

## CHAPTER VI

### THE CANISIUS COLLEGE SEISMOLOGICAL STATION

BUFFALO, NEW YORK

By Doctor Austin C. McTigue

In the Buffalo Express of April 10, 1910, there may be seen a picture of the first Canisius College seismograph in operation. It was described in the accompanying article as follows:

"Wiechert, 80 kilogram, astatic, horizontal seismograph regulated in such a manner to give uniform records of seismic disturbances. This instrument, which may now be seen in running order at Canisius College, is made by Spindler and Hoyer of Goettingen, Germany. It is set on a pier of concrete, five feet deep, which is entirely surrounded by an air space in order to prevent the communication of any vibrations to the instrument other than those which can reach it through the sub soil."

The article includes photographs of five seismograph records.

The descriptions accompanying the records are as follows:

1. "A diagram showing how the recording needles are thrown out of alignment when anyone enters room where seismograph is.
2. A record of the local disturbance made on February 17th, after the damping had been thrown out.
3. A record of passing trolley cars and wagons on February 22nd.
4. A portion of the record of the earthquake of February 28th, the first recorded in Buffalo. The gram, like those received in other stations, is not very pronounced. The quake most likely proceeded from the Pacific.
5. A record of a local disturbance on March 2nd."

In a letter dated September 12, 1949, Father William G. Repetti, S. J. recalls the beginning of seismology in Buffalo



Reverend William C. Repetti, S. J.  
Director, 1910 - 1911



Reverend Thomas J. Love, S. J.  
Director, 1923 - 1925



Reverend John P. Delaney, S. J. with the  
Galitzin-Wilip vertical component  
seismograph

as follows:

"The Wiechert Seismograph was installed at Canisius College, 651 Washington Street, in 1909 by Mr. John T. Vitek, professor of physics, and Mr. Henry J. Wessling, professor of chemistry; both scholastics of the Society of Jesus at the time.

"The seismograph was located in the southwest corner of the old recreation building in the north end of the school yard. A room was made by partitioning off space in the corner. Difficulty was experienced with changes of temperature during the winter, and the first remedy attempted consisted in putting on a storm window on the only outside window, facing west. This did not prove sufficient.

"Records were smoked in the southeast corner, under a hood, of the private chemical laboratory on the top floor of the main building. A long box, with a row of rods near the top and another row near the bottom, was used to carry seven at a time to the seismograph room. I do not recall whether the fixing was in the seismograph room or in the laboratory.

"Mr. Vitek fell ill and had to leave Buffalo, and then Mr. Wessling took charge. I arrived in Buffalo in August, 1910, and Mr. Wessling gave me a general explanation of the seismograph. At a later date he gave another explanation and gave me a seismogram to read. After classes opened I was too busy to give any further attention to the subject in September. On October 3, 1910, Mr. Wessling met with the accident which caused the loss of sight in both eyes. A day or two after the accident I asked Father Minister if there were any plans or desire to carry on the operation of the seismograph. I told him that I had only a general idea of the instrument, but was interested and would attempt to maintain the instrument if desired. He told me that I was perfectly free in the matter and could do as I wished. I carried on and learned as I went.

"The difficulty of temperature control still persisted. Brother Joseph Stamen put an electric heater in the room, but I remarked that it would be costly. ----- The heater operated about three days and then the Brother came to me and said:

'The heater is too costly; come over and show me anything that can be done.' There were two windows in the partition that formed the room and I told the Brother to take out the sash and cover the window openings with thin cotton. This solved the temperature difficulty.

