

PH0055174

**NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM  
FOR FEDERAL PROPERTIES**

(Type all entries - complete applicable sections)

STATE: Hawaii
COUNTY: Hawaii
FOR NPS USE ONLY
ENTRY DATE <b>JUL 24 1974</b>

**1. NAME**

COMMON:  
Whitney Seismograph Vault #29

AND/OR HISTORIC:

**2. LOCATION**

STREET AND NUMBER: <sup>SW of</sup> Underground, west end and crater side of Volcano House Hotel, 30 miles from Hilo on State Rt. 11.

CITY OR TOWN: Hilo  
CONGRESSIONAL DISTRICT: 2

STATE: Hawaii CODE: 15 COUNTY: Hawaii CODE: 01

**3. CLASSIFICATION**

CATEGORY (Check One)	OWNERSHIP	STATUS	ACCESSIBLE TO THE PUBLIC
<input type="checkbox"/> District <input type="checkbox"/> Site <input type="checkbox"/> Object <input checked="" type="checkbox"/> Building <input type="checkbox"/> Structure <input type="checkbox"/> Object	<input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Both Public Acquisition: <input type="checkbox"/> In Process <input type="checkbox"/> Being Considered	<input checked="" type="checkbox"/> Occupied <input type="checkbox"/> Unoccupied <input type="checkbox"/> Preservation work in progress	Yes: <input type="checkbox"/> Restricted <input type="checkbox"/> Unrestricted <input checked="" type="checkbox"/> No
PRESENT USE (Check One or More as Appropriate)			
<input type="checkbox"/> Agricultural <input type="checkbox"/> Commercial <input type="checkbox"/> Educational <input type="checkbox"/> Entertainment	<input type="checkbox"/> Government <input type="checkbox"/> Industrial <input type="checkbox"/> Military <input type="checkbox"/> Museum	<input type="checkbox"/> Park <input type="checkbox"/> Private Residence <input type="checkbox"/> Religious <input checked="" type="checkbox"/> Scientific	<input type="checkbox"/> Transportation <input checked="" type="checkbox"/> Other (Specify) Storage <input type="checkbox"/> Comments

**4. AGENCY**

National Park Service, U.S.D.I.

REGIONAL HEADQUARTERS: (If applicable)

CITY OR TOWN: Hawaii Volcanoes National Park

STATE: Hawaii CODE: 1700

STREET AND NUMBER:

**5. LOCATION OF LEGAL DESCRIPTION**

COURTHOUSE, REGISTRY OF DEEDS, ETC:

National Park Service, U.S.D.I.

STREET AND NUMBER:

CITY OR TOWN: Washington STATE: D.C. CODE: 08

**6. REPRESENTATION IN EXISTING SURVEYS**

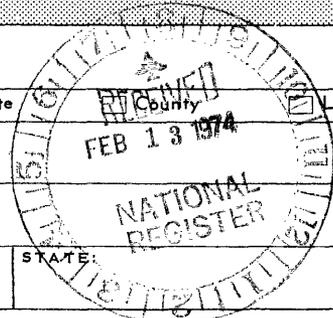
TITLE OF SURVEY:

DATE OF SURVEY:  Federal  State  Local

DEPOSITORY FOR SURVEY RECORDS:

STREET AND NUMBER:

CITY OR TOWN: STATE: CODE:



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## 7. DESCRIPTION

CONDITION	(Check One)					
	<input type="checkbox"/> Excellent	<input checked="" type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Deteriorated	<input type="checkbox"/> Ruins	<input type="checkbox"/> Unexposed
	(Check One)			(Check One)		
	<input type="checkbox"/> Altered	<input checked="" type="checkbox"/> Unaltered		<input type="checkbox"/> Moved	<input checked="" type="checkbox"/> Original Site	

DESCRIBE THE PRESENT AND ORIGINAL (if known) PHYSICAL APPEARANCE

(1) A free-standing, reinforced concrete pier, top approximately 7 feet above 1973 ground level, four-sided, wider at bottom, on the crater side and toward the west end of the Volcano House. Poured in 1912; used for triangulation and camera stations. Originally protruded up through porch of Observatory building, built 1912, and left standing when building razed in 1941. As part of an open-sided covered porch, the top of the pier could be used in the rain.

