catholique) d'une très belle tenue architecturale.



1. Façade du Centre des Humanités Shiffman. 2. Vue d'ensemble. A gauche, le Centre de Civilisation Américaine Olin-Sang ; au fond, le Centre Judaïque Golding ; à droite, le Centre des Humanités Shiffman. 3. Vue vers le Centre Judaïque. 4. Mur-pignon du Centre des Humanités Shiffman. 5. Vue vers le Centre de Civilisation Américaine depuis le portique du Centre Judaïque.

2

Ancien collaborateur de Mies Van der Rohe à qui il a consacré un ouvrage important publié par le Musée d'Art Moderne de New York, Philip Johnson travailla pendant longtemps en pleine communion de pensée avec le Maître, et certaines de ses œuvres sont empreintes de ce purisme classique caractéristique du style de Mies, et que Johnson poussa sans aucun doute jusqu'à ses ultimes conséquences, en particulier dans son habitation surnommée « La Maison de verre » réalisée dans le Connecticut en 1950. Rappelons également sa collaboration à l'immeuble Seagram à New York. Parallèlement, Johnson a dirigé pendant des années la section d'architecture du Musée d'Art Moderne de New York.

Mais, depuis quelques années déjà, Philip Johnson tend à s'éloigner de l'influence de Mies, et à créer un style où le côté formel s'affirme de plus en plus. Il reste presque toujours classique dans ses partis : plans symétriques, utilisation de colonnades, formes géométriques pures. Mais il s'inspire aussi de réminiscences historiques et folkloriques, aboutissant parfois à un néo-classicisme qui n'est pas toujours convaincant.

Nous présentons dans les pages qui suivent, deux de ses dernières œuvres qui nous ont paru compter parmi les meilleures. Le Musée d'Utica (photo ci-contre) est construit sur plan carré, avec grande salle centrale, larges escaliers d'accès auxquels répondent dans le hall, deux escaliers menant aux galeries. La pureté de l'ensemble est indéniable et dans cette réalisation, Johnson est très proche de Mies. Par contre, il s'en éloigne avec le Réacteur atomique qu'il vient de réaliser en Israël, créant un bâtiment d'une grande puissance d'expression, s'élevant dans une région presque désertique.

Ces deux œuvres témoignent, croyons-nous, de ce qu'il y a de meilleur dans le style de Johnson, loin du maniérisme où risque de l'entraîner une recherche de formes baroques, ou des partis par trop inspirés de formes pseudo-orientales qui semblent préoccuper depuis quelque temps les architectes américains.

MUSÉE MUNSON WILLIAMS PROCTOR A UTICA, ÉTATS-UNIS →

PHILIP JOHNSON, ARCHITECTE

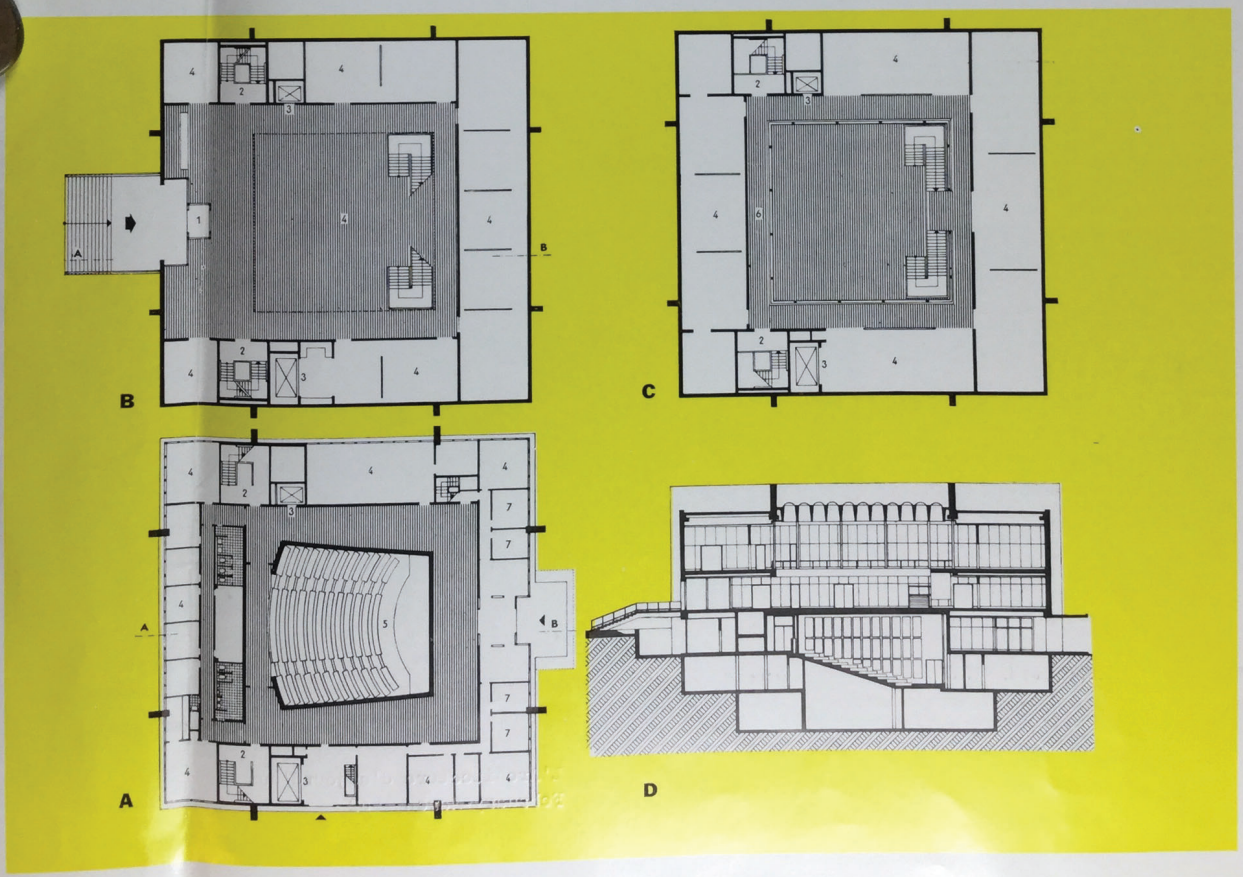
2

Utica est une ville industrielle de 100.000 habitants qui n'offre guère d'intérêt architectural, et qui vient de se voir dotée d'un véritable Centre culturel réalisé par un architecte de grande réputation.

Le Musée comporte trois niveaux. En sous-sol semi-enterré, ont été aménagés, une salle de conférences, une bibliothèque, une salle de musique, ainsi qu'un atelier où les enfants peuvent peindre et dessiner, et des bureaux. Au niveau de l'entrée, un grand hall central à éclairage zénithal s'élevant sur toute la hauteur du bâtiment permet les expositions de sculptures. Il est entouré à l'étage par une galerie d'exposition de tableaux. Le sens de l'espace et des proportions caractérise l'aménagement intérieur. Extérieurement, le bâtiment apparaît comme un parallélépipède fermé, posé sur un soubassement de verre.

Au point de vue constructif, l'ossature est formée de quatre portiques croisés en béton armé précontraint, revêtus de bronze. Le bâtiment est entièrement fermé sur la rue, par des murs revêtus de dalles de granit. L'accès se fait par un escalier monumental enjambant une cour anglaise entourant le bâtiment, et sur laquelle prennent jour les bureaux du sous-sol. Un faux plafond suspendu permet un éclairage régulier de toutes les œuvres exposées.

L'équipement technique a été poussé au maximum, et on prévoit une installation grâce à laquelle les visiteurs auront à leur disposition un appareil à transistor qui donnera les explications concernant chacune des œuvres exposées.



3

2. Vue d
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3

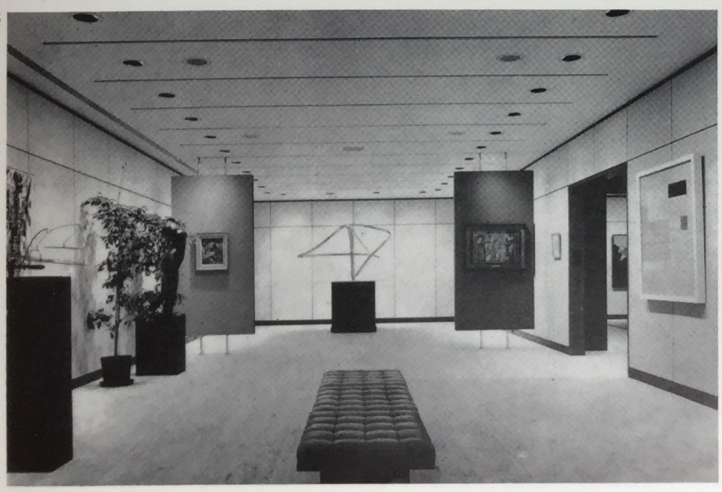
Photos Ezra Stoller.

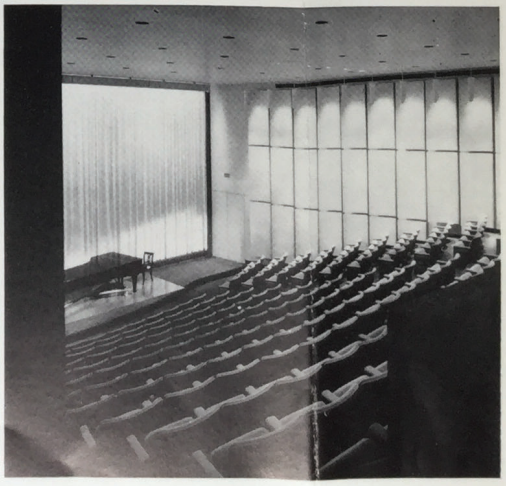
MUSÉE M. WILLIAM PROCTOR, UTICA

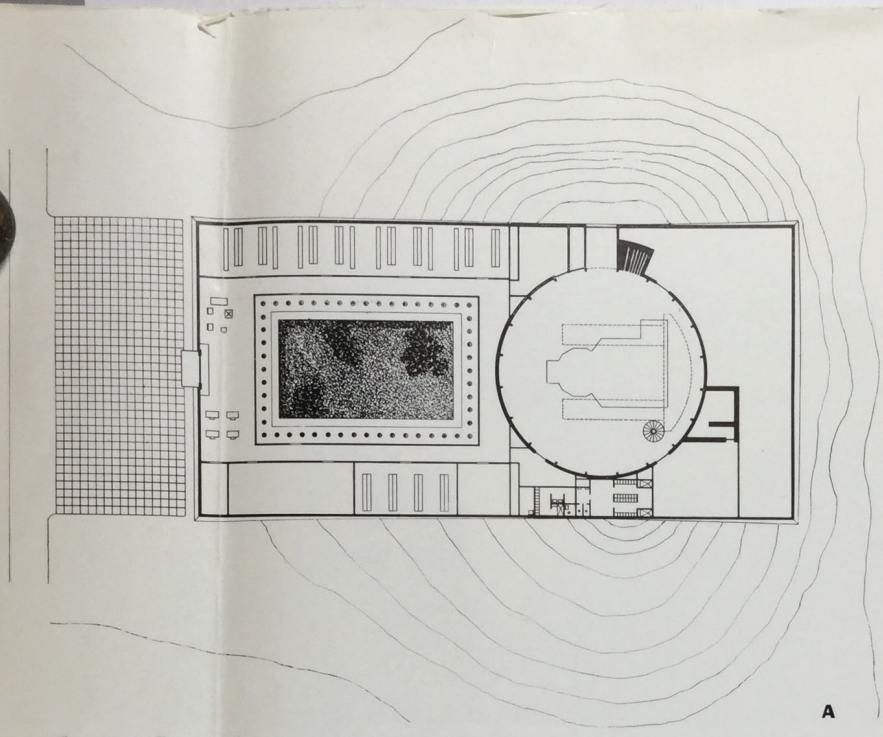
2. Vue de l'entrée. Sculptures de Mary Callery et Lipchitz. 3. Vue du grand hall. 4. Une salle d'expositions. 5. La salle de conférences qui peut être également utilisée pour des spectacles divers.

PLANS : A. SOUS-SOL. B. REZ-DE-CHAUSSEE. C. ETAGE : 1. Entrée. 2. Escalier, 3. Cuisine. 4. Expositions. 5. Salle de conférences. 6. Galerie. 7. Bureaux. D. COUPE.