"Nothing unusual happened until near the end of the year. The foundations of the new college were being dug and I inquired about the preparation of a room for the seismograph. I was told that the space under the front entrance could be used. I asked Brother Stamen to tell me when he was ready to dig the hole for the pier. He asked me to open the seismograph room for him; he took measurements and took the orientation of the pier with a compass. I told him the pier would have to be cast in a different direction with relation to new building.-----

"One afternoon I went out to the new site and found the hole dug in such a way that the instrument would not have its components N-S, and E-W; but would have the directional relation to the new building as to the old. I spoke to the Brother but he paid no attention. I then went directly to the architect's office and told him that I was the one to decide the installation of the seismograph, and that Brother Stamen was making a mistake. I went home, drew a plan of the proper lay-out, went to Father Rector, told him what I had done, and gave him the plan. That night Brother Stamen met me, with my plan, and very much changed in his attitude. I told him what had to be done. I went out the next day and the hole was being dug in the right direction.-----

"When I left for the summer, John Hippchen offered to smoke the records, change and fix them, and send them to me at Keyser Island and Woodstock. I do not know what happened after August, 1911."

In a letter dated February 28, 1950, Father Michael J. Ahern, S. J., continues the history of the Canisius Station as follows:

"We moved to the new college at Canisius in January, 1913, during the Christmas holidays of the preceding week.

"Under my direction the new vault under the main entrance of the college had been built. There was a pier for the Wiechert, and two smaller piers for a prospective small photographic Bosch, which we never acquired. These two piers were used later, I think, by Father Delaney for the Galitzin-Wilip. When I was assigned to Canisius in September, 1911, I was given charge of a senior student, who later became a priest of the Diocese of Buffalo. I think that his name was John Fleming. When he graduated in the summer of 1911, I was in complete charge.

"We moved the instrument some time in the Spring of 1913. Brother Ramage, S. J., of Georgetown spent three weeks at Canisius in repairing and improving the Wiechert. He was then the assistant to Father Tondorf, and a fine technician. John Curtin helped me in the work on the instrument, and when I was transferred to the Tertianship in the Fall of 1914, he took complete charge.

"I do not know the exact date of the beginning at the new site of the operation of the seismograph, but it was some time in 1913."

Professor John A. Curtin was in charge of the seismograph from the Fall of 1914 until the Fall of 1919 when Father Emeran J. Kolkmeier, S. J., then a scholastic, took charge.

The Canisius College Seismological Station is located in the basement of the main building under the front center door. The vault was originally 25 feet long and 13 feet wide. It is windowless and the walls are of brick, approximately 2 feet in thickness. A wooden door permitted an entrance to the seismograph vault from the basement corridor. The only provision for heating was the radiant energy from the two insulated steam pipes. This proved ideal during the years while it was recording; the temperature has not varied more than 4° Fahrenheit. The humidity was never a serious problem. The vault is lighted by two electric

lamps suspended from the ceiling.

Originally there were two concrete piers and one concrete instrument stand. At the far end of the vault from the basement corridor the Wiechert Seismograph rests on a pier approximately 30 inches by 44 inches in cross-section, the bottom resting on corniferous limestone which is 6 feet below the basement floor, and the top being at the floor level. There is a 4-inch space between the pier and a brick wall surrounding the pier. Enclosing the Wiechert is a wooden case, approximately 50 inches by 56 inches in cross-section and 65 inches in height, with clear glass windows on the top and sides. Close to this case stood a concrete instrument stand which was 36-1/2 inches by 30-1/2 inches in cross-section and 30 inches in height. At the end near the door, and to the left as one entered, there was a second pier having a cross-section of 30 inches by 29-1/2 inches. This pier, like the Wiechert pier, rests on solid rock and the top was 30-1/2 inches above the floor level. To the right of the door was a stand on which the paper rolls for the Wiechert were smoked and fixed in a solution of shellac and alcohol. Near the Wiechert and on the south wall, a Spindler and Hoyer clock provided the time impulses for the Wiechert Seismograph. I first saw the Canisius seismograph in the Fall of 1916 when I was a freshman at Canisius College, and the arrangement just described was as I recall the station of Professor John A. Curtin. The

records at that time were changed daily and reports of recordings appeared in the local press. I recall assisting Mr. Curtin during the years 1916 and 1917 when he was experimenting with a type of seismograph which he had designed and placed on the extra pier in the seismograph vault. In the Fall of 1919, Father Emeran J. Kolkmeier, S. J., who was then a scholastic at Canisius took charge of the station. In a letter dated March, 1950, Father Kolkmeier recalls the history of the station during the times that he was director as follows:

"My first try at seismology came in the Fall of 1919. Mr. John A. Curtin had terminated his long service with Canisius during that summer to take charge of the science teaching at D'Youvill College. The Physics Department at Canisius together with the seismograph fell to me.