(2) Whitney Seismograph Vault

Order of Significance: First

Recommended Treatment: Preservation

Preliminary Estimate of Cost: Operation program annually \$100.00

Present: An underground room, 18 feet by 17 1/2 feet inside dimensions, of reinforced concrete walls (1 1/2 feet thick), concrete floor (est. 6 inches thick), and reinforced concrete slab (8 inches thick) roof. The floor rests upon a solid ledge of basalt, reached by digging 5 1/2 feet from the 1912 natural ground level through ash and pumice. Floor to ceiling height is 7 1/2 feet. Reinforce concrete pillars, designed to hold instruments, take up much of the floor space. A wooden floor-to-ceiling partition, with glass panels, forms one side of the instrument area, is located 5 feet from one wall, and extends wall to wall. It separates the room into an instrument area and a viewing corridor. In this corridor are a cabinet for smoking waxed paper used on recording drums and a shellac bath arrangement, with drying lines used to fix the record on the smoked papers after removal from the instruments. Walls and floor are in direct contact with natural steam cracks; the room is hot and humid. Access to the room is by concrete steps on the outside of the west/crater corner of the Volcano House. The top of the vault makes a mound that is covered by topsoil and is incorporated in the lawn on the crater side of the Volcano House.

Original: The partition, piers, instruments, doorways, floor, and walls up to a height of 5 1/2 feet are original. The upper portion of the walls in 1912 were wood, with glass panels to admit light. The original roof framing and material are unknown, but upper walls and roof modifications were made almost immediately and then intermittently through 1941. Major modifications were made in 1941 in connection with the construction of the present Volcano House. These modifications consisted of extending the reinforced concrete walls upward to make a 7 1/2 high ceiling; the pouring of the concrete roof slab; installation of ceiling light outlets, ceiling timing circuit outlets, and duplex convenience outlets; the covering of the roof with topsoil; and the construction of the exterior access steps and stairwell. Originally the vault was considered the "cellar" to the original observatory building (built 1912 and razed in 1941). The 1941 modifications eliminated an adjacent walled cellar room, which may have contained in 1912 a wooden tank which stored rainwater collected from the roof of its overhead observatory building.

SEE INSTRUCTIONS

**8. SIGNIFICANCE**

PERIOD (Check One or More as Appropriate)

- |  |                                       |                                       |  |
|--|---------------------------------------|---------------------------------------|--|
| <input type="checkbox"/> Pre-Columbian | <input type="checkbox"/> 16th Century | <input type="checkbox"/> 18th Century | <input checked="" type="checkbox"/> 20th Century |
| <input type="checkbox"/> 15th Century  | <input type="checkbox"/> 17th Century | <input type="checkbox"/> 19th Century |  |

SPECIFIC DATE(S) (If Applicable and Known)

AREAS OF SIGNIFICANCE (Check One or More as Appropriate)

- |   |   |  |  |
|---|---|--|--|
| <input type="checkbox"/> Aboriginal     | <input type="checkbox"/> Education              | <input type="checkbox"/> Political           | <input type="checkbox"/> Urban Planning  |
| <input type="checkbox"/> Prehistoric    | <input type="checkbox"/> Engineering            | <input type="checkbox"/> Religion/Philosophy | <input type="checkbox"/> Other (Specify) |
| <input type="checkbox"/> Historic       | <input type="checkbox"/> Industry               | <input checked="" type="checkbox"/> Science  | _____                                    |
| <input type="checkbox"/> Agriculture    | <input checked="" type="checkbox"/> Invention   | <input type="checkbox"/> Sculpture           | _____                                    |
| <input type="checkbox"/> Architecture   | <input type="checkbox"/> Landscape Architecture | <input type="checkbox"/> Social/Humanitarian | _____                                    |
| <input type="checkbox"/> Art            | <input type="checkbox"/> Literature             | <input type="checkbox"/> Theater             | _____                                    |
| <input type="checkbox"/> Commerce       | <input type="checkbox"/> Military               | <input type="checkbox"/> Transportation      | _____                                    |
| <input type="checkbox"/> Communications | <input type="checkbox"/> Music                  |  | _____                                    |
| <input type="checkbox"/> Conservation   |   |  | _____                                    |

STATEMENT OF SIGNIFICANCE

The Whitney Seismograph Vault, built in 1912, represents the beginnings of the continuous and resident study by American scientists of the earth's volcanic and seismic activity at Kilauea and Mauna Loa volcanoes. The Hawaiian Volcano Observatory, a U. S. Government facility since 1917, used the vault from 1912 through 1961 when more sophisticated instrumentation made the seismometers and tiltmeters it was designed to house obsolete.