4/5







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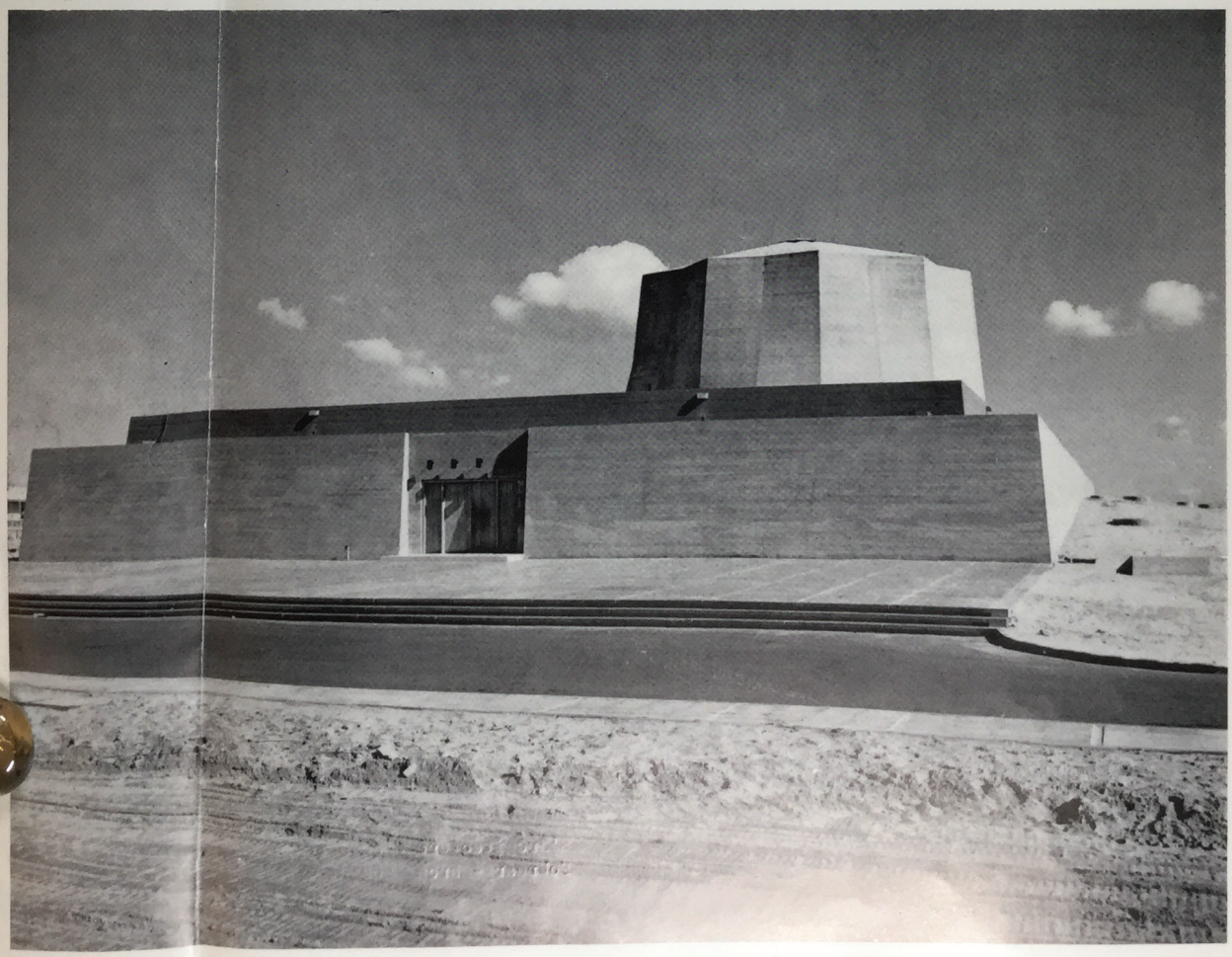
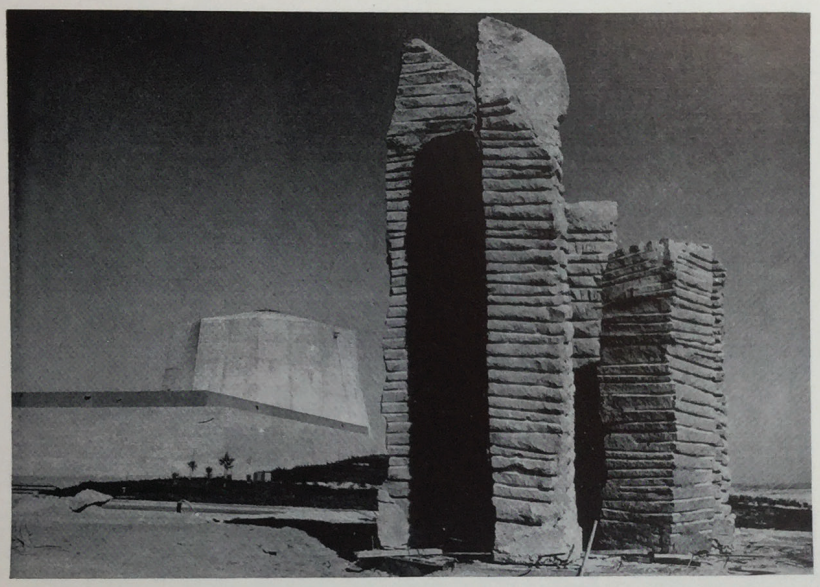


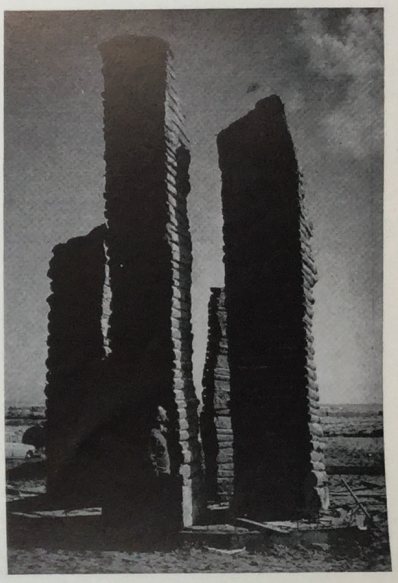
2

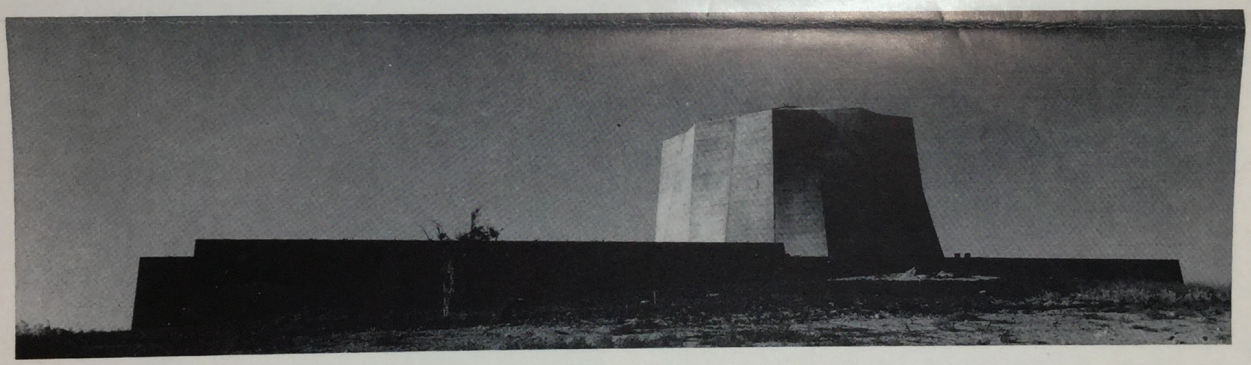
ART

ARTS & ARCHITECTURE
JULY 1962

DORE ASHTON







The pages of architecture magazines are hosts to endless discussions of the roles of architects and sculptors in collaboration. Advice is solicited nearly every year in the form of symposia on the subject. And every year the sculptors tell the architects that they should be privy to the plans from the ground up, and every year the architects tell the sculptors they don't understand the architect's problems. So the argument trails on from year to year with tiresome polemics and few results.

Not one of the usual prescriptions was followed in the exceptional collaboration involving Philip Johnson, the state of Israel, and the sculptor Shamai Haber. Philip Johnson was approached by Israel's minister of defense, Shimon Peres, to design a building to house a nuclear reactor. He had never been to Israel, and even after he won the commission, he didn't go to Israel. He *still* hasn't been to Israel. This in itself is somewhat unusual.

Johnson was not supplied with a budget or any other strictures. The defense minister, described enthusiastically by both architect and sculptor as a remarkable man, gave him the free hand every architect dreams of. He supplied Johnson with photographs of the terrain—a powerful, bleak coastal plain of sand and scrub set on a height—and confidently awaited the results. Johnson knew only that the site was elevated and that one could see the long line of the sea in the distance.

Naturally, Johnson cannot praise his patron enough. "It could only happen in a state like Israel," he says. "Not only did they leave everything up to me, but they built it *exactly* as I drew it, without supervision." Even the unusual stairs he designed for the interior were executed precisely, to his astonishment.

In creating his taut, sculptured building, Johnson bore in mind that the interior would have to house a large crane turning within it. "I could have made it a bubble, a cube, or a plain parabola," he explains, "but I chose what I thought would make a better shape—hyperbolic parabolas." As it turns out, these hyperbolic parabolas with their wide curves are tremendously dynamic in the sharp sun, deflecting the light and giving an illusion of movement exactly corresponding to the function of the elaborate machine within.

With the stern terrain in mind, Johnson chose raw concrete, gray and nude (and also cheap) for his building. Its long walls, unpierced, lie

(Continued on page 6)

MUSIC

PETER YATES

STRUCTURE AND TEXTURE

The familiar stylistic distinction between Classic and Baroque is better stated as a distinction between structure and texture. The distinction does away with dates. It applies as well to Byrd, who is a structural composer, and to Gibbons, who is a textural composer; to Schoenberg, who in spite of his predilection for retaining the structural sectioning by formally designated worked-out movements, is from the first a textural composer, while Stravinsky, who delights in all mannerisms of texture, remains throughout firmly structural.

The search for larger form during the harmonic period of European music proceeds out of three types of themes: one type which may be called textural and two which may with differentiation be called structural.

A textural theme consists of a melody, not irreversible and capable of furnishing its own accompaniment. The theme is often in two sections, the whole or either section being potentially capable of statement in reverse order, or in inversion, or of being mirrored in some instances by an equal but contrary statement. While these possibilities of the textural theme are never realized in the works by Gibbons and by no means always in the works of Bach, they underlie all textural composition as well as all applications of textural method by structural composers, and continue as lively as ever in the works by Schoenberg and Webern.

All extensions, positions, and partialities of the musical working are derived ultimately from the full melodic organization of the theme. Harmonic relationship is subordinated to the positioning of voices; its working out is conditioned by the harmonic possibilities set up by the intervallic relationships of the melodic theme, taken in melodic order. When the intervallic relationships deny any key, the resulting composition must be without key, not polytonal, as Webern and Schoenberg recognized with misgiving. The melodic themes of Bach contain more possibilities of interrelationship in varying degrees of harmony than those of any other composer. The design is unfolded rather than explored, the length being a condition of the elaboration. The marvel of Bach's workmanship is seen best where he seems to have enjoyed most displaying it for his own pleasure, in compositions for two or three voices, where the beauty is by extension rather than accumulation.

Beethoven has left one such theme, unexploited, a subject with which one might attempt another *Art of Fugue,* the subject of the first *Bagatelle,* opus 126.

The more potent of the two types of structural theme, that one which may be called the truly classical, begins most often in a tune or figurative fragment and can evolve around so little as a single interval. As the textural theme is not the original statement but its potential, so the classic theme by structure is not the tune, the fragment, or the interval, but the unit, which is exposed, analyzed and recombined, and which may often bring forth new themes—as with Ives. The logic of a structural theme is displayed against the background of its reconstruction in unfamiliar positions and in relation to the progress of the harmony. The moving voice or voices are conditioned harmonically by the successive positions of the bass, in short figures or long plateaus. The progress from one position to another by modulation, transition, or variation sets up a journey of events, dramatized by their successive relationships with one another and to the original key harmony.

With Ives, the polyphonic independence of the voices often redistributes a simple harmonic and contrapuntal relationship, so that the sense of implied bass is done away with, yet the musical result is not atonal, and any listener who expects a bass to be either evident or absent is quite lost.

Any rise or fall by a chromatic interval in the bass can severely affect the harmony. Whether such a change is to be a storm or a breeze over the waters depends on the context. In textural music, by contrast, the chromatic rise or fall of the bass obeys instead of determining the context.

Any structural composer, as he enlarges the scope of his method, finds more use for texture, to expand the incidental developments of chromaticism, as counterpoint or modified fugue, the structure supplying a framework for the texture. Textural composition can continue only so long as the theme permits; the addition of themes allows added sections and in some cases a final combining of themes. Thus a fugal movement, in structural composition, is likely to contain the opposing theme group of a tight sonata movement, so that the fugal theme, however prominent, is seldom the sole determinant. The alternatives are perhaps most evident in Beethoven's last sonata, *opus 111,* the first movement essentially structural, the second essentially textural. Fugue, however, does enter into the first movement, and a continuous progress of modulation into the second movement.

The utmost effect of structural music is brought about when the harmonic control, after having been most thoroughly threatened by an eruption of independence in the moving parts, is firmly and finally reasserted by the composer by means which make clear that, however far afield he may have wandered, he has never lost direction. This drama and reassurance, combined, explain the emotional authority of Beethoven: no matter how "tragic" the events his music figuratively suffers, he is never defeated at the end. Mahler, accepting the authority of this method, wilfully allows the harmonic control or direction to fall away or slacken without emphatic reassertion, so that the denouement occurs brokenly, as "pathos." That these moral conclusions do actively express a genuine state of mind there can be little doubt, but we are unwise to judge the worth of a composer by the moral effect or appearance of his method. Mahler's Ninth Symphony explores the breakdown of all that Beethoven's Ninth Symphony affirms and reaffirms, yet the very insistence of Beethoven's *Credo* in the *Solemn Mass* raises grave doubts concerning his belief.

The second or romantic type of structural theme consists of an irreversible melody or melody and accompaniment. Such a theme cannot be manipulated texturally or with analytic economy by structural concentration, having to assert its full length in sequences of juxtaposition, no matter how inworked or overworked

(Continued on page 7)

ART

(Continued from page 4)

along the land with the awe-inspiring presence of ancient monuments. Their powerful horizontal silhouettes remind me of a moon temple in Peru, crowning the bluffs toward the sea. The parapet, by the way, forms a lonely walk overlooking the sea. Below, an inner courtyard, colonnated and glassed, provides a more secret ambulatory.

Now we come to the second unorthodox element in the collaboration. He is Shamai Haber, an energetic sculptor, citizen of Israel and resident of Paris. He had never met Philip Johnson and indeed, had never seen the nuclear reactor building. In his Paris atelier, he had been dreaming of a monumental sculpture for Israel. Already in his mind he had formed an image of what it would be: five great monoliths on the desert plain. When first conceived, they were to have a superstructure of glass and an elaborate scheme of fountains which would trickle water over the stony flanks of the sculpture, but Haber later relinquished these complicated details.

Having heard of the remarkable Minister Peres, Haber paid him a visit and announced that he wished to make a great sculpture for Israel. The minister was pleased. Go have a look at Philip Johnson's nuclear reactor and come back, then we'll talk, he told Haber.

Haber went. Conditions couldn't have suited him better. He found Johnson's building superb, and the terrain exactly what he wanted. As a stone sculptor who has always favored rude materials and elemental designs, its dry and barren face was an inspiration. He determined to make his five monoliths there, a monument "that would be a response to the architecture."

Back he went to Peres telling him roughly what he had in mind. Again Peres concurred without question. Whatever Haber wished to do he could do. In addition, he could count on all the assistance he needed. This was particularly important since Haber intended to comb Israel in search of the right granite. When he found it, he quarried the pink stone with a team of workers and transported it with great difficulty to Rehovot, the site of the reactor.

Johnson recalls that he first heard of Haber when the sculptor wrote him a letter describing his enthusiasm for the building and asking permission to proceed with his sculpture. From photographs of Haber's previous work, Johnson felt Haber was his man. "It was collaboration by instinct," he says. Incidentally, the collaboration was so successful that the two are discussing future plans.

From Haber's point of view, this successful collaboration is a great augury for the future. A short, powerfully built man given to ebullient declarations, he is convinced that he will realize his grandiose schemes to enrich the "noblesse" of sculpture in our century.

"I have always worked in stone," he explains, "and it is natural for me to want to do public sculpture. When you do a sculpture on a particular site you are able to give a supplementary dimension to everything around. The distance between the buildings and the sculpture, for instance, or between the sculpture and the horizon, becomes my material. My sculpture will give meaning to everything around it." Furthermore, Haber says, a monumental sculpture like his Israeli monoliths is sociologically significant. It re-transforms the artist into a member of society, he thinks. "Society needs my sculpture as much as it needs the cinema." Noblesse, noblesse, he repeats, such as Bernini and Rodin—that is what he is after.