"September of 1919 was a war year for the College in that the Students Army Training Corps was installed. The activities of the school were much changed by the military character of the student body and changes also were made to scholastic and scientific efforts of the faculty. Even in the previous year the war had its effect on the school. One of the results of this disturbance most pertinent here is that the one seismometer in the school was allowed to deteriorate no little.

"The kind generosity of Father Creeden at Georgetown University permitted us to borrow Brother Ramage for a complete overhaul of the Wiechert. He did this with experienced skill, and left us with a well-working instrument. He also obtained for us some replacement writing points and some special spacers for the recording arms. Some of these were needed at once, others were kept on hand to replace such as might fall into the oil-filled space between the pier and the building floor. They were needed later.

"Brother had these parts made by a Mr. Reynolds of the American Instrument Company in Washington, D. C.

"The next problem was a determination of the constants of the instrument. No instructions were found and it took much letter writing to find copies which had been made by other operators of the Wiechert.

"It was during this period of supervision of the seismograph, I believe, that we dismantled an experimental form of seismograph projected by Mr. Curtin. It may be of interest to describe what was left of it.

"On the pier wisely provided by the original designer of the vault Mr. Curtin poured a cheese-box concrete footing for a vertical column. The column was a three-inch galvanized pipe about eight feet long. Just above the concrete footing an indentation was made in the vertical column to engage the pointed end of a boom. This boom was a half-inch iron rod, five or six feet long. At the far end of the boom a mass of lead had been molded to act as a steady point, and this was supported against gravity by a steel wire running to the top of the column. No records were found to indicate the type of recording to be used with this instrument.

"In the summer of 1922 I was sent for my theological studies to Woodstock.

"At the end of those studies, in 1926, I was returned to Canisius for one year. That was during a period of expansion, and the teaching load permitted not more than a supervision of the daily record changing on the seismograph.

"In the summer of 1938 I was again returned to Canisius to take over the Physics Department, and incidentally the seismograph. Father John P. Delaney had done much excellent work and was much interested in the station. He had acquired a vertical Wilip-Galitzin and had made many necessary changes for its installation and recording. Our offerings to the station at this time were slight. We changed the position of the recording drum and put it under a light-tight box so as to permit a view of the vault



from the corridor, through a window in the door. The electrical equipment was completely renewed and a radio time receiver was set up to put the daily time signals directly on the seismic records.

"There was a suggestion to relocate the seismograph vault from its place under the main building to a spot in the Horan-O'Donnell Science Building, then under construction. The good temperature and humidity conditions of the old vault were considered too good to expose to a possible loss in a new building. Nearly all time and energy was expended on the new Physics Department leaving little for seismology. However, there were some investigations of local earthquakes, the Attica quake of February, 1939, in particular, and these were due chiefly to the enthusiasm and initiative of the present director of the Station-----yourself, Dr. McTigue."

During the college year of 1922-1923 there was no director of the Canisius Station. However, the records, as usual, were changed daily by Mr. Austin C. McTigue.

The directors for the following years beginning with 1923 and continuing until 1928 were: The Reverend Thomas J. Love, S. J., the Reverend Joseph M. Kelley, S. J., the Reverend Emeran J. Kolkmeier, S. J., and the Reverend Joseph McAree, S. J. In the Fall of 1928, the Reverend John P. Delaney became the director and continued in that capacity until June, 1938.

On July 16, 1929 Father Delaney ordered a Galitzin-Wilip long period vertical seismograph and one registration apparatus from the manufacturer, Mr. Hugo Masing, of Estonia. On March 10, 1930 Mr. Masing wrote to Father Delaney and told him the seismograph and the registration apparatus had been shipped.

