

## CHAPTER XIII

### THE FORDHAM UNIVERSITY SEISMIC STATION

NEW YORK, NEW YORK

By J. Joseph Lynch, S. J.

The Fordham Station was started as were most of the American Jesuit Stations in 1910. The equipment consisted of a Wiechert 80-Kilogram two component horizontal pendulum--- a Spindler and Hoyer clock and smoked paper registration equipment. The station was housed in the basement of the Administration Building in a room that later became the University paint shop.

In 1922 at the suggestion of Reverend Joseph Lynch, S. J., the then director of the Station, the class of 1924 as Sophomores donated the first modern addition to the Station in the form of a Milne-Shaw horizontal seismograph with optical recording. This was followed the following year by the donation of a new seismic clock by Mrs. John L. Grady, the mother of John L. Grady of the same class.

In 1923, Mr. William Spain, the father of another member of the same class, graciously donated a new Seismic Observatory to be dedicated to the memory of his son William who had died as a Sophomore student of the then director of the observatory. The plans for the observatory were completed by Reverend Frederick Sonon, S. J., the present Director of the

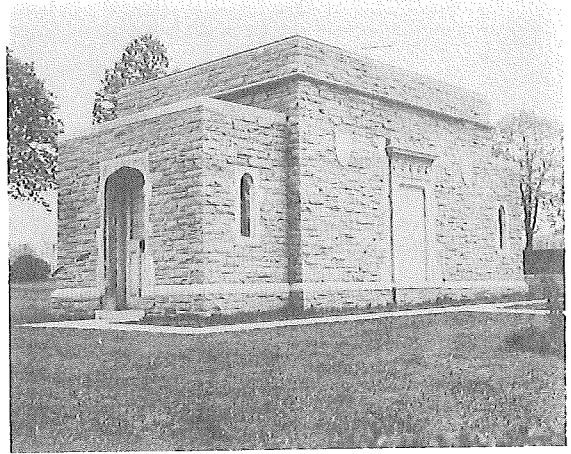
Georgetown Observatory, and the station was blessed by Bishop John Collins, S. J., and formally opened by the then Rector of the University, Reverend William Duane, S. J., in October, 1924. The equipment consisted of the Wiechert and Milne-Shaw instruments. The bronze plaque on the observatory door was a gift of Pope Pius XI. It depicts St. Emidio, appointed by the same pope as Patron of Seismologists.

The concrete piers on which the instruments rested and which were sunk down to bed rock proved to have such a large diurnal tilt that it was found necessary to move the observatory to a new site, -- that occupied at present by the clock tower of Keating Hall. The super-structure was moved en masse and a new and larger vault constructed under the direction of Reverend John Tynan, S. J. the then Director. Mr. Spain again bore the expenses of the rebuilding and in addition donated a set of Galitzin electromagnetic seismographs, two horizontal components and a vertical. This second observatory was completed in 1927.

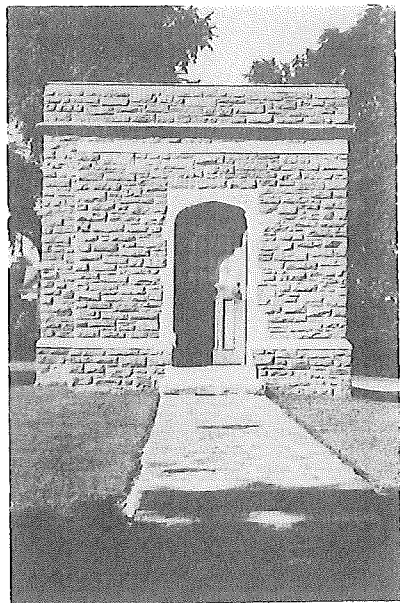
Moving Day was not yet over for the observatory, however. Plans for the present Graduate School Building, Keating Hall, in 1931, called for its erection on the highest point of the campus. That point was already occupied by the seismic station. The lowly seismic observatory was again moved, the superstructure en masse as before and a new and third concrete vault built 20 feet underground alongside of the present Physics Building. This vault, 40 feet by 20 feet by 10 feet, duplicated in every way its predecessor which had