The story of Haber's Israeli accomplishment goes back to an exhibition two years ago at the Stedelijk Museum in Amsterdam. "I saw all those sculptures of mine done in the studio and I was very unhappy." Then he spotted a fountain outside the museum and it struck him that he would project water on glass, combine it with granite, and produce a fusion of elements—the antithesis of mechanical, man-made structures, and of the gratuitous static qualities in his own past work.

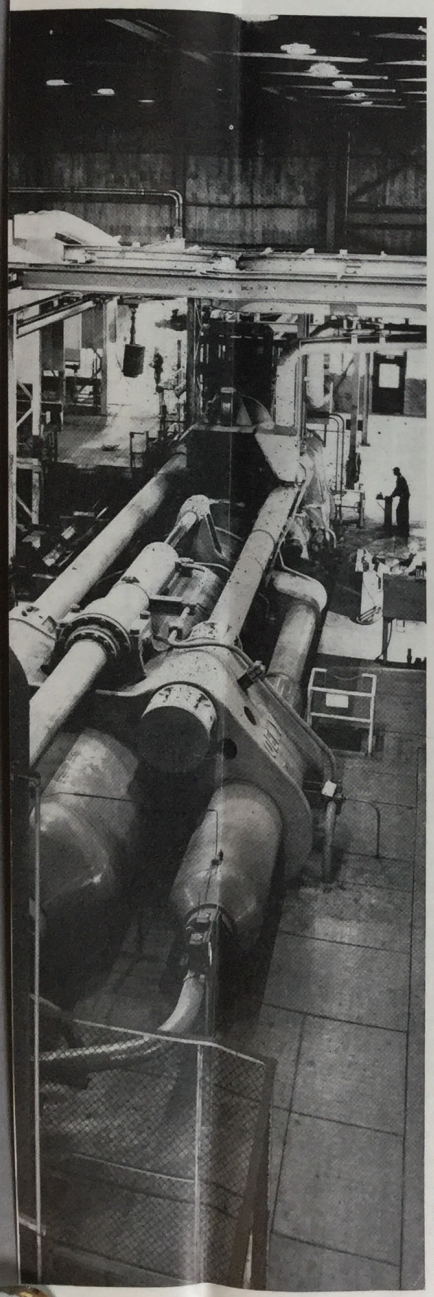
Haber clung to this dream until he had hauled the huge chunks of granite down to his Rehovot site. His vision of five monoliths, the first six meters high, the second five, and so on, was conceived in relation to the rhythms of the reactor building. In the arid plain he needed water. When he got his stones there, he saw that what he wanted was not a cascade which would blur the massive strength of his stone forms, but a rectangular lake which would serve as their base. This lake would be a response for the rectangle of Johnson's long walls. Its waters would reflect the monoliths, and the rectilinearity of its basin would provide a tension for the natural irregularity of the monoliths' summits. (Haber left them rough-cut on purpose.) The dynamic and static elements would then correspond to Johnson's design in which the severity of the walls contrasts with the curving parabolas.

What Haber finally wrested from his gigantic masses of pink granite was an ensemble of roughly hewn shapes clustered together like mysterious ruins. There surfaces are chiseled with irregular striations leading the eye upward to the deliberately chipped, asymmetrical terminals. In profile, each monolith gives the appearance of having been gnawed by the elements. Their wavering outlines are subtle allusions to the curvilinear dome of Johnson's building. The warm pink of their surface will diffuse light softly, in contrast to the sharper way the cold concrete will bounce it off.

Instinctively, Haber was able to complement Johnson's building. The moral of this story is so obvious I will not even bother to conclude with it.

Technology

Aviation eyes the building industry



Much that has been learned in making air frames and rockets could be used in the construction of tomorrow's buildings.

By LAWRENCE LESSING

A major revolution may well be under way in the invasion of building by the aircraft industry. The influence of aeronautical design on architecture is already strong. In the finely jointed, thin-aluminum or stainless-steel-clad buildings typical of today there is the unmistakable light touch of the air age. More advanced types of structure, such as space frames, cable-suspended roofs, geodesic domes, and air-supported buildings, show an even clearer debt to aeronautical design. Even concrete, through development of thin-shell construction, prestressing, mesh reinforcement, and lightweight aggregate, has taken on soaring aerodynamic qualities.

Today, by a violent coincidence of economic and technological events, there are signs of an even more direct entry of aeronautic techniques, materials, and designs into building. The U.S. aircraft industry is in the midst of the greatest transition and crisis of its life. The ascendancy of rocket missiles over manned military aircraft is pushing the industry's historic airframe business into a decline from which it is expected never to revive. While most of the big aircraft makers are shifting to rocket-satellite work, and some can continue to count on a small backlog of orders in jet aircraft, the whole business is not expected at its optimum to occupy more than about a quarter of the industry's present 105 million square feet of floor space and facilities. Hence the industry is on a search even more frantic than that following World War II for diversification into other industrial products. And some of the giants are having a long look at the building industry.

Building would seem to be a natural for the aircraft industry. The aircraft industry is perhaps the world's most advanced developer and fabricator of materials and components into self-contained structures. Its deployment of men and machines on a factory floor is one of the wonders of the modern world. Moreover, over two-thirds of that plant and its machines—about $1.2 billion worth—is free and clear, having been paid for by the U.S. government. Above all, this industry has an unparalleled core of engineers and researchers to draw on in any attack on building problems. And boiling up out of the industry's space research are still newer, more advanced techniques, materials, and constructions that, together with those of the past, might indeed revolutionize building.

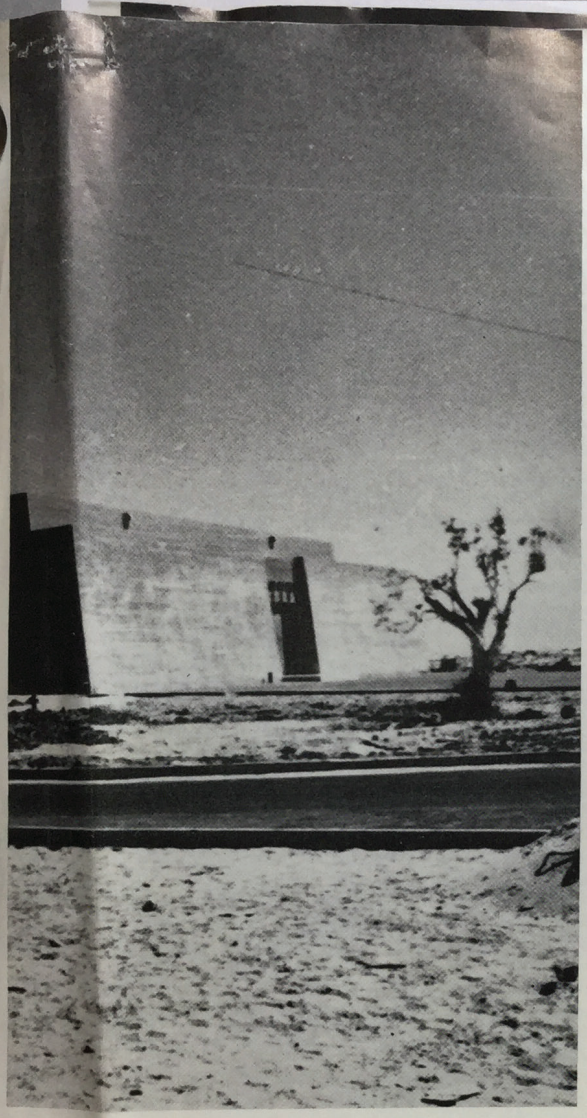
Plastic molding of metals

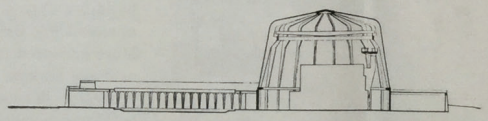
Essentially, the manufacture of air frames, as it has developed, has become a smooth molding of light metals into curved aerodynamic shapes, whereby metals are more and more treated as plastic materials. For this there has been developed a great range of metal molding and manipulating machines, which, if turned to building products, might well introduce into the generally rigid rectilinear patterns dictated by conventional steel beam-and-column construction some of the curvilinear freedom of such plastic materials as concrete (or an occasional metal form such as the Alcoa Building's soft-cornered windows). Moreover, the range of shapes and sizes thus made available for building could be greatly extended, particularly in the direction of larger, more economical unit components.

Two classes of these metal-forming machines would probably be most readily adaptable to building needs. One is a range of big extrusion presses,

WILLIAM VANDIVERT

Giant extrusion press *at Curtiss Wright Metal Processing Division at Buffalo (left) is typical of the advanced equipment in the aircraft industry available, with the decline in airframe production, to new concepts in building and construction. About two-thirds of the aircraft industry's modern plant will have to be turned over to new markets in the next decade or be disposed of at a substantial loss. The huge stretcher press (right) is part of the Aluminum Company of America's plant in Lafayette, Ind.*





Atoms for Israel

Philip Johnson's nuclear reactor building, designed for the Israeli government and located in Rehovot, recently won a deserved honor award from the American Institute of Architects—deserved for this is a remarkably strong and richly suggestive design.

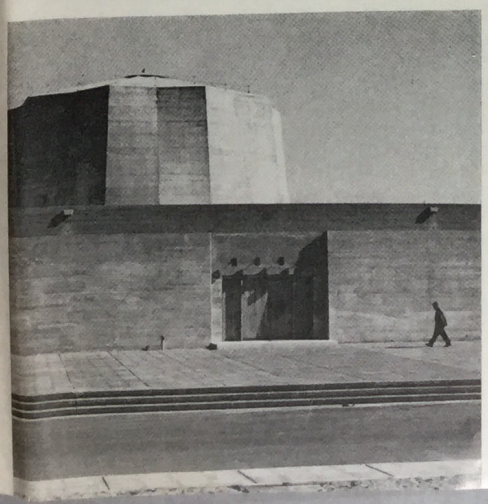
Its roughly formed, raw concrete walls, unbroken by windows, reflect a conscious effort to turn away from the harsh natural surroundings of the rugged coastal plain. It embraces instead a stylized, serene, artificial nature of its own in the oasislike interior court, which is rimmed with carefully articulated columns and walls of glass.

The secret nature of the work within is suggested by the steeply battered, fortresslike walls which clearly—and powerfully—resist the visitor. This is not a building which invites, but one which repels. Another aspect of the building's function is suggested by the dome, whose restless, faceted exterior hints at the struggle to harness the enormous, restive forces within.

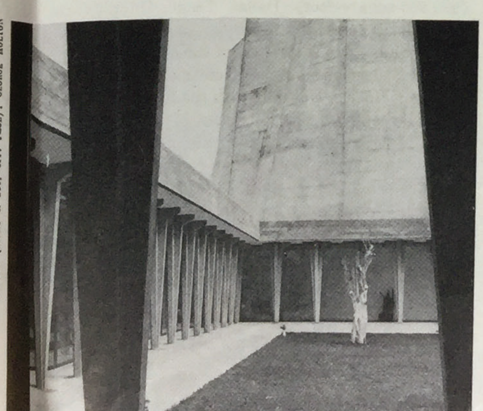
Finally, in the severe, rigidly formal organization, which culminates in the great space of the reactor dome, the building suggests a temple, with a peculiarly regional flavor of ancient Israel and Egypt. And, in a way, it is a temple, dedicated to the new "religion" and served by a new order of high priests.

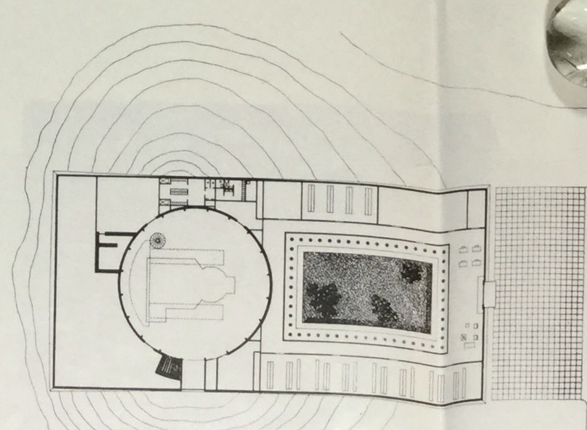
Supervising architect for the Israeli government: Gideon Ziv. Structural engineer: Dr. Lev Zetlin.

Architectural Forum
April 1961

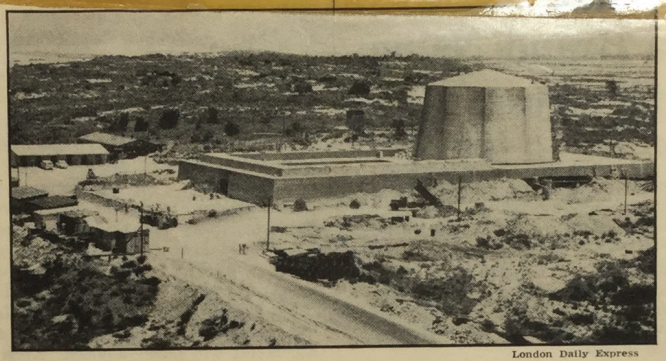


PHOTOS (RIGHT & BOT. OPP. PAGE): GEORGE HOLTON





Newsweek, January 2, 1961



London Daily Express

Israel's Nuclear Power—What Next?

Outwardly the Arabs were furious; inwardly, they feared that in nuclear plants, like the one above, Israel was becoming a nuclear power (NEWSWEEK, Dec. 26, 1960).

Tel Aviv flatly denied that it is building a bomb. The facts: (1) Israel is building a 24,000-kw reactor which will produce both power and plutonium; (2) the power will be used for peaceful purposes; (3) the plutonium could go into nuclear weapons, if Israel feels so inclined.

As of now—with no plutonium available—Tel Aviv has no hard plans to build a nuclear weapon. But when supplies of plutonium become available—as they will sometime this year—the Israelis freely admit that they may change their minds.

New York Times - Friday
March 25, 1960

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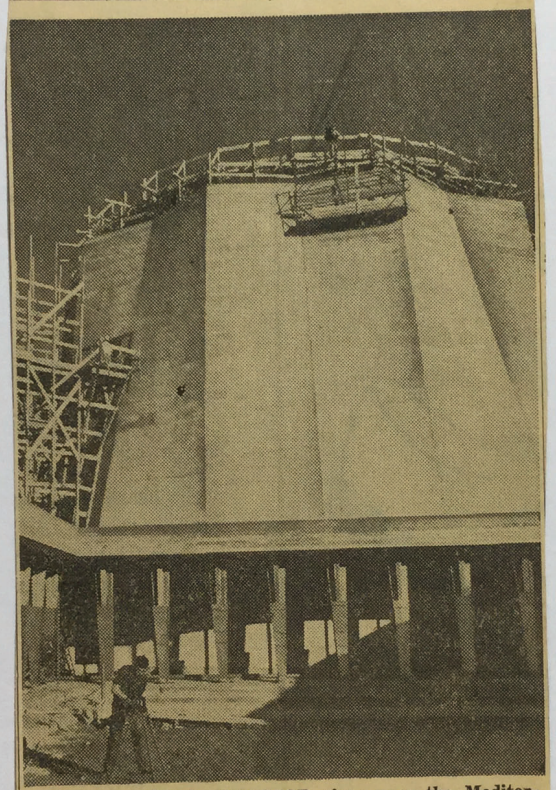


ISRAELI ATOMIC REACTOR rises near the Mediterranean seaport of Ashdod. Half of $600,000 project is being financed by United States grant. U. S. is also lending Israel 22 pounds of enriched uranium-235 for fuel.