On March 11, 1930, Mr. Howard C. Menagh sent Father Delaney the letter that follows on the next page.

March 11, 1930

Rev. John P. Delaney  
Canisius College  
Buffalo, N. Y.

Rev. dear Father:

At their last meeting the Board of Directors of the Greater Buffalo Advertising Club voted to donate to Canisius College the additional equipment which has been ordered for the Seismographic Division of the College.

It gives us genuine pleasure to make this donation to your splendid institution and it is our sincere hope that through the continued efforts of our Educational Committee the Greater Buffalo Advertising Club may make further contributions in the future.

When the equipment is received may we ask that you advise us. Arrangements will then be made for the payment of the invoice and for a suitable plate to be mounted on the equipment.

Sincerely yours,

GREATER BUFFALO ADVERTISING CLUB

Howard C. Menagh,  
President

HCM:VM

When Father Delaney received the equipment, the Galitzin-Willip seismograph was mounted on the second pier described above in the seismograph vault. The recording apparatus was mounted on a specially prepared concrete pier alongside the seismograph. After the seismograph and recorder were in adjustment, the seismograph began its series of recordings. During the time that Father Delaney was in charge, he did a considerable amount of research work and was responsible for many publications (see

Part III, p. 277 of this volume).

It was during Father Delaney's directorship that some of the amusing incidents concerning the station occurred. One is reported in the book, Down to Earth by Carey Cronels and William C. Krumbein; published by the University of Chicago Press, Chicago, in 1936; the article may be found in chapter 23 and is marked "Plate 24". It is to the effect that the station was accused of causing earthquakes and the party in question demanded that the seismograph cease its activity.

In the Fall of 1940 Dr. Austin C. McTigue was appointed director and has continued in that capacity to the present time.

Realizing the need of further seismographs for the Canisius Station and the friendly interest displayed by the Greater Buffalo Advertising Club, the needs for additional equipment was presented to the Greater Buffalo Advertising Club, and after several discussions with the Advertising Club Officials, and a final meeting with the Directors of the Club, the Reverend Timothy Coughlin, S. J., President of Canisius College; and Doctor Austin C. McTigue, Director of the Station, the letter on the following page was received.

July 22, 1946

Dr. Austin C. McTigue, Director  
Seismological Observatory  
Canisius College  
Main and Jefferson  
Buffalo 8, New York

Dear Dr. McTigue:

I know that Mr. Herbert J. Vogelsang, Chariman of our Educational Committee, has already told you this verbally, but please accept this letter as official notification of the action taken by the Committee at the meeting held July 3, 1946, at the Buffalo Club, 388 Delaware Avenue, Buffalo, New York.

By unanimous vote of the Directors present, it was regularly moved, seconded and carried, that your request for the purchase of additional new and up-to-date equipment for the Seismological Observatory at Canisius College, by the Educational Committee of the Greater Buffalo Advertising Club, be granted as follows:

That the Committee purchase: Two components (north-south, 725.00, east-west, 725.00), the recording drum (1,500.00) and two galvanometers (250.00) at a total cost of \$3,200.00. Also the cost of installing concrete piers for the instruments, estimated at \$300.00---The Grand Total cost being estimated at \$3,500.00

You are accordingly authorized to proceed with the purchase of the above equipment and instructed to forward invoices covering same to the offices of the Greater Buffalo Advertising Club in the Hotel Statler, Buffalo, New York, as soon as received.

Please be advised that Mr. Vogelsang will check with you regarding an official publicity release on the above project at an early date; meanwhile we will ask you to please refrain from releasing any publicity whatsoever regarding this donation on the part of our Educational Committee, until such time as Mr. Vogelsang elects to release same. It is planned, of course, to time such publicity release with a meeting of the Ad Club he has in mind at which time the work of the Educational Committee is to be publicized.