Bronze Plaque of St. Emidio on Door of  
Fordham Observatory  
Donated by Pope Pius XI



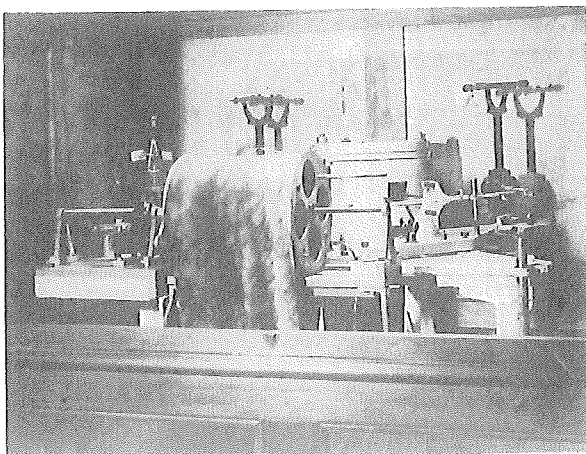
The William Lavelle Spain Seismographic Station  
in its original location on the Fordham campus



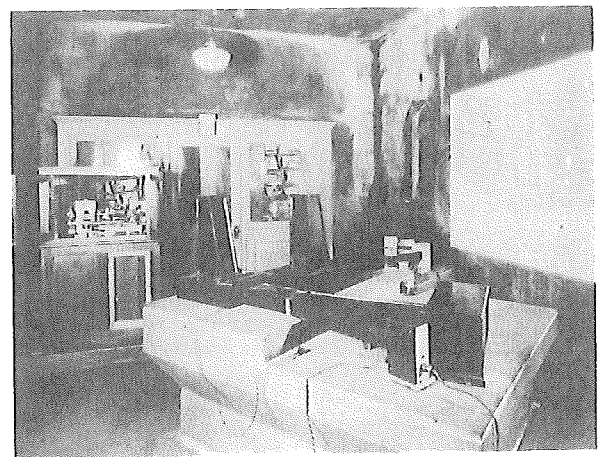
Fordham University Observatory



Panel on the Side of the Fordham  
Observatory erected in memory of  
William Spain



The Original 80 Kg. Wiechert in Service  
from 1910 - 1927



Interior View of the William Lavelle Spain  
Station in the Original Location. Milne-  
Shaw Seismographs on the Pier in the Left  
Foreground. Wiechert in the Rear.

proven so satisfactory, except that a better waterproofing job was made possible by the knowledge acquired by the varied peregrinations of the observatory. It is undoubtedly the most moved seismic observatory in the world and has travelled over almost every foot of the campus.

Two short period Wood-Anderson seismographs were added to the new vault, a donation from Mr. M. J. Meehan whose sons were students in the College.

Since the opening of this latest observatory considerable improvements have been made. Twenty seismographs are at present in daily operation. The Wiechert, Milne-Shaw and Wood-Anderson instruments are now used only as demonstration equipment.

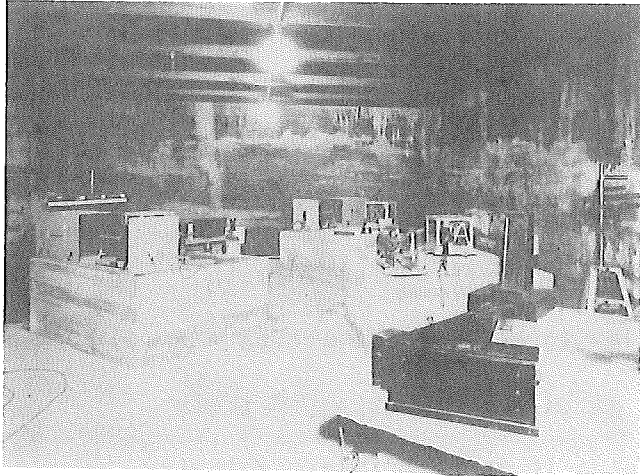
The three Galitzins, N.S., E.W., and vertical instruments are coupled with an American Instrument Company triple drum. Three short period Sprengnether instruments, N.S., E.W., and vertical are coupled to a Sprengnether triple drum. In addition, a throw-over switch enables these seismometers during a microseismic storm to be switched to another high speed triple drum turning at 600 millimeters per minute (the other two drums are 30 millimeters and 60 millimeters per minute respectively). A Benioff long and short period vertical instrument completes the equipment for routine earthquake recording.