Haifa, 5. Keller St.
3.7.62

Dear Philip Johnson,
this postcard might interest you (in case you have not got it already)
Sorry, indeed you were not able to come to Israel!
Best wishes
M. Mansfeld

Mr.
PHILIP JOHNSON
architect
375 Park Avenue
NEW YORK 22
NY.
U.S.A.

ISRAEL
0.30
ישראל

PAR AVION

כור המחקר האטומי הראשון בישראל
THE FIRST ATOMIC RESEARCH REACTOR IN ISRAEL 5692

ISRAEL ASSURES U.S. ON REACTOR

Ambassador Informs Herter Plant Will Not Be Used to Make an Atomic Bomb

By DANA ADAMS SCHMIDT
Special to The New York Times.

WASHINGTON, Dec. 21—Ambassador Avraham Harman of Israel assured the United States Government yesterday and today that Israel's new nuclear reactor being built near Beersheba would not be used to make an atomic bomb.

Israel has other reactors, to which United States aid has contributed, already in use for scientific research.

Mr. Harman called on Secretary of State Christian A. Herter yesterday with a formal reply to Mr. Herter's inquiries on Dec. 9.

Today Mr. Harman held a more detailed discussion with G. Lewis Jones, Assistant Secretary for Near Eastern and South Asian Affairs.

Lincoln White, the State Department's press officer, said that the Israeli had "assured the Secretary that the new Israeli reactor, now in the early stages of construction, is for peaceful purposes only."

These discussions were accompanied by growing United States anxiety over political repercussions of the affairs in the Middle East and on United States policy.

It was feared that Arab alarm over Israel's potential ability to make atomic weapons would encourage Arab extremists to demand the destruction of Israel before she had time to develop her potential. Some Arabs were expected to turn to the Soviet Union for comparable scientific equipment and support against Israel.

On the other hand, United States officials said that the way Israel's construction project had been kept secret from the United States had hurt the Israelis and marred American confidence in the Israelis.

C. I. A. Reported Project

The existence of Israel's project to build, with French help, a natural uranium reactor with a capacity of 24,000 thermal kilowatts was apparently first reported by the Central Intelligence Agency.

According to American estimates, such a reactor would be capable of producing enough plutonium for slightly more than one bomb a year beginning about two-and-one-half years from now.

United States officials now believe Israel's reasons for secrecy to be these

¶The Israelis feared that the Arabs, who maintain that they are still at war with Israel, would try to interfere with French and other suppliers of equipment for the project. An Arab boycott already has caused some companies to withdraw from Israel. For similar reasons, the Israelis now try to keep secret details of their sources of immigration and their supply of oil.

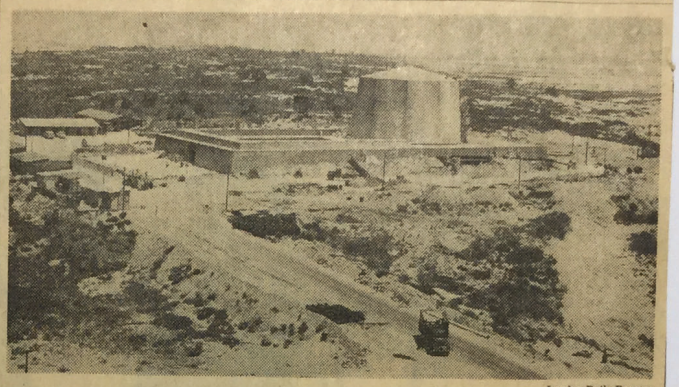
¶The Israelis feared that in any renewal of Arab commando (Fedayeen) raids the new plant would be a natural target.

¶Israeli leaders have a habit of secrecy that goes back to their days in the ghettoes of Eastern Europe and to their training in the underground Zionist movement.

On Dec. 9, Secretary of Stat Herter called in Ambassado Harman to ask what Israel wa doing.

Reports that another natio might soon join the "atom club" were published here afte the Joint Atomic Energy Com mittee met Dec. 9, but Israe was not mentioned.

The Israelis e they delayed their the confidential Herter's inquiry



London Daily Express

REACTOR IN ISRAEL: This nuclear installation, built with United States aid, is on the sand dunes near Rishon le Zion. It is for industrial, medical and agricultural research. Israel has denied that she was working toward production of a nuclear bomb.

able to wait until the Secretary returned from the Paris meeting of foreign ministers of the North Atlantic Treaty Organization.

Ben-Gurion Explains Project
Special to The New York Times.

JERUSALEM (Israeli Sector), Dec. 21—Premier David Ben-Gurion said today that Israel was building a nuclear reactor for peaceful uses.

Responding to a question in the Knesset (Parliament) by Gideon Ben-Israel, a colleague of the Premier in the Mapai party, the Premier said the reactor would have a capacity of 24,000 kilowatts but would not be completed for three or more years.

The reactor, he said, would "serve the needs of industry, agriculture, health and science."

[The Premier asserted that reports that Israel was producing an atomic bomb were "deliberate or undeliberate" untruths, United Press International reported.]

Mr. Ben Gurion said the reactor would be open to trainees from other countries upon its completion. He described it as similar to a larger one that the Canadian Government had helped to build in India.

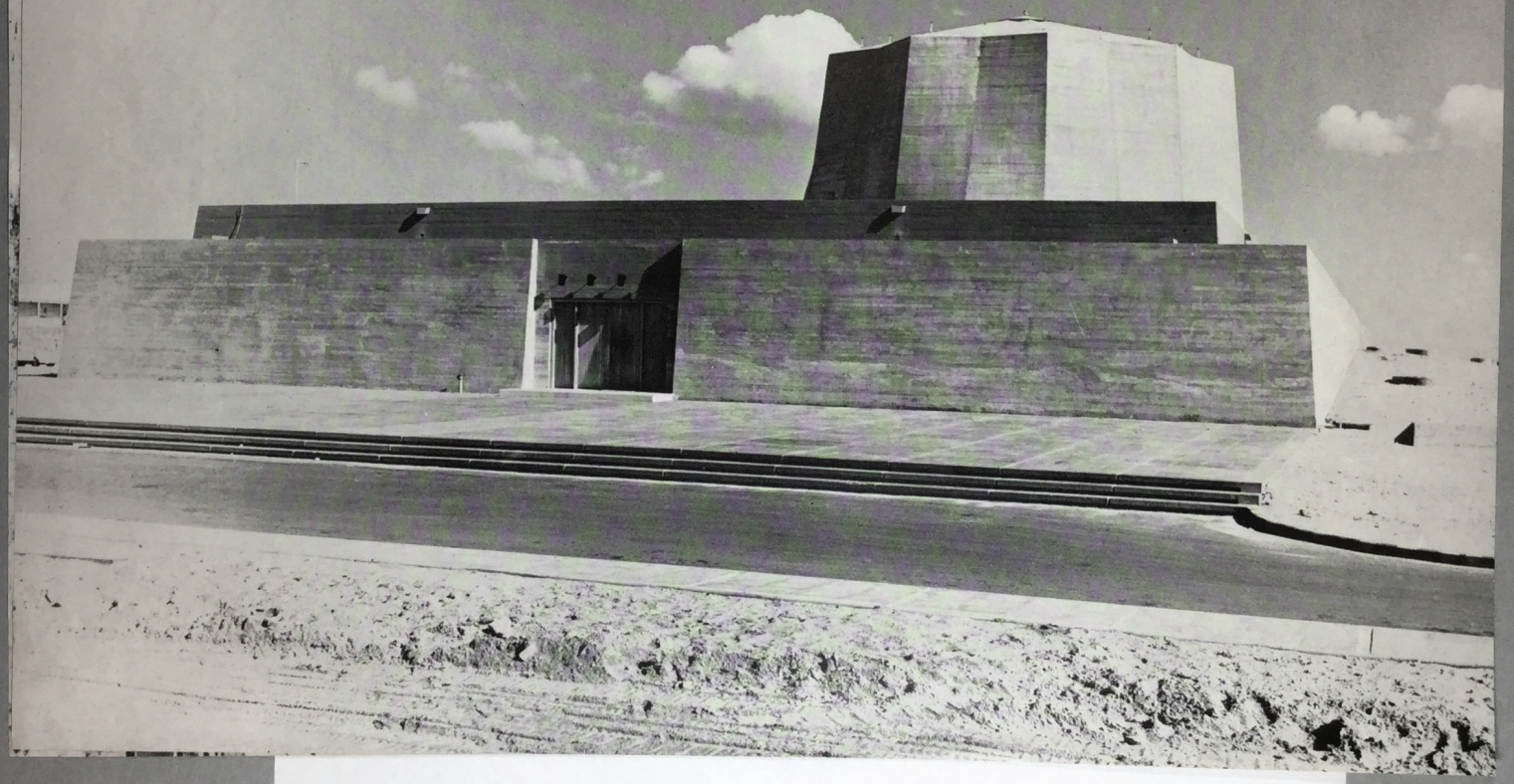
The United States granted Israel $350,000 to help in the construction of a relatively small reactor at Nahal Rubin, on a lonely stretch of beach west of Yavne.

Last March the uranium fuel for this reactor arrived on loan from the United States and its use for peaceful purposes is governed strictly by an agreement between the two countries.

Architecture June 1961

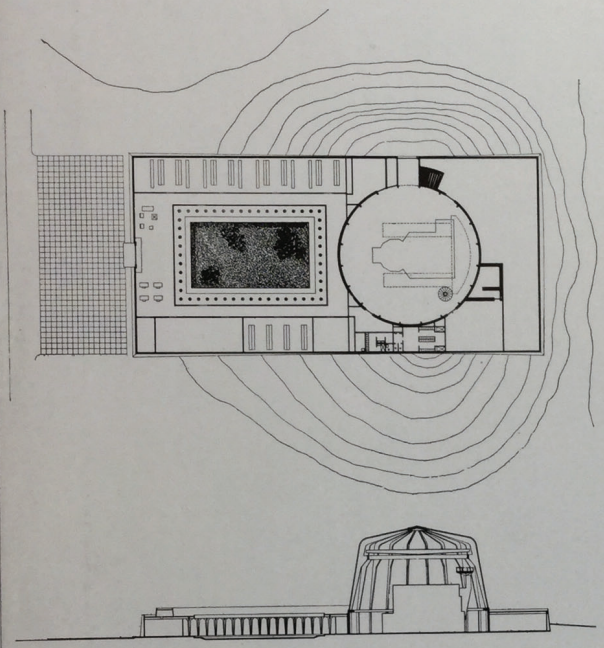
George Holton, *photographer*

イスラエルにたつ原子炉　フィリップ・ジョンソン



フィリップ・ジョンソンの最近作　イスラエルにたつ原子炉

明石　乃武



自邸を「ガラスの家」と呼ばれ，その名を人びとに知られるフィリップ・ジョンソンが 1958 年にイスラエルに計画をしていた原子炉を，まだ周囲のランドスケープは完成していないがとのことわり書きで，その写真を数葉送って来た．

ミース・ファン・デル・ローエの派に属し，その最もよき理解者として見なされていた彼の最近の仕事は感覚的に豊富な現代絵画，彫刻への知識をもとにしてミースからの脱皮が見られる．が簡潔性，明快性が姿を変えはしても彼の近作には一貫しており，独自の品格 quality が常につけ加えられている．この点アクション派の傾向といいながらフィリップ・ジョンソンの仕事はサーリネンの作品の TWA ビルなどに現われるフォービズム的な彫塑性とは異ったもので表現性に走らない素直な性格をこの原子炉からみつけ得るであろう．

しかしイスラエルの構造家の参加で始められたこの原子炉であるだけに建築表現上で最近のフォート・ウォースに計画されている美術館のごとくアール・ヌヴォーのような絵画的空間ののフォルムに走らず，構造を率直に表現している形体の単純さが合理的という装いで人びとの目を打つかもしれない．

室内空間の捉え方にしてもフィリップ・ジョンソンはミース流な free plan を徹底的に採り上げた自邸にみられる環境への無限定性の差しのべ方．それとは逆に敷地外には排他的な高いフェンスで接し，その内部を完全に自己のものにするという求心的な空間を把握する技法――例としてはケンブリッチにある住宅――を今までに見せている．この原子炉でもその後者の性格をはっきりと打ち出しており，建築家それ自体が責任が持てる目由空間での解放性を捉えており，目に見えぬ一線が周囲と隔絶された形でこの建築を取り巻いている感がある．それは過去のエジプト，アッシリヤの遺跡に見られる荒涼たる不毛の地に抵抗するように建てられた酷暑という自然の力に立ち向う排他的な空間の性格を再現しているし，内部ではギリシャ，ローマの中庭のコロネードの閉ざされながらも人間尺度 human scale の絶妙な表現として見なされるその美しさが彼のイメージの中にあるネオクラシックな好みを刺激したのであろうか．

創造性（イメージ）．それは事実単なる合理性への奉仕というコマーシャル的な建築上の動きを打ち破ろうとする作家意識とも結びつくであろう．ただのイメージの上にあぐらをかく表現のみの世界でもないし，技術的遍向の中にも住み得ないであろう．建築造形の歴史的様式の変遷を振り返ってみてもそれを規定しかかる条件の相関的な変化が生み出してきたものと見ることができる．それはすべてが具象的世界の産物とは考えられないだけに造形のみの手仕事の目的ではないであろうか．

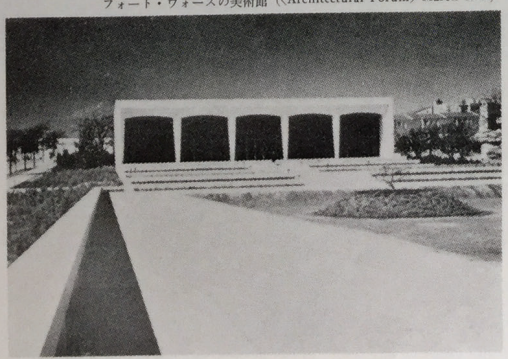
とある芸術家との雑談の中で「建築物内に入ってしまえば芸術の綜合と呼ばれてもわれわれの仕事は建築家のイメージを手助け，引き立てる役のひとつにしかならないスケールが運命的につまらない.」といわれ「建築家はまるでピラミッドをつくる帝王のごとく造形上では尊大だね.」とぼやかれたことをふと思い出す．２次元的な絵画とか３次元的な彫刻のような視覚的な次元に多角的な現代の把握にたつイメージが多次元の世界へと歩めるというのも事実であろう．