Halemaumau, the almost continually active firepit and the principal vent within the summit crater of Kilauea, had for almost a century prior to 1912 enjoyed a worldwide reputation of safety for spectators and ease of access. Kilauea volcano attracted both laymen and scientists. Few of the world's active volcanoes permitted such close observation and none were easier to reach. Scientists were also interested in Mauna Loa, a higher and larger volcano adjacent to Kilauea. It was not as active as Kilauea, but was more potentially dangerous to life and property. Dr. Thomas A Jaggar, of the Massachusetts Institute of Technology, recommended Kilauea as the best site in the world for study of volcanoes and their associated earthquakes. Among his reasons were that it had a history of great and varied activity; was relatively safe; that it, with Mauna Loa, formed an isolated center of activity without complications occasioned by other nearby volcanic centers; was very accessible; and its ownership was American. Jaggar received the support of M.I.T. and enlisted the support of the Honolulu Chamber of Commerce and some interested citizens. Hawaii interests pledged \$5,000 per year for five years to operate a volcano observatory at Kilauea. M.I.T. received from the trustees of the estate of Edward and Caroline Whitney the sum of \$25,000, with principal and interest to be used for geophysical research or teaching, with the recommendation that the work be conducted in Hawaii. The Hawaiian Volcano Research Association was formed to administer both funds. Dr. Jaggar arrived at Kilauea on January 17, 1912, to be director of the Hawaiian Volcano Observatory, a post he held through his retirement in 1940. In 1917, the observatory became a part of the U. S. Government, finding a home in the Department of the Interior in 1924. The Hawaiian Volcano Observatory is now a part of the Geological Survey.

SEE INSTRUCTIONS

(continued)

9. MAJOR BIBLIOGRAPHICAL REFERENCES

Apple, Russell A.  
 1953 They study Hawaii's volcanoes. In The Hawaii Weekly, July 12, Honolulu, pp. 4-5

1954 A History of the Land Acquisition for Hawaii National Park, M. A. thesis, University of Hawaii, Honolulu, mss., pp. 20-24

(continued)

10. GEOGRAPHICAL DATA

LATITUDE AND LONGITUDE COORDINATES DEFINING A RECTANGLE LOCATING THE PROPERTY			OR	LATITUDE AND LONGITUDE COORDINATES DEFINING THE CENTER POINT OF A PROPERTY OF LESS THAN TEN ACRES		
CORNER	LATITUDE	LONGITUDE		N. LATITUDE	W. LONGITUDE	
	Degrees Minutes Seconds	Degrees Minutes Seconds		Degrees	Minutes	Seconds
NW	° ' "	° ' "		19°	25'	57"
NE	° ' "	° ' "		155°	15'	38"
SE	° ' "	° ' "				
SW	° ' "	° ' "				

APPROXIMATE ACREAGE OF NOMINATED PROPERTY: **less than 1 acre**

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE:	CODE	COUNTY:	CODE
Hawaii	15	Hawaii	01
STATE:	CODE	COUNTY:	CODE
STATE:	CODE	COUNTY:	CODE
STATE:	CODE	COUNTY:	CODE



SEE INSTRUCTIONS

11. FORM PREPARED BY

NAME AND TITLE: Russell A. Apple, Pacific Historian DATE: 5/30/73

BUSINESS ADDRESS: Hawaii Group, National Park Service, U.S.D.I.

STREET AND NUMBER: Suite 512, 677 Ala Moana Blvd. PHONE: 808/521-3027

CITY OR TOWN: Honolulu STATE: Hawaii 96813 CODE: 15

12. CERTIFICATION OF NOMINATION NATIONAL REGISTER VERIFICATION

State Liaison Officer recommendation:

Yes  
 No  
 None

[Signature]  
 State Liaison Officer Signature

In compliance with Executive Order 11593, I hereby nominate this property to the National Register, certifying that the State Liaison Officer has been allowed 90 days in which to present the nomination to the State Review Board and to evaluate its significance. The recommended level of significance is  National  State  Local

[Signature] NOV 1973  
 Federal Representative Signature Date  
 Regional Director, Western Region  
 Title

I hereby certify that this property is included in the National Register.