In addition to the routine recording and reporting of earthquakes the Fordham Observatory is engaged in solving

the problem of the nature and origin of two-second microseisms. Observations over the past few years at Fordham have shown fairly conclusively that they are definitely connected with the passage of cold fronts over New York. The tripartite station set up on the campus has given the direction of their source fairly consistently! Nothing is known of their velocity however. Nothing is known of the mechanism whereby they are imparted from the upper atmosphere to the ground. Very little is known as to their true nature though they seem to be predominantly Rayleigh waves. By using three separate methods to determine the direction of their source, i. e., a) the intersection of the directions obtained from the two tripartite stations, b) the center determination from the vertical instruments at the three corners of a five-mile triangle, c) the phase difference between vertical and horizontal components on the high speed drums, it is hoped to establish their velocity and their nature and possibly the mechanism whereby they are imparted to the ground. The Office of Naval Research is helping in the financing of this project by a grant of \$15,000.

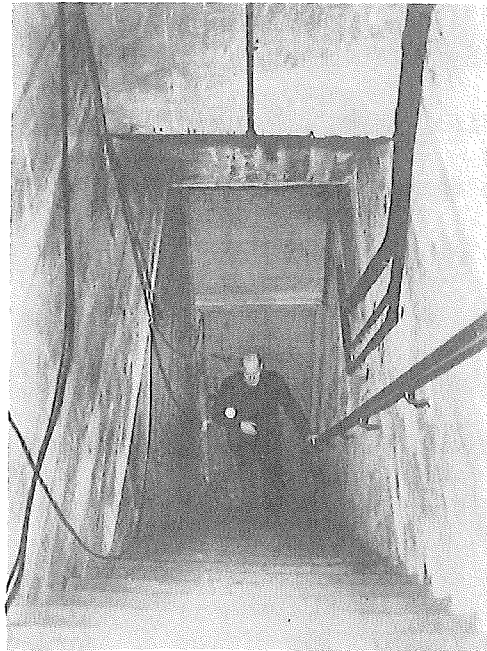
For the microseismic work a tripartite station consisting of three short period horizontal Sprengnethers housed in concrete boxes at the three corners of the campus are wired to a high speed triple drum recorder in the Physics Building.

A second and similar tripartite station has been



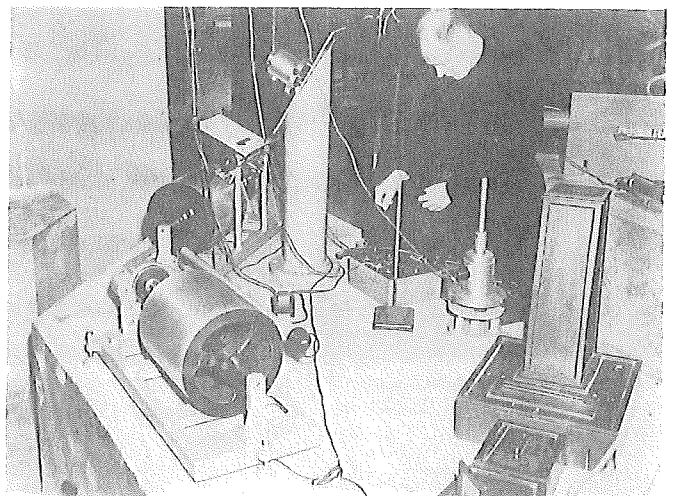
Interior, Vault, Fordham University Observatory  
Wilip-Galitzin Seismographs in Background