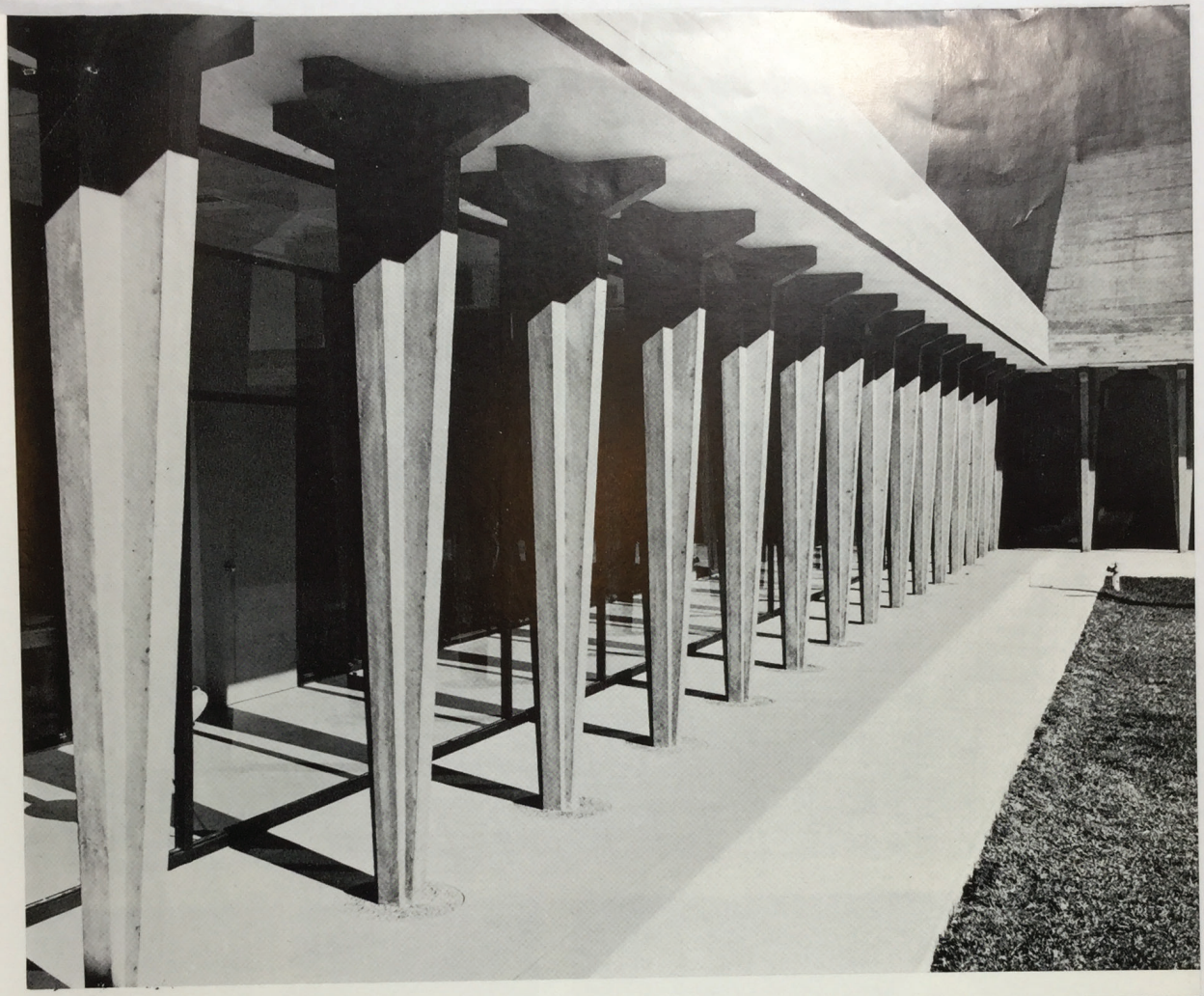
スピリットの中にある多角的な形体こそ organic という言葉で表わされデザイン以前の問題として人びとに課題を与える気がするし，浮薄なるデザインの性格に進歩という方向性を与えることができるとすればこの分野での定見こそ必要になる気がする．

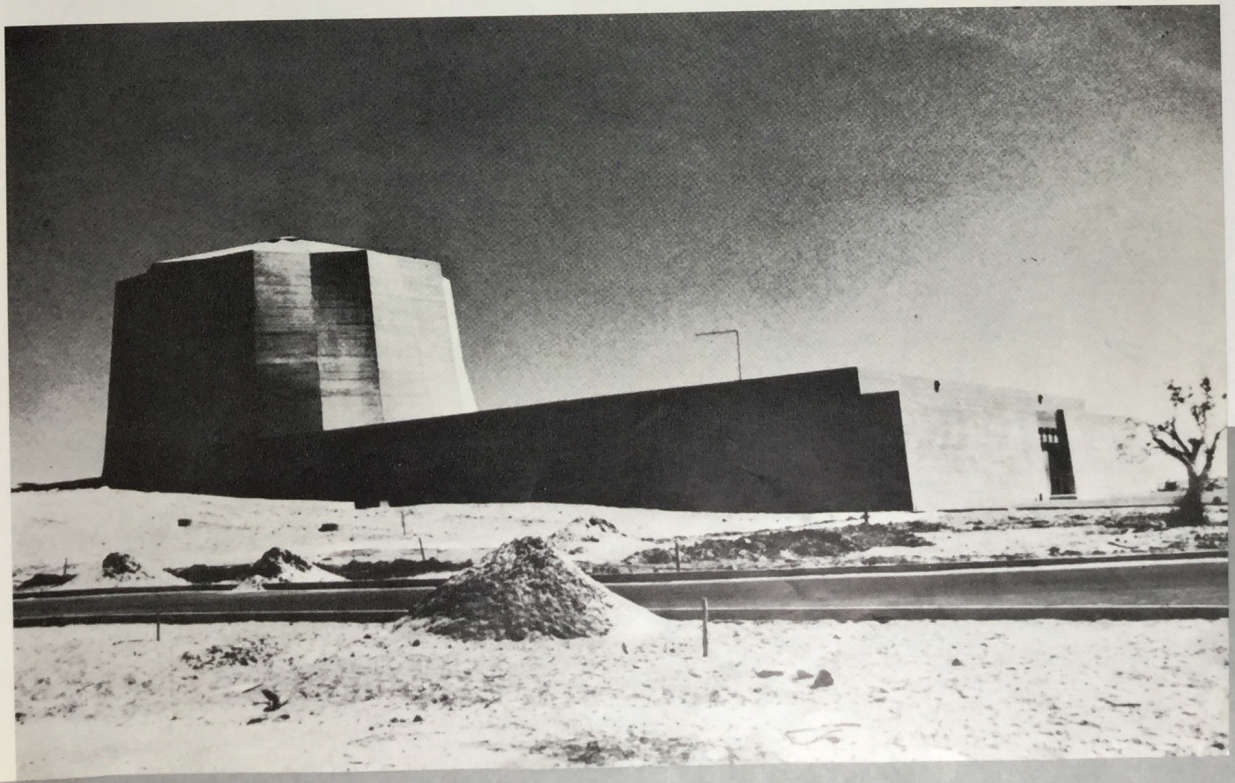
このイスラエル原子炉にしても数葉の写真を見て「いかにもいかめしい建物.」とその外観の現わす brutal な表現に人間味を感じないといって歎いた人もあった．現在アイヒマン裁判と世界の耳目をそばだてるイスラエル．過去のユダヤ人の苦しい圧迫，流浪の歴史を新しく塗りかえる努力を被虐的な考えに支配されると考えるアラブ民族との間に緊張を生み出している背景がこの建物に反映しているのか……．あるいは原子力という人類のいまだ持ったことのないエネルギーが平和的な国際間の監理協定がなされず，ただ軍事上のバランスに使われている不気味な恐怖からであろうか……．

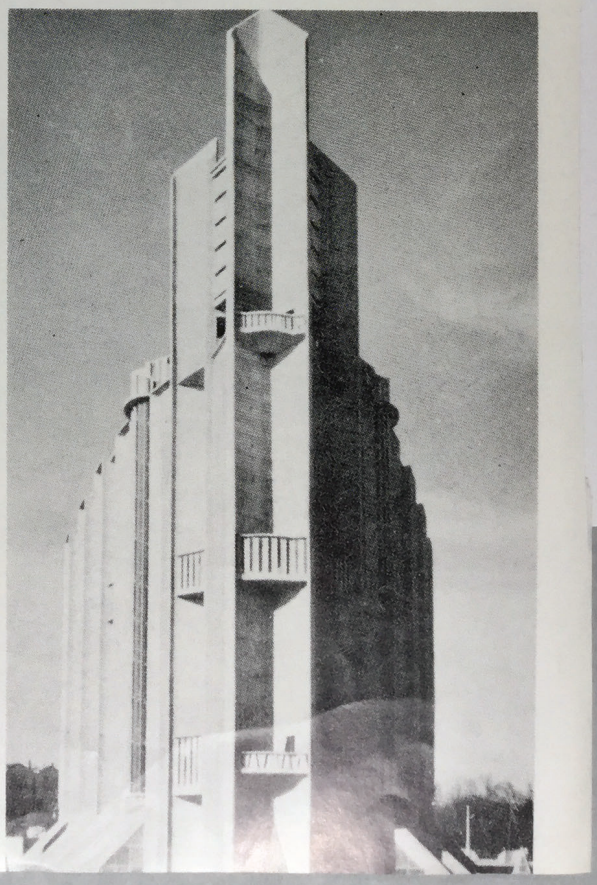
この建築が存在する本質のかげに知性で解決すべき諸問題がこの建築の形体上の暗さ，排他的ないかめしさに輪をかけて人びとに重苦しさを与えるのではないかとも考える．いつの日かこの種の研究所の平和的使命が鮮明されるとき，われわれの未来に輝しい光を投げ与える姿としてひとに親しまれるような建築表現が完成されるとき，はじめてこの種の建築の表現の本質の本質を衝きうると考えていたい．

フォート・ウォースの美術館（〈Architectural Forum〉 March 1961）



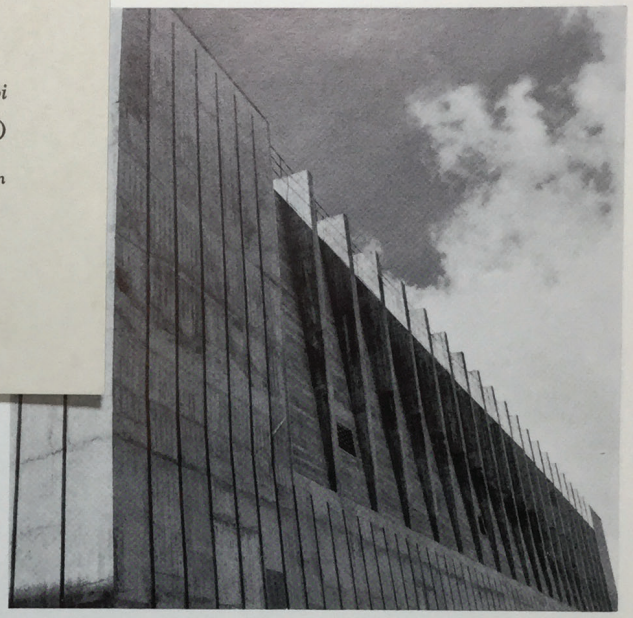






The Author Giampiero Aloi
and the Publisher Ulrico Hoepli (Milan Italy)

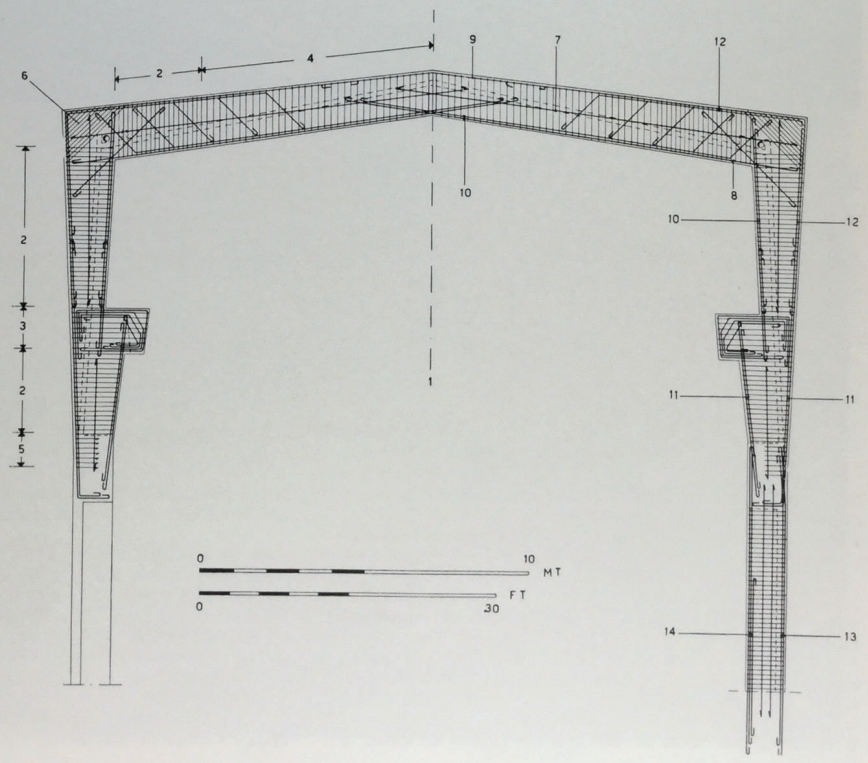
with best thanks for your kind cooperation



– 9 3 ⌀ 30 – 10 6 ⌀ 30 – 11 7 ⌀ 30 – 12 8 ⌀ 30 – 13 10 ⌀ 30 – 14 20 ⌀ 30.

