

1953/37  
Copy 1

COMMONWEALTH OF AUSTRALIA.

---

MINISTRY OF NATIONAL DEVELOPMENT.  
BUREAU OF MINERAL RESOURCES,  
GEOLOGY AND GEOPHYSICS.

---

RECORDS.  
1953/37

MOUNT LAMINGTON

VULCANOLOGICAL OBSERVATIONS

PROGRESS REPORT

February, 1953.

by

G.A. TAYLOR

24th February, 1953

MOUNT LAMINGTON.

VULCANOLOGICAL OBSERVATIONS.

Progress Report,

February 1953.

by

G. A. TAYLOR,

Records 1952/53

Contents

	Page
DOMB MOVEMENT	1
GAS RELEASE	1
GAS COMPOSITION	2
TEMPERATURES	2
SEISMIC ACTIVITY	3
SOUND EFFECTS	3
CONCLUSIONS	3

---

## Mount Lamington Vulcanological Observations

The activity of Mount Lamington over the last half year has tended to confirm conclusions drawn from earlier observations, namely that conditions of slow decline in overall activity pointed towards a return to the dormant state.

There have been fluctuations in activity during this period, renewed dome building in some sectors of the crater and on one occasion, explosions were reported to have occurred near the dome summit.

### DOME MOVEMENT.

During August some movement of the southern sector of the lava dome appeared to take place. An air inspection in September revealed a broad plateau-like shelf in the zone which had previously been gently sloping. In October upthrust of the terminal spine brought the height of the dome to 5424 feet above sea level. Disintegration and collapse from cooling and weathering subsequently reduced the height. The last reading taken in January gave an elevation of 5380 feet for the dome summit. This pattern of upthrust and collapse is characteristic of the dome building mechanics.

Compared with the activity of the first half of the year the overall dome movement has been of a minor order.

The available volcanic energy appears to be nearing exhaustion.

### GAS RELEASE.

The actual volume of gas emission appears to be declining. The crater cloud is generally much smaller than during the early part of the year. However, there are wide fluctuations in apparent emission. It is still not uncommon to see a crater cloud ascending to well over ten thousand feet although its more usual height is around 7 - 8 thousand feet. Atmospheric conditions play a large part in the apparent volume of the condensation cloud.

Two instances of minor explosive activity were reported as having been seen by observers at Sangara on 7th November. The explosions occurred on the east side of the terminal spine sending up a vertical cloud to a height of about 1000 feet above the summit and subsequently laterally distributing an ash cloud down the avalanche valley for a distance of about a mile.

These explosions are attributed to small localised gas pockets released by dome movement which was taking place around that time.

During September a new high pressure vent was observed outside the crater on the southern slopes. The vent is located on a very steep rock face about 200 yards south of, and on the same level as, the rim of the south east breach in the crater wall. The roar of escaping gas can be heard quite distinctly from the breach rim. Attempts to make a close inspection of this vent were unsuccessful. The crater wall in this southern sector appears to be the remnant of an ancient lava dome. In addition to the high pressure vent on the southern flank, a great number of small steaming points have developed on the northern flanks (or inner crater wall) during the last six months.

Increased activity in this sector is not regarded as significant for three reasons. Firstly, it has been unsupported by a significant increase in seismic frequency. Secondly, recent slow dome movement in this southern sector indicates the existence of high pressure accumulations of a normal order with

possible diversion channels to surrounding areas. Thirdly, debris from dome movement and finer grain erosional material has tended to seal off the large vents of the southern crater trough.

These vents have been some of the most consistently active during the course of the eruption. The blockage of vents in one sector of a crater frequently means increased activity at another. The gas flow is diverted to other exit channels producing either an increase at old vents or establishing fumarole groups in new areas. It seems highly probable that the new fumaroles formed on the southern crater walls are due to such a migration of escape channels.

#### GAS COMPOSITION

It is now possible to traverse the dome summit without the protection of a gas mask. The concentration of sulphur dioxide in the gas from the very numerous emission points is high enough to be distinctly unpleasant but provided that reasonable care is taken to avoid the localised areas of intense activity, the summit area is negotiable. In certain areas of the dome summit heated zones having no visible condensation cloud are encountered. In their vicinity a gas having a menthol-like odour was detected. No other gases were detected on the summit area.