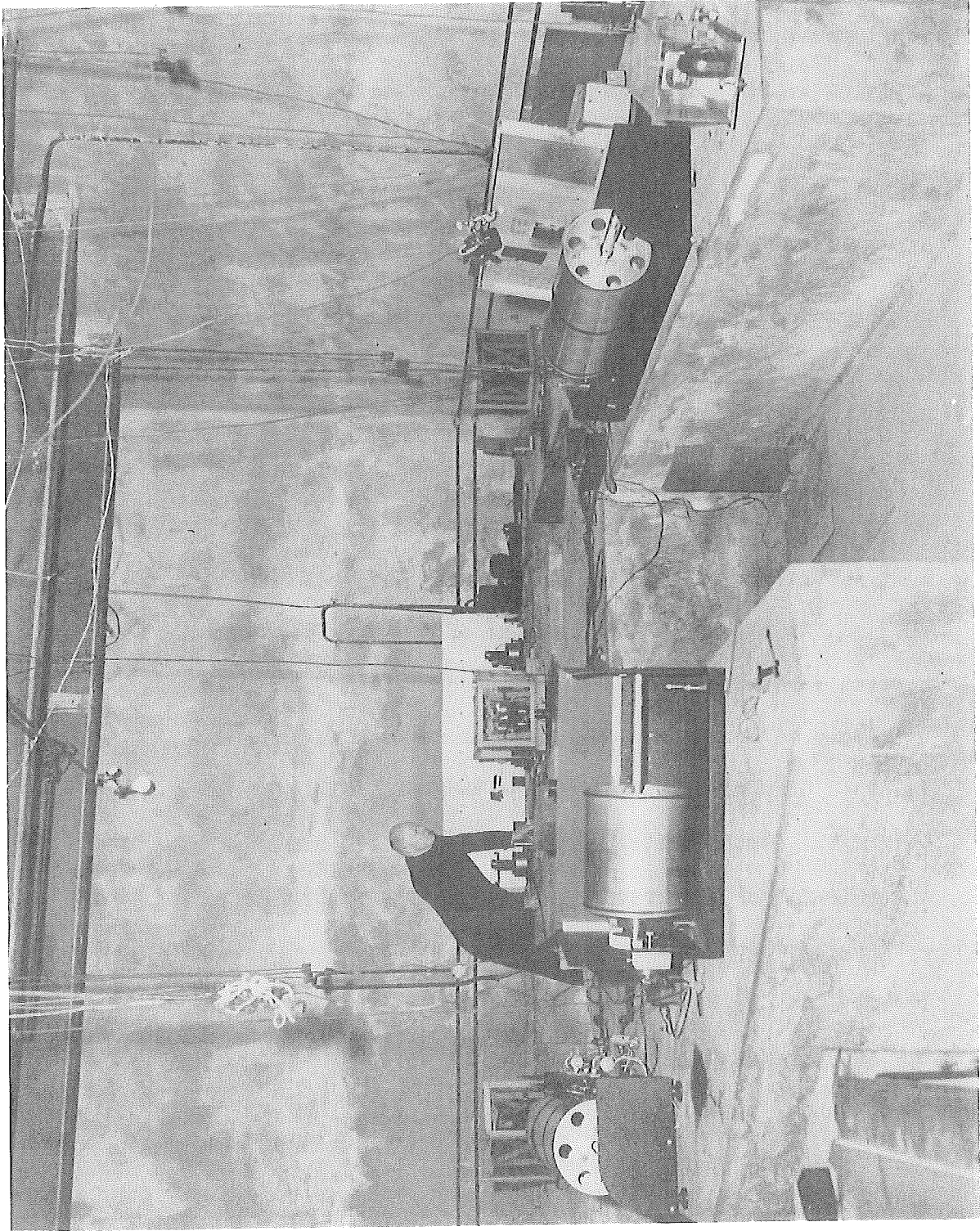
Entrance to Seismic Vault



Father Lynch

Short and Long Period Benioff Galvanometers  
and Recorders





Father Lynch in the present subterranean vault --- Willip-Gelitzin Seismographs and Sprengnether Single, Double and Triple Drums.

set up at Fort Schuyler five air-miles away. In addition, short period horizontal and vertical Sprengnether instruments have been set up at Fort Schuyler and Iona College (New Rochelle), giving a triangle of roughly five mile sides. The observatory clocks in all three stations are Standard Electric Time Self-winding Invar Pendulum clocks.