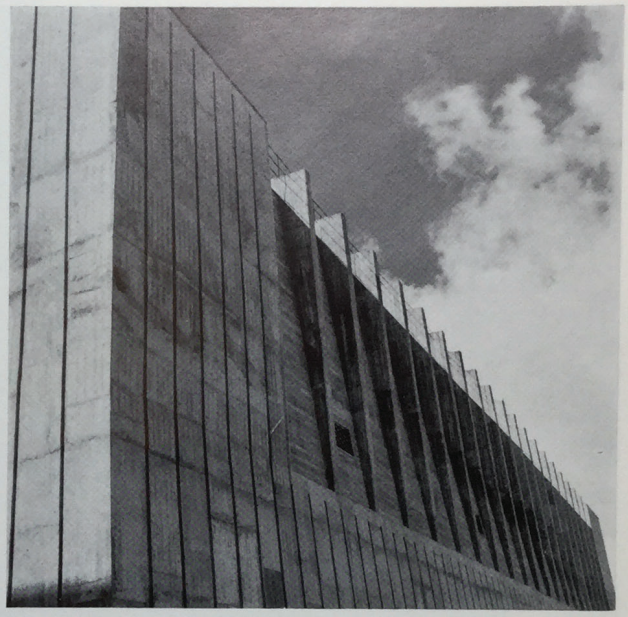
Reinforcing rods for roof covering frames of station

1 *axis of symmetry* – 2 *7 stirrups* 3/8″ ⌀ *each* 3.28 *ft.* – 3 *7 stirrups* 9/16″ ⌀ *each* 3.28 *ft.* – 4 *5 stirrups* 3/8″ ⌀ *each* 3.28 *ft.* – 5 *7 stirrups* 5/16″ ⌀ *each* 3.29 *ft.* – 6 1 *stirrup* 3/8″ ⌀ *each* 3.93 *in.* – 7 *two* 9/16″ ⌀ – 8 *two* 1.1/8″ ⌀ – 9 *three* 1.1/8″ ⌀ – 10 *six* 1.1/8″ ⌀ – 11 *seven* 1.1/8″ ⌀ – 12 *eight* 1.1/8″ ⌀ – 13 *ten* 1.1/8″ ⌀ – 14 *twenty* 1.1/8″ ⌀.



Particolare del fianco dell'edificio centrale.

A detail of the power station building side.



Armatura dei telai di copertura dell'edificio centrali

1 *asse di simmetria* – 2 7 *staffe* ⌀ 10 *al metro lineare* – 3 7 *staffe* ⌀ 14 *al ml* – 4 5 *staffe* ⌀ 10 *al ml* – 5 7 *staffe* ⌀ 8 *al ml* – 6 1 *staffa* ⌀ 10 *ogni* 10 *cm* – 7 2 ⌀ 14 – 8 2 ⌀ 30 – 9 3 ⌀ 30 – 10 6 ⌀ 30 – 11 7 ⌀ 30 – 12 8 ⌀ 30 – 13 10 ⌀ 30 – 14 20 ⌀ 30.

Reinforcing rods for roof covering frames of station

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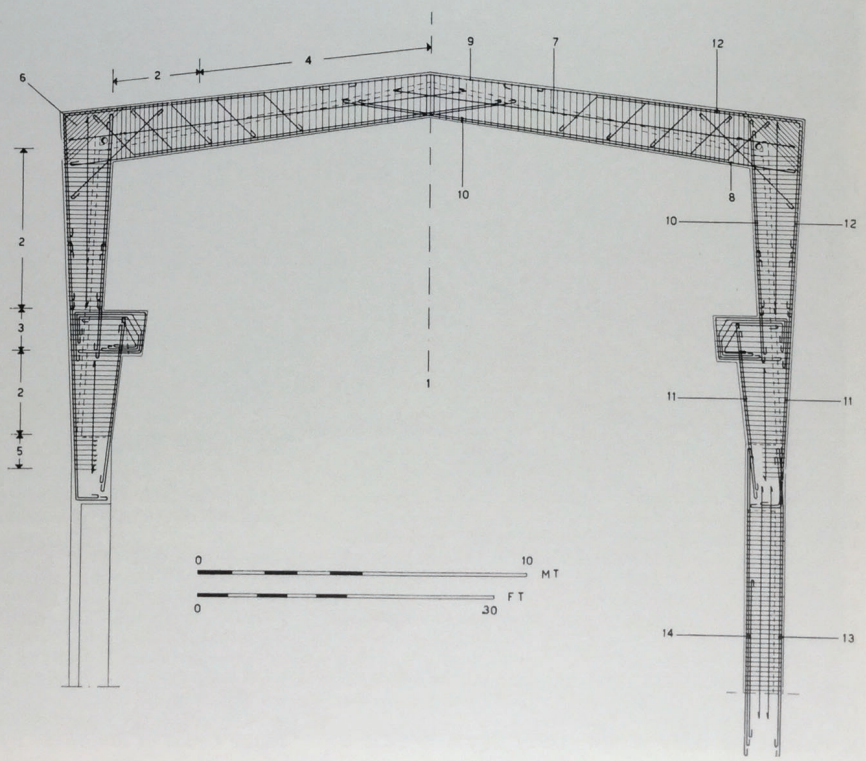
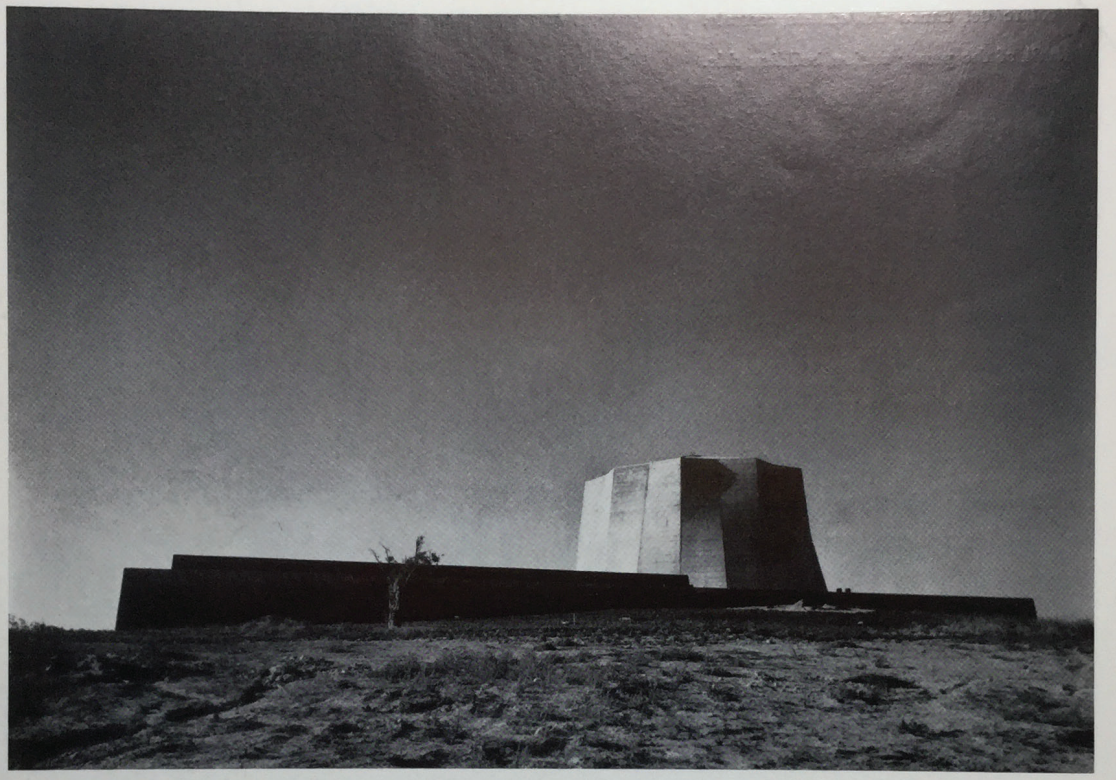




REATTORE NUCLEARE A REHOVOT, ISRAELE.

Philip Johnson, architetto.

Collaboratori: per i calcoli strutturali, Lev Zetlin, ingegnere; Guy B. Panero, ingegnere meccanico; per la direzione lavori, Gideon Ziv, architetto.

Si tratta di un reattore nucleare progettato per il governo di Israele e situato a Rehovot.
I suoi muri di cemento grezzo, senza finestre, conferiscono all'organismo una staticità che si oppone alla rugosa severità della pianura circostante.
La sua forma che suggerisce l'idea di un tempio sembra riflettere caratteri regionali, quelli degli antichi Israele ed Egitto.
Al visitatore si presenta, entrando, una corte orlata da colonne cruciformi rastremate dal basso all'alto, corte su cui si affacciano, sui lati lunghi, i corridoi vetrati che disimpegnano laboratori, officine ed uffici.
Il reattore, contenuto in una grande cupola in c.c.a. a larghi piani inclinati, comporta una serie di servizi, docce, spogliatoi ecc. che sono distribuiti ai suoi fianchi.

Area coperta dall'edificio 2.764 m² - struttura, copertura, scale, muratura esterna in c.c.a. - pavimenti in c.c.a. e mosaico alla palladiana - soffitti: pannelli fonoassorbenti - balaustrata delle scale in acciaio - rivestimenti interni: sala reattore: piastrelle; uffici: intonaco a gesso; servizi: blocchi di calcestruzzo - pavimenti: sala reattore: piastrelle; uffici: piastrelle viniliche; servizi: piastrelle ceramiche - serramenti esterni in acciaio - serramenti interni: laboratori: acciaio; uffici: profilati metallici - scultura di Shamai Haber - anno di costruzione 1961.

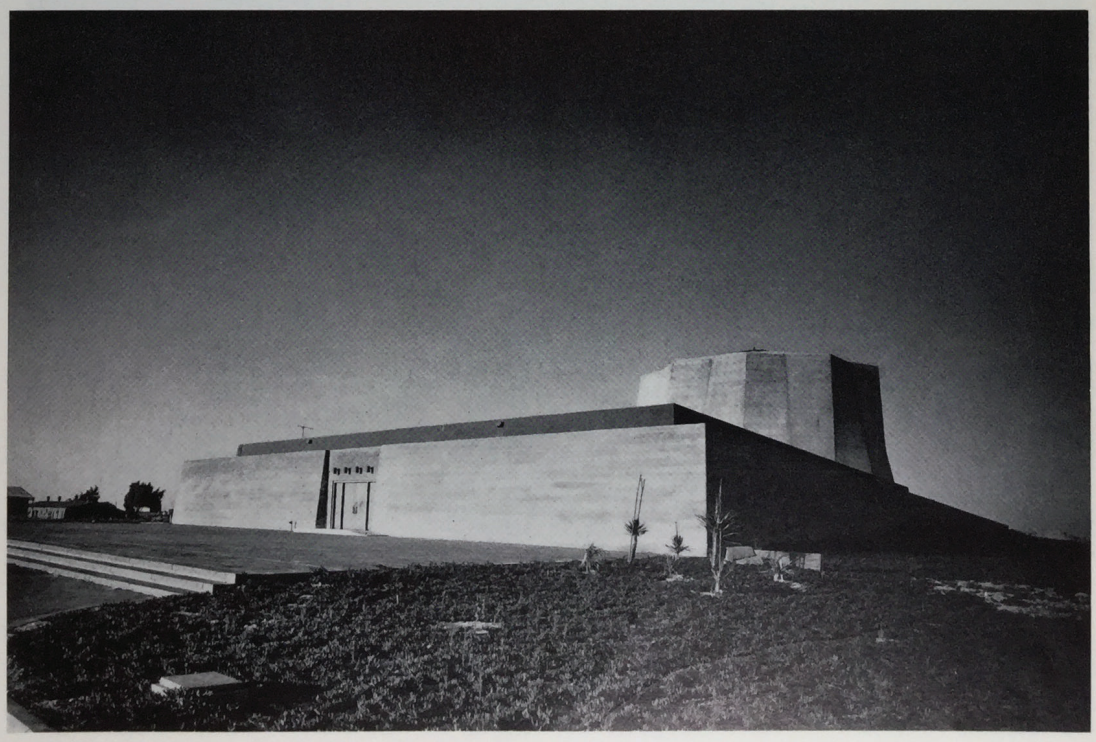
NUCLEAR REACTOR AT REHOVOT, ISRAEL.

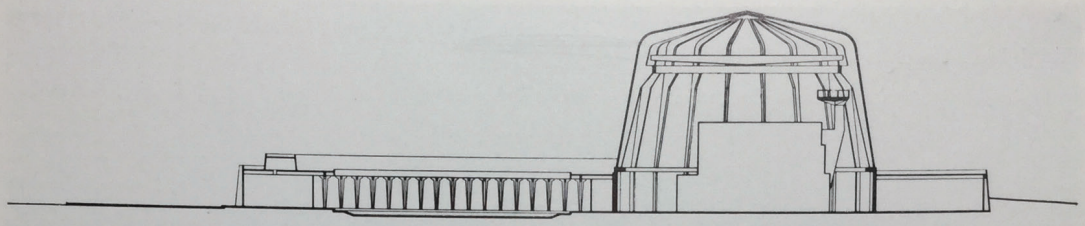
Philip Johnson, architect.

Consultants: for structural calculations, Lev Zetlin, engineer; mechanical engineer, Guy B. Panero; for work direction, Gideon Ziv, architect.

This is a nuclear reactor designed for the government of Israel and situated at Rehovot.
The raw concrete walls without windows confer a static state on to the organism which is quite opposed to the rugged severity of the surrounding open plain.
Its form, suggesting the idea of a temple, reflects regional characteristics of ancient Israel and Egypt.
On arrival the visitor is presented with a courtyard bordered by cross-shaped columns diminishing in size in an upward direction. The courtyard is faced on the long sides by the glass corridors which divide the laboratories, workshops and offices. The reactor, housed in a large r.c. dome of wide surfaces, includes a series of services, showers, changing facilities etc. distributed at its sides.