[Signature]  
 Director, Office of Archeology and Historic Preservation

Date: 7/24/74

ATTEST:

[Signature]  
 Keeper of The National Register

Date: 7-24-74



UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES  
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(Number all entries)

8. SIGNIFICANCE

Physical facilities to permit efficient observation and study were constructed in 1912. These included moving, rebuilding and fencing a small cottage to the north side of Halemaumau; a laboratory-office building (of Oregon pine, with two laboratories, director's room, photographic dark room, veranda on three sides, with concrete pier for geodetic and photographic studies) on land leased from the Bishop Estate; and the construction and equipping of the Whitney Seismograph Vault. Only the pier and vault remain of the original observatory facilities.

Excavation of the vault was done by Territory of Hawaii prisoners from a nearby prison camp, and performed through 5 1/2 feet of ash and pumice. Seismometers were designed by Professor F. Omori of Japan, and were of Japanese manufacture. Of the "tromometers," (1) the most sensitive registered N-S, E-W, and vertical earth movements; (2) a less sensitive one registered N-S and E-W movements; and a third (3) which required more tedious installation, recorded major earthquakes and registered N-S, E-W and vertical earth movements. (1) and (2) had continuously moving recording drums (at first used only during working hours of the staff) with time marks every minute; and the drum of (3) was set on motion only by major earthquakes, traveled rapidly, and marked the time every half-second. It also had a loud alarm bell which could be heard in the building above.

Problems solved in the early years of this pioneer seismic study included air currents and dust accumulation (the vault was battened and painted to seal it), drum drive mechanisms, excessive friction in the instruments, accurate timing (rated chronometers were loaned by Territorial officials and institutions), magnification adjustments, instrument sensitivity (an oil bath was added to dampen recording arm swings), and the natural tilting of the summit as the volcano swelled and deflated, which caused recording arms to stray off the drums. By September 1912, the vault had been sealed by battens and painting, and several major problems solved. In April 1913, a new concrete pier was added for an Omori instrument modified in design by the German seismologist Bosch. Major earthquakes occasionally disabled all instruments. In its first 2 1/2 years of operations, the Whitney Vault recorded 604 local earthquakes. Origins for 411 were computed and conclusions reached as to fault zones and the island's internal composition.

Modifications and adjustments continued. In its standard description included with weekly bulletins from the Hawaiian Volcano Observatory in 1915 was the following:

The Whitney Laboratory of Seismology is equipped with two Bosch-Omori 100 kg tromometers

(continued)

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(Continuation Sheet)

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registering N-S and E-W motion, a heavy Omori tromometer registering E-W motion, and an Omori "ordinary" seismograph designed for registering strong earthquakes in all three components of motion. These are seated on concrete piers in a closed basement room having practically constant temperature beneath the chief observatory building near the hotel. Time is referred to a rated chronometer, checked at intervals by solar observation with a transit. Both instruments are loaned by the College of Hawaii. At the substation by the edge of the active pit Halemaumau an Omori two-component tromometer...

In January 1916, the roof of the vault collapsed in a storm, and water entered the vault, destroyed records and put the tromometers out of operation. Repairs were completed by March. In 1918, Dr. Arnold Romberg added photographic bromide paper to the recording method of smoked paper on drums. The drum speed was adjusted to 33mm per minute on one instrument, 13mm per minute on another, with times marked by an electrically operated clock. Such optical recording would have required a light-proof vault. In addition, Dr. Romberg rebuilt several instruments and placed all smoked paper recordings onto a single drum. The vault for a period recorded on both smoked and photographic paper, but the optical recording was eventually eliminated. Subsequent instrument modifications were frequent, many by Burton J. Loucks, an instrument maker on the observatory staff.

The Whitney Seismograph Vault continued in use through 1961, when electronic instrumentation made the vault and its instruments obsolete. The original instruments, as modified, are still within the vault, but parts may have strayed to other locations used by the Hawaiian Volcano Observatory.



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(Continuation Sheet)

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Eaton, J. P. and C. K. Wentworth  
1962 The Hawaiian Volcano Observatory. In Thrum's All About Hawaii.  
Honolulu, pp. 35-44.

Hawaiian Volcano Observatory  
1912 Weekly and/or monthly reports, 1912-1925. Volcano, Honolulu  
and Boston, mss. Complete file at Bishop Museum, Honolulu.

Jackson, Frances  
1972 An administrative history of Hawaii Volcanoes National Park,  
Haleakala National Park, Honolulu, mss. p. 41.

National Park Service, USDI  
1941 Drawing No. NPHAW 2050, Seismograph cellar and terrace.  
Approved 4/4/41.