Summary of Some of the Highlights in the History of the Fordham Station -

(1) An exhibit of a model earthquake recorder at the Chicago World's Fair of 1933. By pushing a button an earthquake was produced and recorded and the wax paper record taken home by the visitor. The instrument was later transferred to the Field Museum in Chicago.

(2) At the Scientific Exhibit of the American Association for the Advancement of Science at New Orleans and St. Louis an Earthquake Demonstrator was put on exhibit. It was a converted pinball game - the ball rolling into one of the earthquake zones on the map closed contacts on a zig-zag track underneath and lighted the path of the ensuing earthquake waves through the earth.

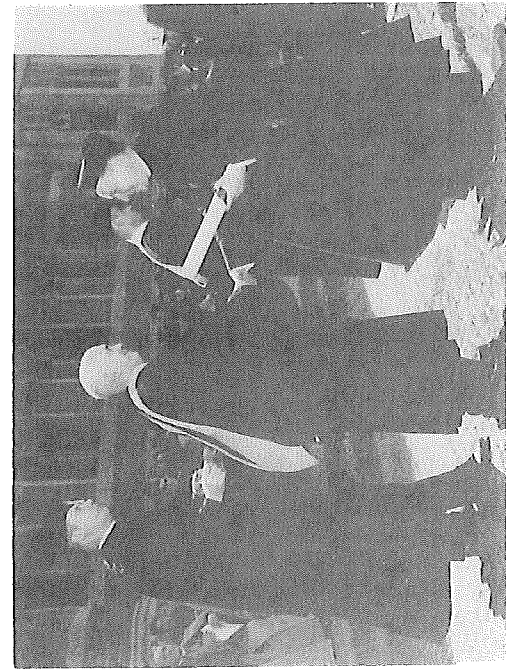
(3) At the New York World's Fair in 1939 and again in 1940 an extensive seismological exhibit was set up with an attendant in charge daily from 10 a.m. till 10 p.m. Some 3,000,000 people visited the exhibit. A much improved push-button model for surface and deep focus quakes was among the exhibits.



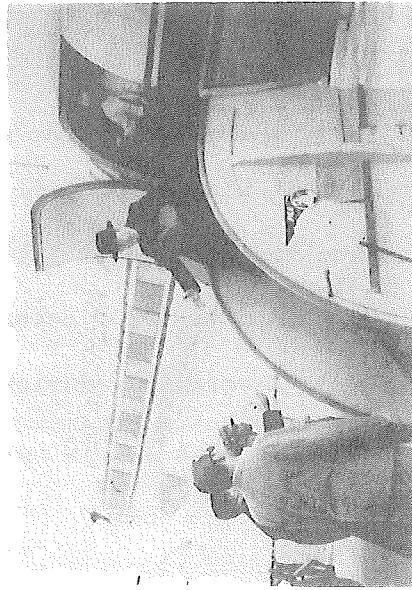
(4) To commemorate the Centenary of the University in 1941 an extensive symposium on the Physics of the Earth was arranged by the Director of the Observatory. Papers were read by Dr. Heck, Dr. Hodgson, Father Macelwane, Dr. Hess, Dr. William Lynch, and Father Joseph Lynch. The symposium was later presented in full in the Journal of Applied Physics for March, 1943. Dr. Heck, Chief of the Division of Seismology, U. S. Coast and Geodetic Survey, was given an honorary D. Sc. to commemorate the occasion.

(5) In 1946 the Director of the Observatory in company with Mr. Ralph Bodle of the U. S. Coast and Geodetic Survey made a survey of the island of the Dominican Republic to report on the damage done by the quake of August, 1946 and offer suggestions on rebuilding. The Director of the Observatory later took down two Sprengnether instruments and designed an observatory modeled exactly on the lines of the Fordham Observatory. This is now in operation with complete equipment of long and short period instruments.