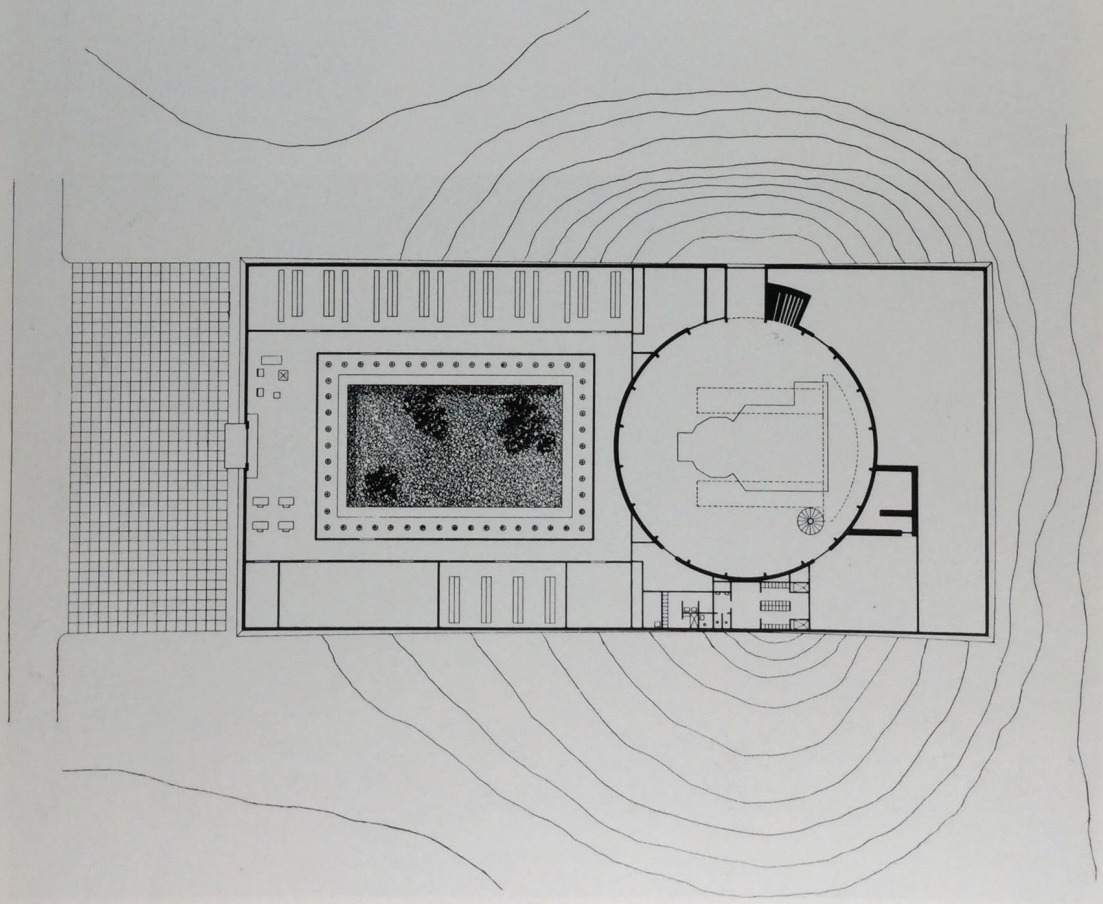
Area covered by the building, 29,750 sq. ft. - structure, roof, stairs and external masonry of r.c. - floors of r.c. and terrazzo - ceilings: sound absorbent panels - stairs balustrade of steel - internal facings: reactor hall, tiles; offices, plaster and chalk; services, concrete blocks - flooring: reactor hall, tiles; offices, vinyl tiles; services, ceramic tiles - external door and window frames of steel - internal door frames: laboratories, steel; offices, metallic sections - sculpture by Shamai Haber - year of construction 1961.

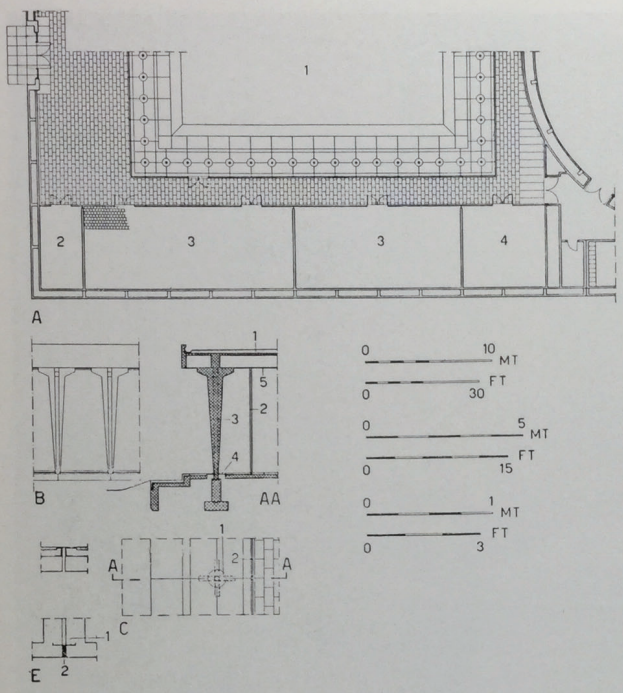




Sezione longitudinale. – Longitudinal section.

Pianta generale. – General plan.





A Pianta parziale del primo piano
1 *corte aperta* – 2 *ufficio* – 3 *laboratorio* – 4 *officina.*

B Fronte del pilastro tipo – C pianta del pilastro tipo
1 *graniglia di marmo* – 2 *vetro.*

E Giunto di espansione nel pavimento – E giunto di espansione nel muro
1 *ferma - acqua metallico* – 2 *mastice.*

A-A sezione
1 *vermiculite* – 2 *vetro* – 3 *pilastro prefabbricato di calcestruzzo* – 4 *graniglia di marmo* – 5 *soffitto di intonaco.*

A Partial first floor plan
1 *open court* – 2 *office* – 3 *laboratory* – 4 *workshop.*

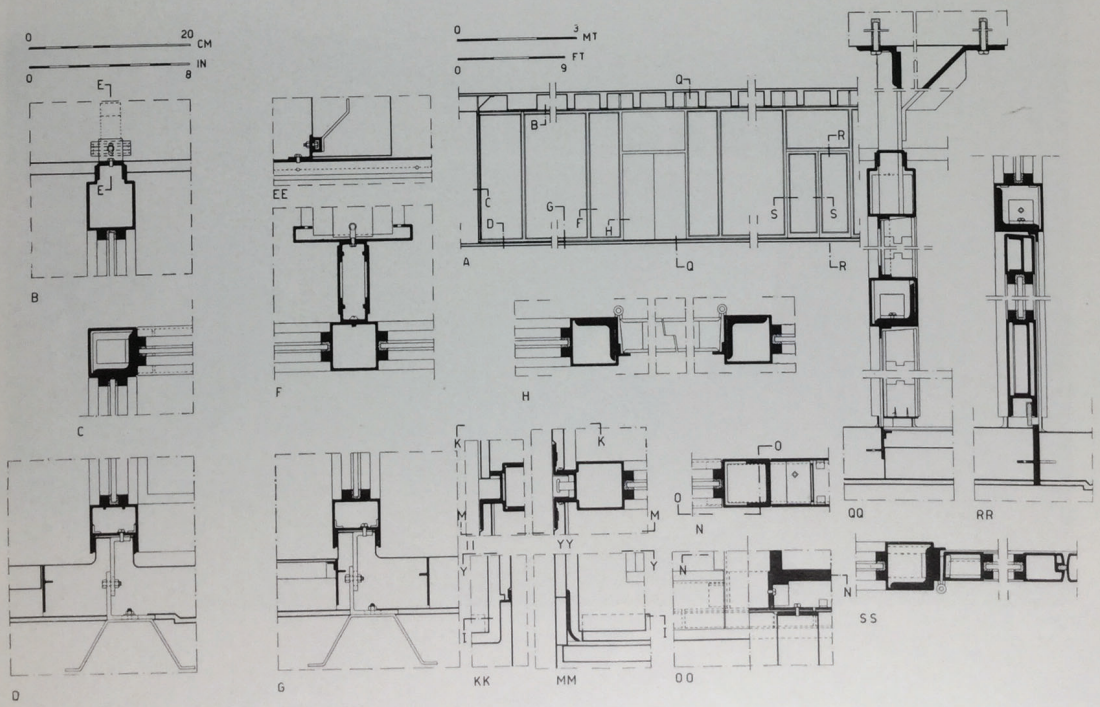
B Typical column elevation – C typical column plan
1 *marble chips* – 2 *glass.*

E Floor expansion joint – E wall expansion joint
1 *metal waterstop* – 2 *mastic fill.*

A-A section
1 *vermiculite fill* – 2 *glass* – 3 *precast concrete column* – 4 *marble chips* – 5 *plaster ceiling.*

A Schema di alzato di pannelli tipo e porte delle pareti finestra interne ed esterne – B, C, D, E-E, F, G, H, I-I, Y-Y, K-K, M-M, N, O, Q-Q, R-R, S-S particolari.

A Diagrammatic elevation of typical panels and doors of exterior and interior window walls – B, C, D, E-E, F, G, H, I-I, Y-Y, K-K, M-M, N, O, Q-Q, R-R, S-S details.



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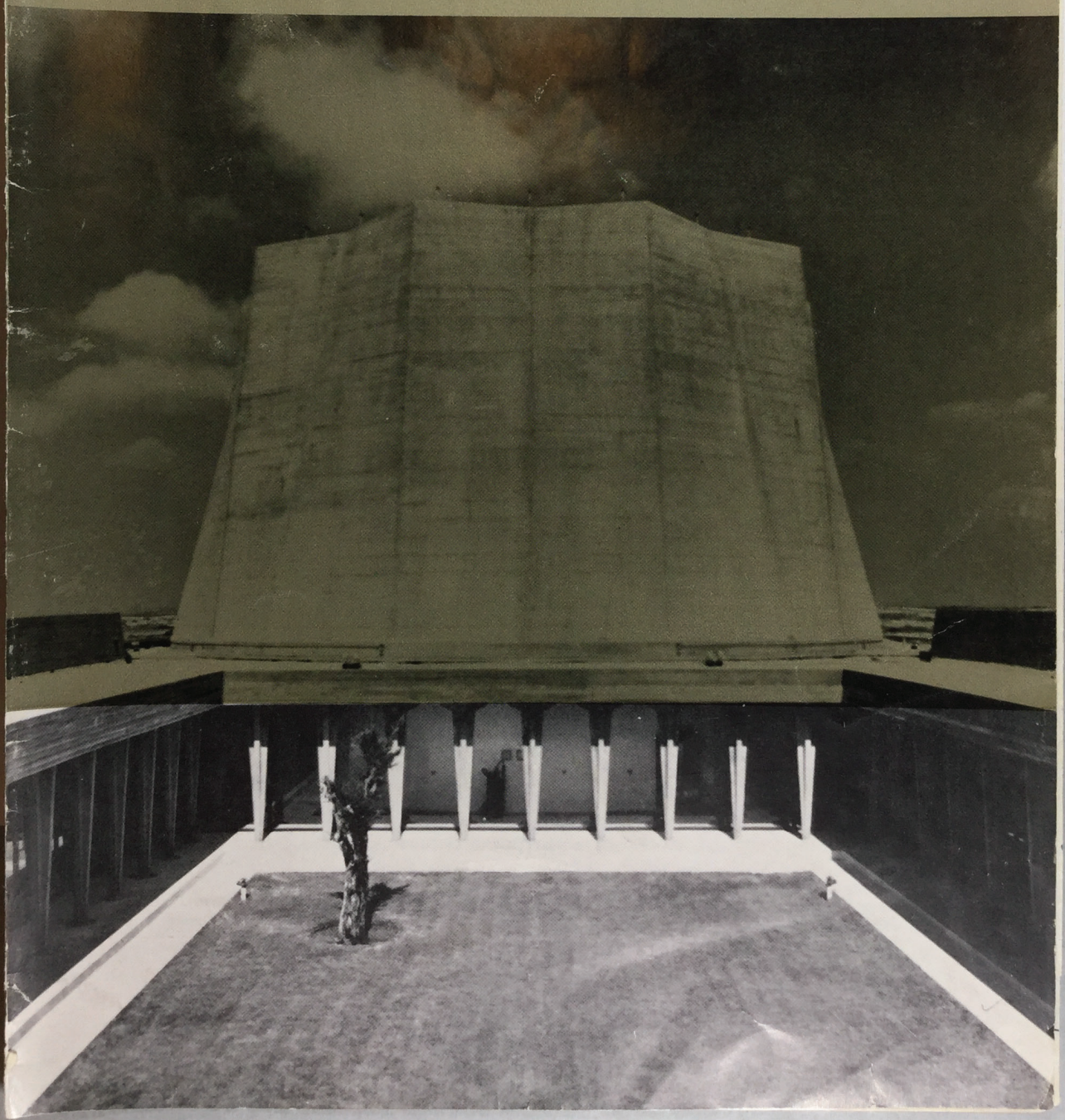

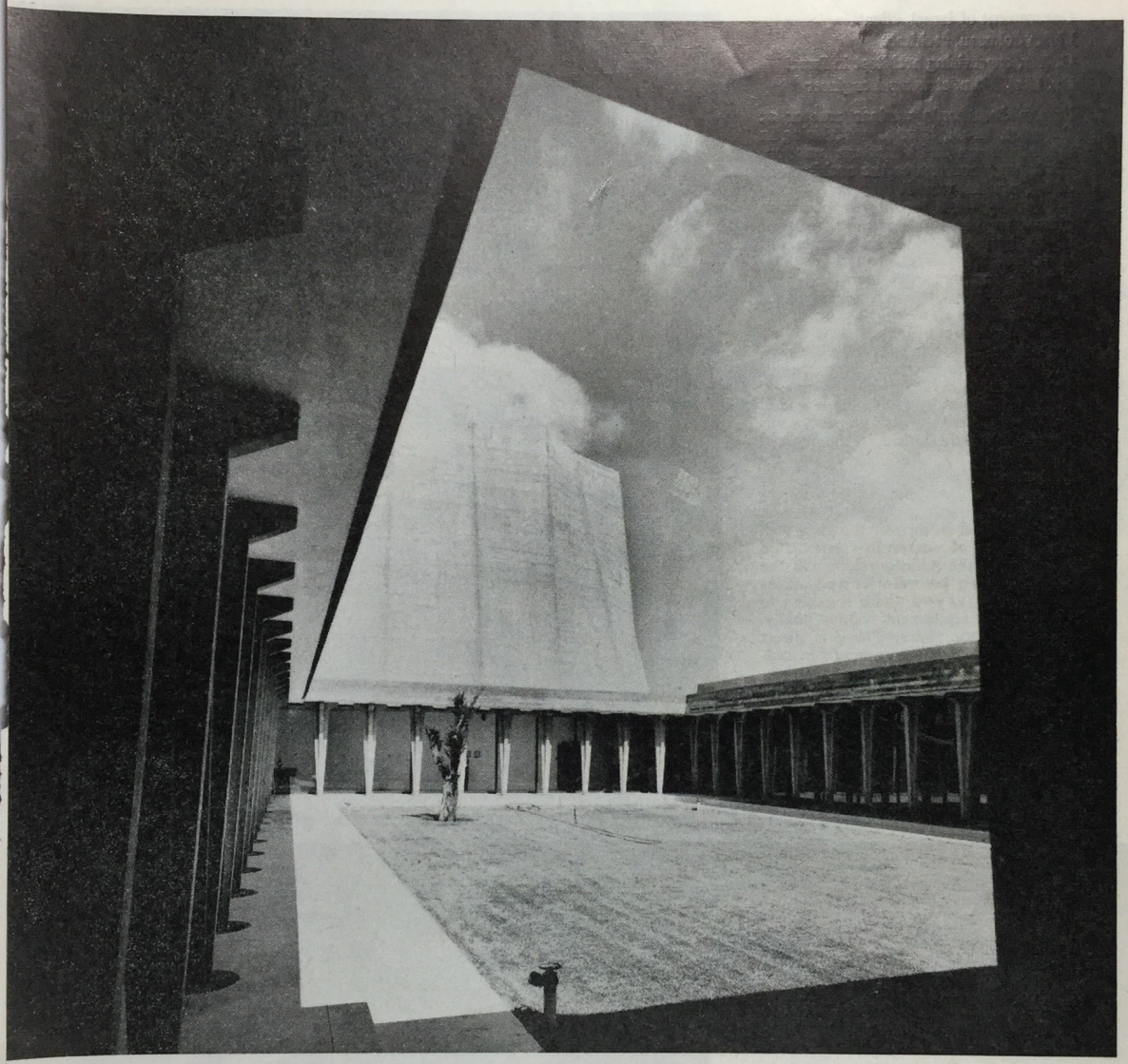

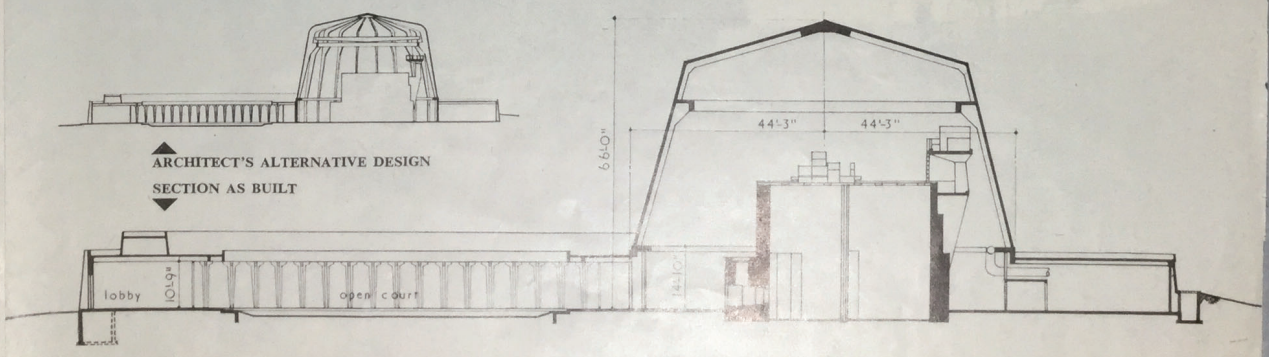

nuclear reactor, Israel

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Government of Israel, client
Philip Johnson, architect
G. Ziv, supervising architect in Israel
Dr. Lev Zetlin, structural engineer