Sulphur dioxide is not present in the high temperature gases emitted from the fumaroles at the northern foot of the dome and no distinguishable gas is present in the few secondary fumaroles which persist in the avalanche valley up to a little over three miles from the crater.

On the south side of the dome the vents on the crater floor emit gas containing a slight amount of sulphur dioxide and an eye-stinging gas which was unidentifiable. The strongly active vents of the eastern flank of the dome emit gases of a composition similar to the summit area.

Other than a slight decline in sulphur dioxide concentration there appears to be little change in the composition of the gases over the last half year. The relatively low concentration of this gas appears to be consistent with the waning of general activity.

#### TEMPERATURES.

No luminous effects have been apparent during the latter half of the year suggesting that general dome surface temperatures have fallen below 550°C. Pyrometer readings taken at widely separated points covered a considerable range and revealed a definite fall in temperature on the eastern flank.

Temperatures up to 400°C were recorded at a group of fumaroles at the northern foot of the dome on the valley floor just below the limit of the talus apron. Temperatures of the eastern flank vents obtained a maximum of 350°C which represents a fall of roughly 100°C during the last nine months.

On the southern side, the pressurized vents which emerge from the crater floor yielded temperatures up to 130°C. Higher temperatures may exist, for recording conditions are by no means ideal. Dense clouds of hot gas are swept along the narrow crater floor by the strong winds which are funnelled through the deep trough formed by the dome slope and the southern crater wall. The gas from these vents appeared to contain a much higher percentage of water vapour than elsewhere. Their location suggested that groundwater may influence both gas composition and temperature conditions in this area. Temporary lakes form in some parts of the adjacent crater floor.

Secondary fumaroles in the ash flow from the 1951 March eruption all yielded temperature less than 100°C. A mile and a half from the crater a temperature of 96° C was recorded and an

isolated vent a little over three miles from the crater emitted gas at 66° C.

SEISMIC ACTIVITY.

AVERAGE DAILY FREQUENCY.

MONTH	VOLCANIC TREMORS	MICRO TREMORS	TECTONIC TREMORS.
Aug.	0.35	14.60	1.8
Sept.	0.15	12.55	1.5
Oct.	0.33	10.60	1.5
Nov.	- -	- -	-
Dec.	0.12	6.50	3.3
Jan.	0.00	10.90	1.8

The above table is indicative of the low seismic frequency existing at Lamington over recent months. Except for a slight rise, in October, during a powerful luni-solar maximum there appears to be a progressive decline in frequency of occurrence of volcanic earthtremors.

When explosive potential was high during the early phases of the volcano's activity the frequency rose higher than 1000 tremors per day. The present seismic activity is negligible when compared with earlier conditions of high explosive potential.

SOUND EFFECTS.

Subterranean noises indicative of energy transfers at depth were a common feature of crater observations during the first half of the year. As many as 10 per hour were occurring during April.

Recent crater inspections failed to reveal a single occurrence of this phenomena.

C ONCLUSIONS.

The important subterranean energy transfers indicated by earthtremors and deepseated rumbling have declined in recent months to almost negligible proportions. There has been a corresponding decline in surface manifestations in that dome movement has been comparatively slight and gas emission has become less evident. Some confirmation to this general picture of waning volcanic energy is given by consideration of existing temperature and gas composition.

This pattern of slowly declining activity has about it an air of permanence, for abrupt changes in conditions would augur well for an abrupt recrudescence of activity.

Mount Pelee gradually lapsed into solfatoric activity after the 1902 eruption. It remained quiet for 27 years. Mount Lamington differs from Pelee in that prior to its disastrous eruption, the period of dormancy was much longer. The physical state of the lava suggests a less active magma than Pelee. Hence it seems probable that Lamington will have a longer period of quiescence.

The removal of restrictions on the area surrounding the volcano is recommended. The eventual establishment of a vulcanological station in the area will act as a safeguard against any developments in future years.

People visiting the crater should be warned that dangerous falls of rock occur at irregular intervals from the dome slopes and crater walls.

G.A.TAYLOR.