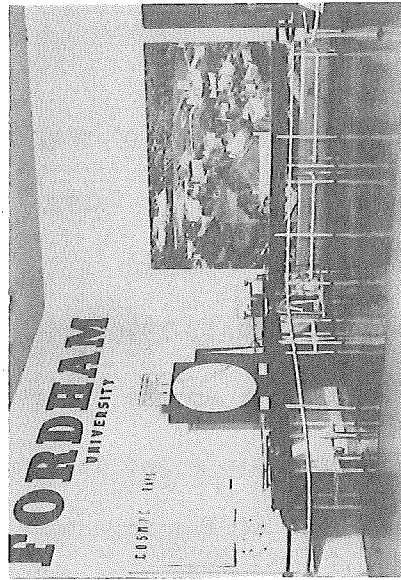
Directors of the Fordham Station - The Directors of the Fordham University Seismic Station since the beginning were Reverend E. P. Tivnan, S. J. from 1910 to 1912; Reverend Clement Risacher, S. J. from 1912 to 1914; Reverend William C. Repetti, S. J. from 1914 to 1918; Reverend Joseph McAree, S. J. from 1918 to 1920; Reverend Joseph Lynch, S. J. from 1920 to 1923; Reverend Frederick Schon, S. J. from 1923 to 1924; Reverend John S. O'Gonor, S. J. from 1924 to 1926; Reverend



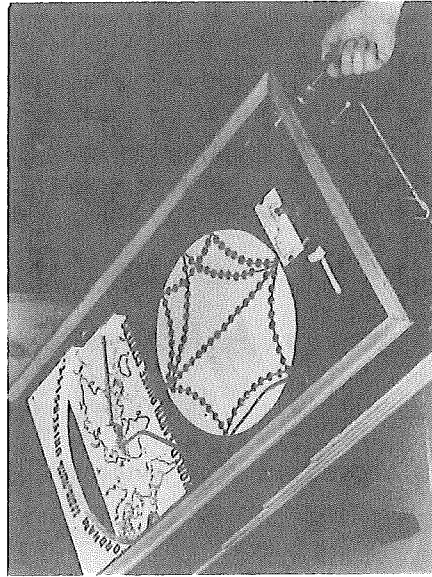
Captain Nicholas Hunter Heck, Chief of the Seismology Division, United States Coast and Geodetic Survey, receiving Honorary Doctor of Science Degree at the Fordham Centenary Convocation



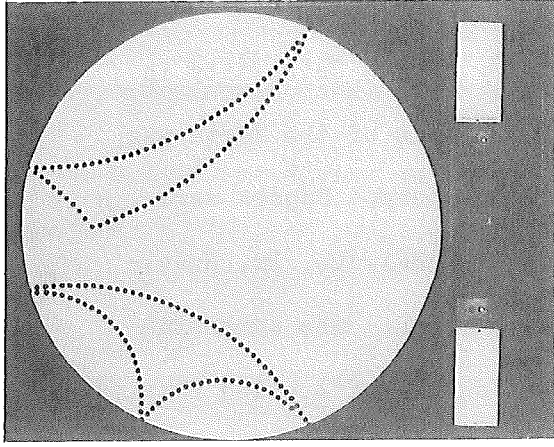
The Director of Fordham Observatory arriving in Dominican Republic to survey the damage of the 1946 Earthquake



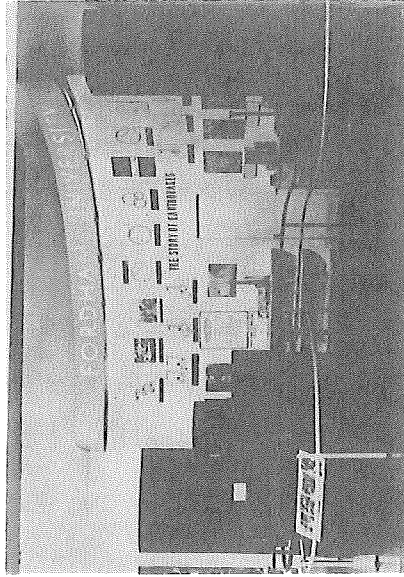
Fordham Seismological Exhibit at New York World's Fair, 1939 - 1940