PHILIP JOHNSON'S nuclear reactor at Rehovot, Israel, is uncompromising in the expression of its modern function, yet it pays homage to the architecture of the 'ancient world'.

Standing on a low hill in a barren almost treeless landscape, its battered rough concrete walls suggest an impenetrable fortress. Over these windowless battlements can be seen the 'keep', buttressed for the extra security, the obvious *raison d'être* of the group.

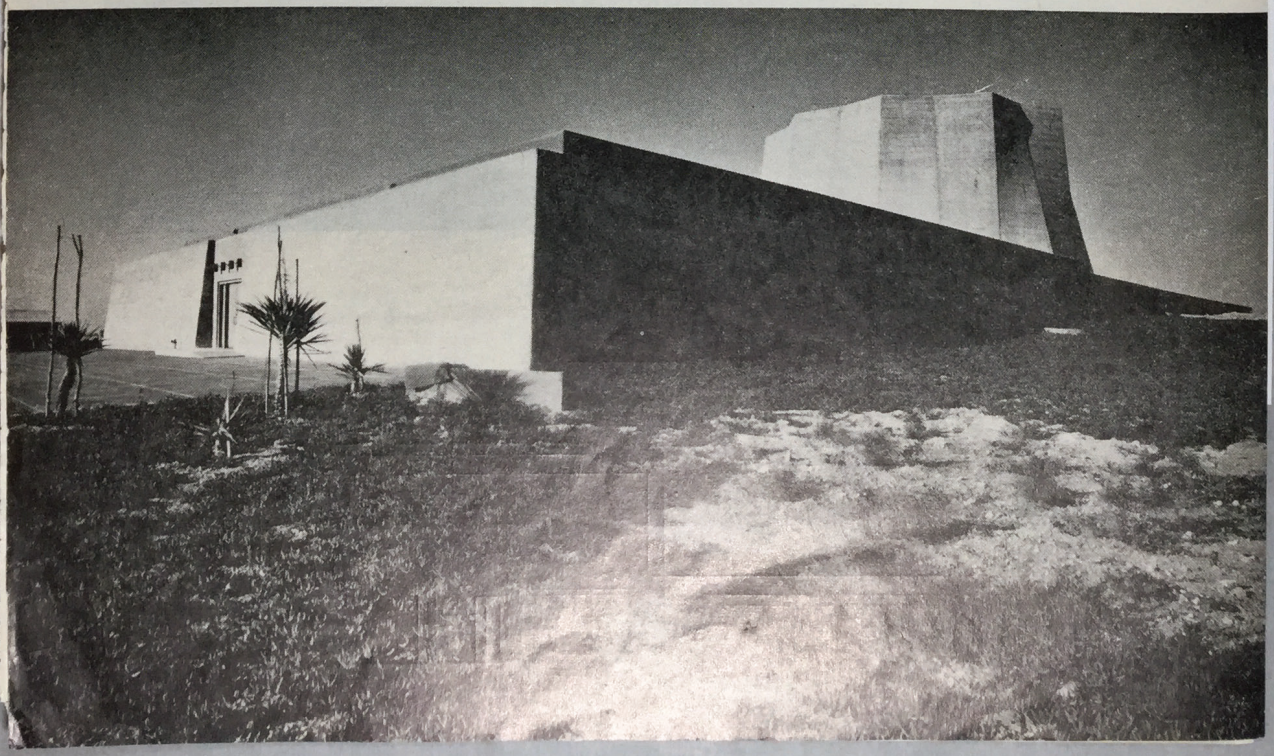
The entrance, small in scale, is on the central axis. Once through the gate, the atmosphere changes and a part of the interior is revealed: a large grassed atrium enclosed by a colonnade round all four sides with glazed walls behind. Straight ahead is the faceted 'holy of holies', fascinating but impregnable.

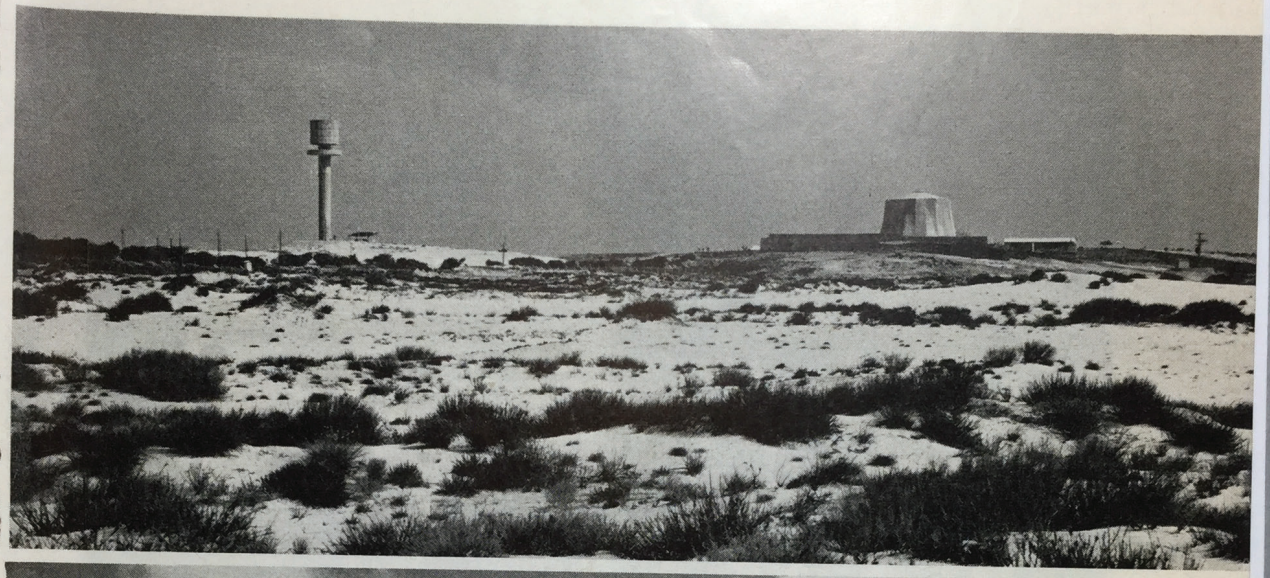
The plan is as simple as the exterior suggests. Around the central garden, and separated from it by the glass wall and lines of carefully articulated columns, is the main corridor. Off the corridor open laboratories and offices and, at the far end, there is access to control and equipment rooms, finally, to the reactor room. There is direct access to the reactor room from outside for vehicles.

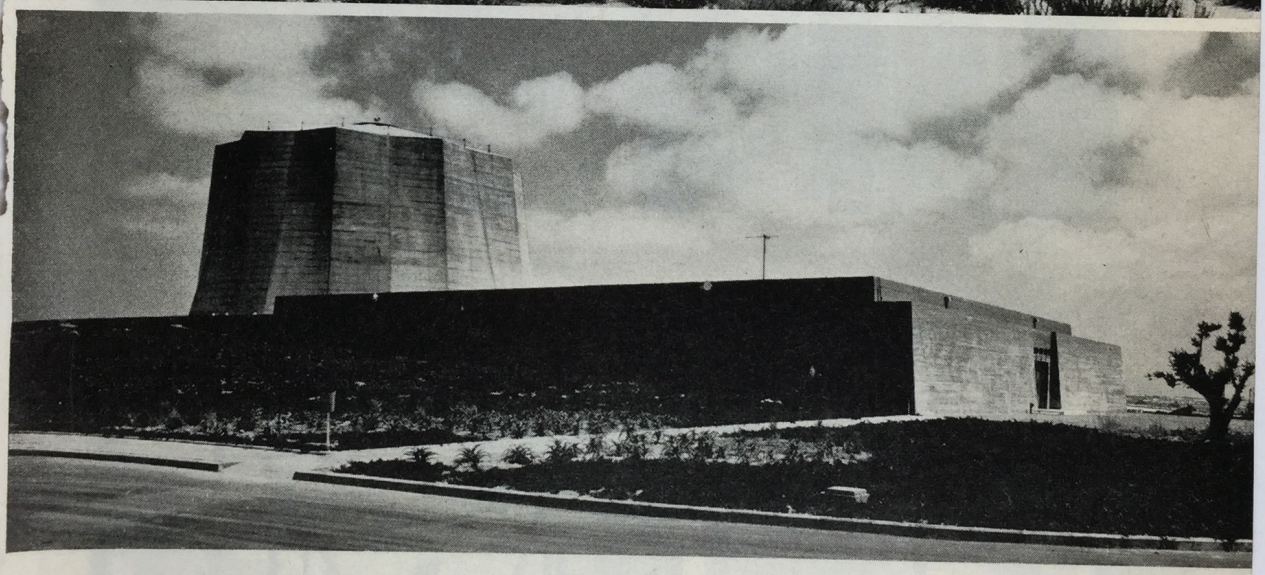
The nuclear reactor building recently won an AIA award.

The reactor room stands at the end of the enclosed garden

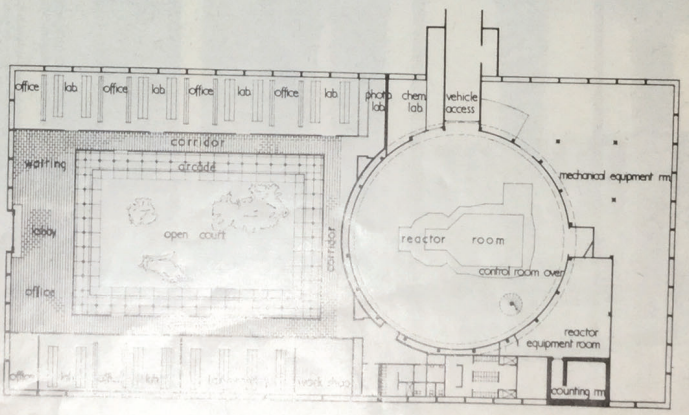
In contrast the exterior, set in a barren landscape, is uninviting







Battered rough-shuttered concrete walls suggest a well-guarded fortress or temple with a faintly eastern flavour



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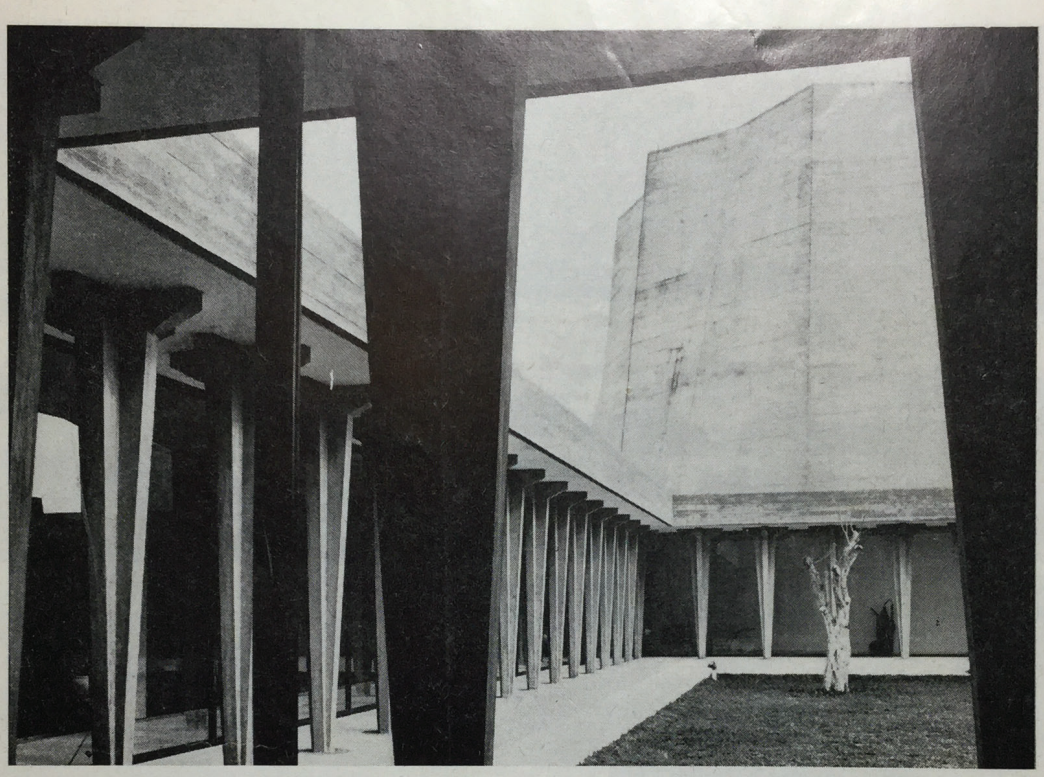

Concrete, rough from the shuttering, contrasts with the precisely articulated columns and glass walls enclosing the lawn

There is no hint of the barren landscape outside, once inside the reactor enclosure