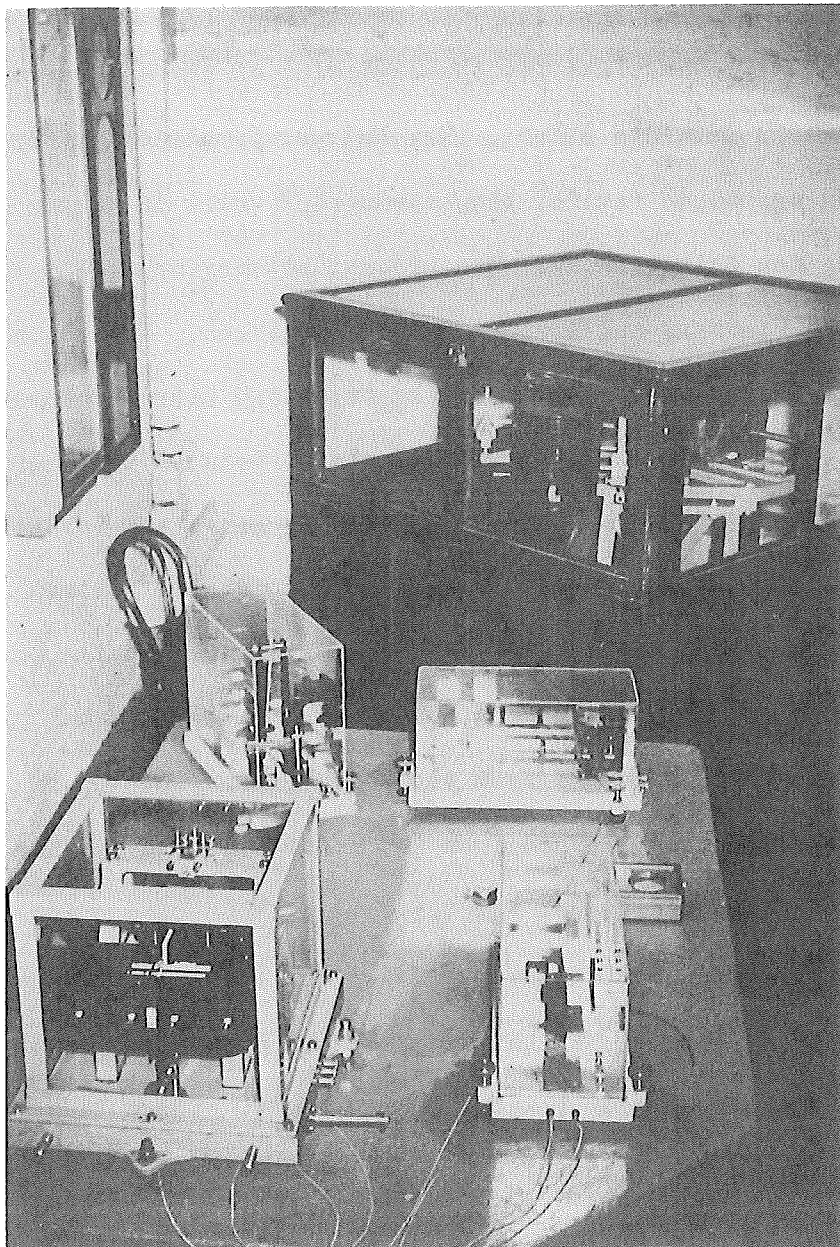
Cordially yours,

FLOYD M. CRAWFORD  
Executive Secretary

FMC:JR

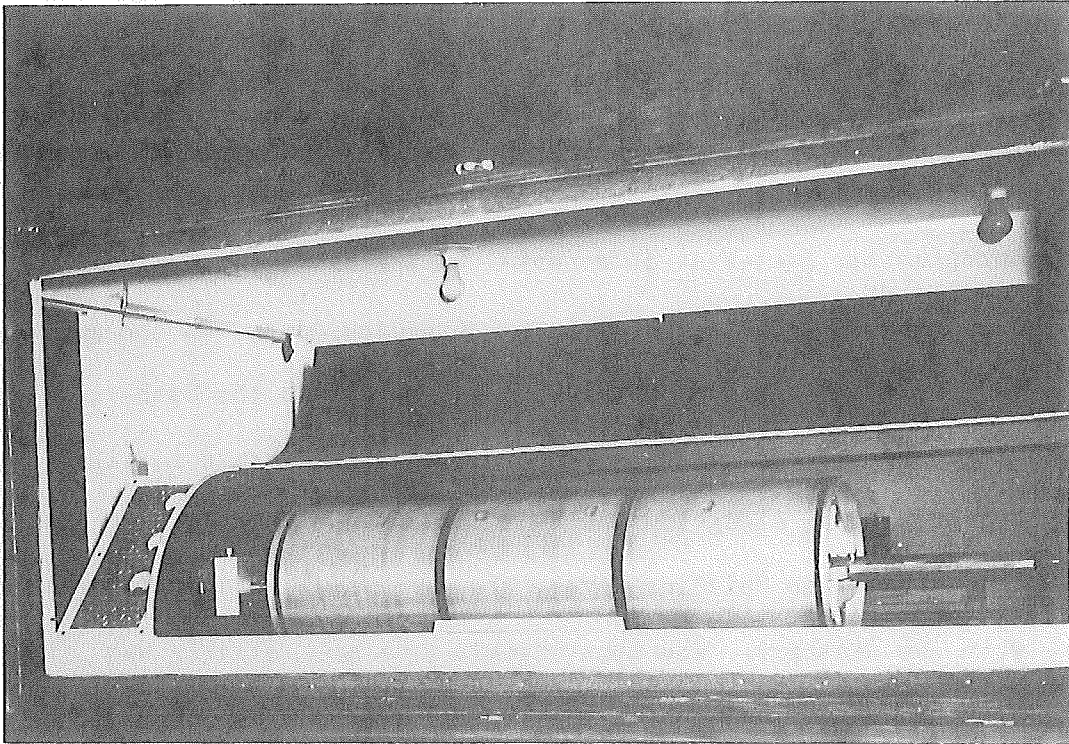
With this gift the plans for the expansion of the seismograph station were put into effect. The Metzger Construction Corporation agreed to remodel the seismograph vault to accommodate the new seismographs. The present seismograph vault retains the Wiechert and its pier as first placed. The second pier was cut so that the top of the remaining pier was about the level of the floor. Burlap was placed between the pier and its surrounding wall, and the pier capped with a wooden cover. The former concrete instrument stands were removed and a new concrete pier (4' x 6' x 9') was poured on the Corniferous limestone so that the south side of the pier was parallel to and 18 inches from the south wall. The top of the pier is about 33 inches from the floor level to provide a convenient working level for the four seismometers which rest on the top. The general position of the pier, with respect to the vault, may be seen from the photograph which was taken from the door leading to the vault. There is a 4-inch space between the pier and a cement wall which surrounds the pier below the floor. This space is covered at the floor level by a board. Contact between the pier and the board is obtained with soft felt.

The seismometer in the left foreground is the Galitzin-Wilip Vertical; the seismometer in the right foreground is the horizontal, long-period, Sprengnether North-South component; the seismometer in the left background on



On the pier, foreground: a Galitzin-Wilip vertical component seismograph and three components of the Sprengnether type. In the case at the back, the Wiechert inverted pendulum seismograph; on the wall at the left, the time control clocks.