Pin-Ball Earthquake Demonstrator Exhibited at St. Louis and New Orleans



Five Foot Push Button Model illustrating paths of earthquake waves, designed and built by the Director of the Fordham Observatory



Fordham Seismological Exhibit at New York World's Fair, 1939 - 1940

John Tynan, S. J. from 1926 to 1928. The present director, Reverend Joseph Lynch, S. J., has been director since 1928.

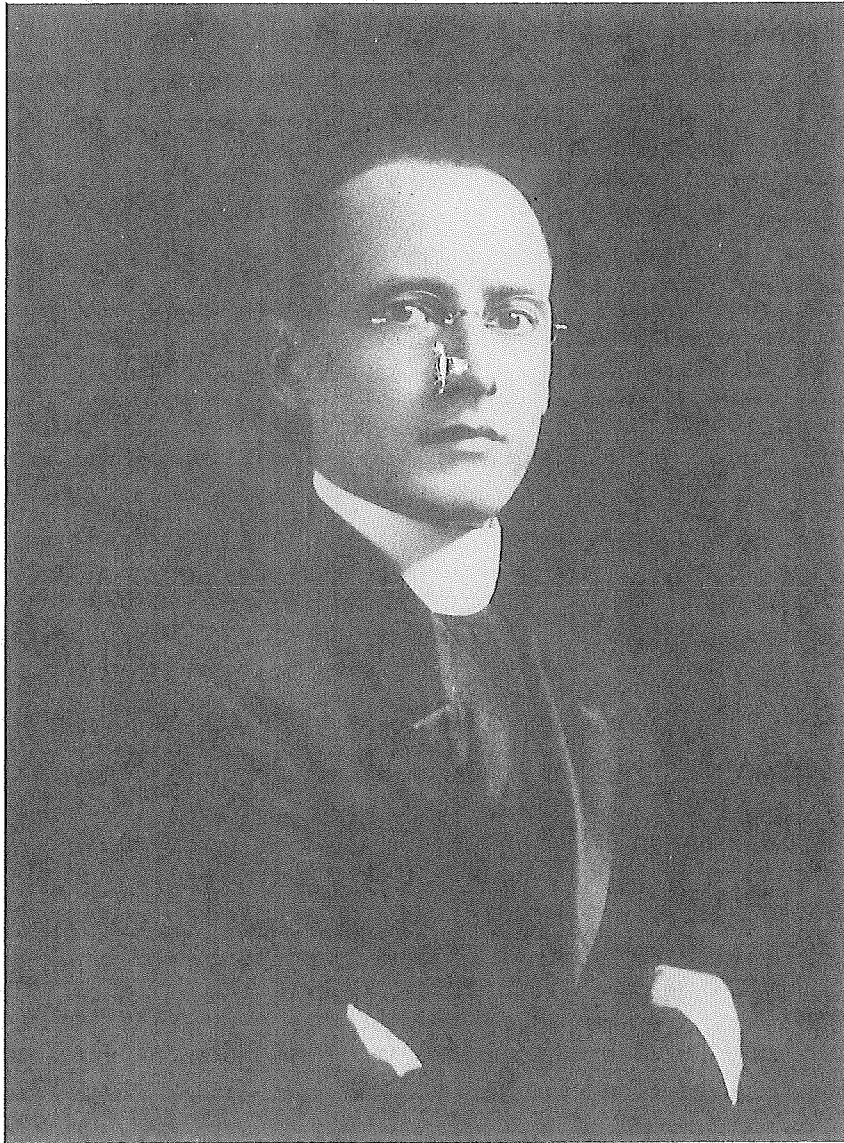
The present director is a Fellow in the American Association for the Advancement of Science, the American Geographical Society, the New York Academy of Sciences, the Royal Astronomical Society; and a member of the American Association of University Professors, the American Association of Physics Teachers, the American Geophysical Union, the American Institute of Mining and Metallurgical Engineers, the American Institute of Physics, the American Mathematical Society, the American Physical Society, the Franklin Institute, Institute of Engineers of the Dominican Republic, Seismological Society of America, Sigma Xi, and the Society of Exploration Geophysicists. He has given lectures on seismology to many college groups; Phi Beta Kappa (New York Annual Meeting), Sigma Xi (Minnesota), New York Academy of Science, Brooklyn Institute of Arts and Science, Hayden Planetarium (New York), Bowdoin College (Maine), Middlebury College (Vermont), Colby College (Maine), Trinity College (Hartford), Yale University, New York University, Tulane University, Loyola University (New Orleans), Columbia University, Carleton College (Minnesota), Villa Maria College (Erie, Pennsylvania), St. Thomas' College (St. Paul), St. Catherine's College (St. Paul), Immaculata College (Pennsylvania), College of the Ozarks (Arkansas), Virginia Military Institute, Manhattanville College,

Greenbrier College (West Virginia), Milton College  
(Wisconsin), Martha Washington College (Virginia), Washing-  
ton and Jefferson College (Virginia), Franklin and Marshall  
College (Pennsylvania), Franklin Institute (Philadelphia),  
Louisiana Polytechnic Institute, St. Benedict's College  
(Minnesota), E. Stroudsburg Teachers College, Cooper Union  
(New York, New York), Hunter College (New York, New York),  
City College of New York, Brooklyn College, University of  
South Carolina, Pittsburgh Diocesan School Annual Meeting,  
Sterling College (Kansas).



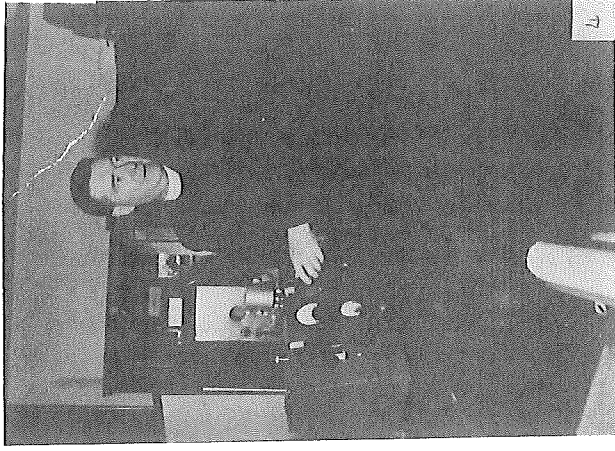
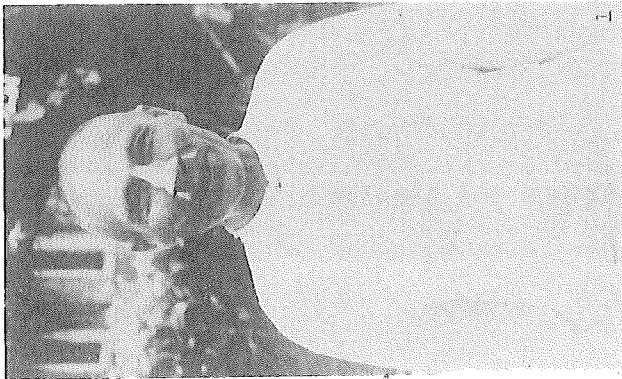
(photo by Fabian Bachrach)

Reverend J. Joseph Lynch, S. J., Director, 1928 - ----



*Anna Frances Levins*

Reverend Edward P. Tivnan, S. J.  
Director, 1910 - 1912



Some of the Former Directors of the Fordham Station

- 1) Rev. Clement Rischer, S. J. 1912 - 1914
- 2) Rev. William C. Repetti, S. J. 1914 - 1918
- 3) Rev. Joseph McAree, S. J. 1918 - 1920
- 4) Rev. John S. O'Connor, S. J. 1924 - 1926
- 5) Rev. John Tynan, S. J. 1926 - 1928