the pier is the short-period, Sprengnether vertical; the seismometer in the right background is the long-period, Sprengnether East-West component. In the far background may be seen the Wiechert enclosed in its wooden case. On the wall to the left above the pier in the foreground is the Seth-Thomas No. 71 Regulator which furnished time signals for the seismographs. Alongside the Seth-Thomas, and farther back on the wall is the Spindler-Hoyer, the clock originally supplied with the Wiechert. The time signals from radio station WWV U. S. Bureau of Standards are manually recorded and compared with the regulator and clock twice a day. Electronic equipment is now being constructed so the recordings are automatic. A log is kept in which all pertinent information concerning the seismographs is recorded. In the far background on the left is the insulated steam pipe which furnishes the heat for the vault. To the right of the door and not shown on page 55 is an enclosure housing the Sprengnether triple recording drum. A door opens outward from this enclosure so the attendant may conveniently remove the records and place new photographic papers. The drum as seen through the open door of the enclosure is shown in the photograph top of page 57. The triple drum rests on a concrete instrument stand which in turn rests on the floor. Back of the triple drum is another concrete instrument stand resting on the floor. On this stand the galvanometers for the Galitzin and Sprengnether horizontal,



The Sprengnether Triple Drum Recorder



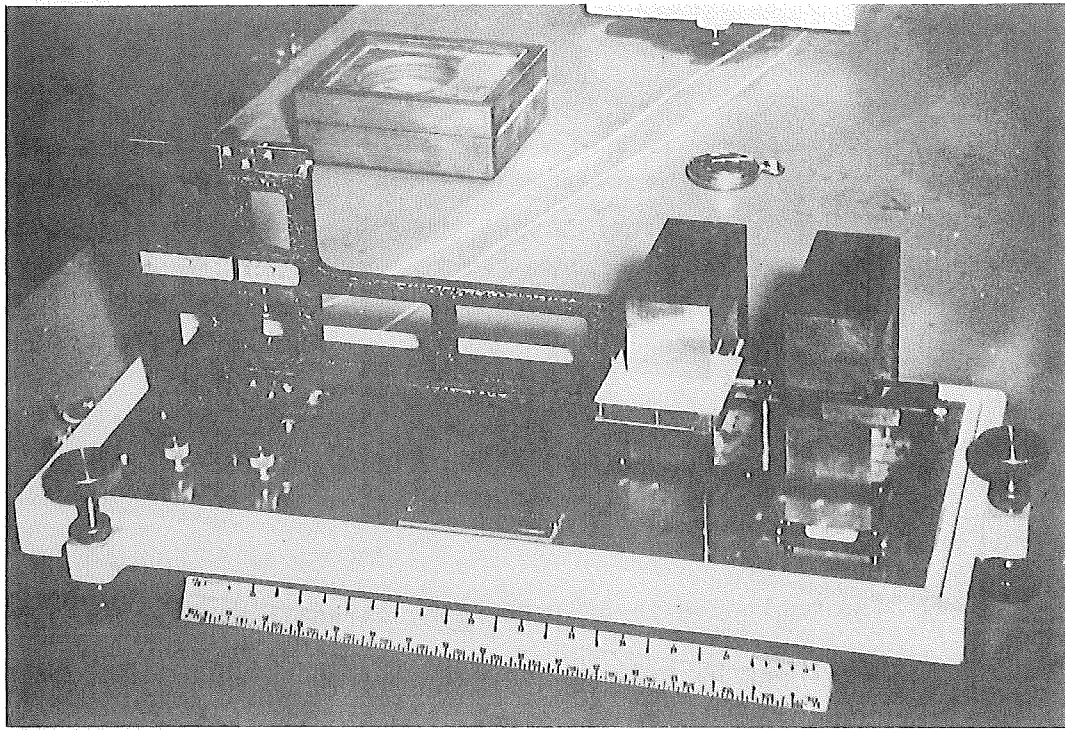
Austin C. McTigue, Present Director of the Canisius College Station



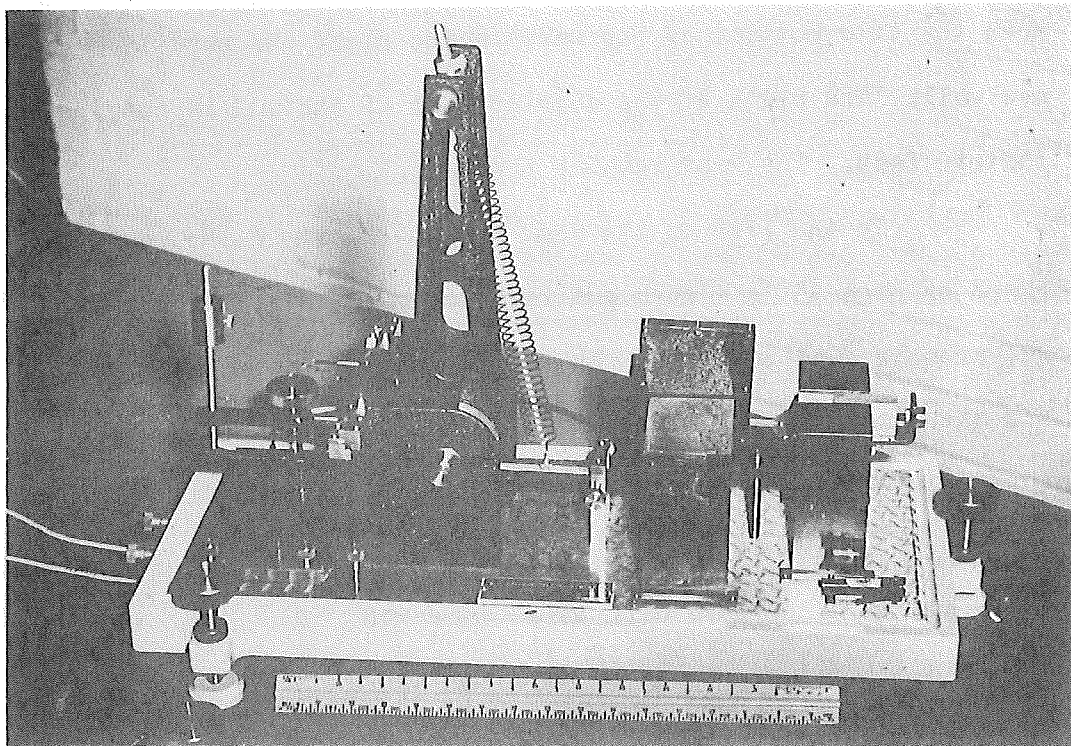
long-period seismographs rest. They are approximately one meter from the triple drum. Above the triple drum, in suitable positions, are two Kodak Darkroom Lamps which permit sufficient light to change the seismograph records. Looking through the open door in the photograph top of page 57, a second door may be seen which permits an attendant to enter the enclosure for adjustment of the galvanometers and optical system. The enclosure is of sufficient strength so that the space above it may be used as storage space for seismograph records.

The portion of the side walls of the seismograph vault near the basement corridor were built of tiles eight inches in thickness. To accommodate the enclosure for the triple drum, Sprengnether recorder it was necessary to remove the tile portion of the wall on the right and rebuild a new wall. The width of the corridor end of the wall is nearly fifteen feet. The rear remains the same.

To the left of the door and not shown in the photograph on page 55 is a much smaller enclosure housing the galvanometer and the Galitzin spring driven recording drum for the short-period vertical, Sprengnether seismograph. The galvanometer and the recording drum rest on the concrete stand formerly constructed by Fathers Delaney and Kolkmeier. The enclosure is of plywood with three doors suitably placed so that the galvanometers may be adjusted and the records changed on the drum.



Detailed view of a Sprengnether long-period horizontal component seismograph



Detailed view of the short-period Sprengnether vertical component seismograph

From 1929 there has been a number of reports of earthshaking in the immediate vicinity of the Canisius Station. Two field surveys were made with the assistance of the Strohaver Science Club of Canisius College; one following the Attica Earthquake of February 23, 1939, and one following the Niagara Falls Earthquake of September 20, 1946. Isoseismal maps were drawn from the reports of the field surveys. The station has received numerous reports particularly from the East and North of the station regarding sounds radiating from the earth.

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The earliest Jesuit Seismological Station Record on file at Canisius College is Record #2 from February 1 to February 28, 1911. It is signed: William C. Repetti, S. J.