Table 1. Analyses of gases collected from Sulfur Bank fumarole.

Sample tube	Constituents (vol %)					
	CO_2	CO	H_2	SO_2	O_2	N_2 (residue)
During an eruptive stage of Kilauea Volcano, July 1952						
1	97.4	1.0	0.4	1.5	0	0
2	97.6	1.4	0	1.8	0	0
3*	96.2	1.7	0.4	1.6	0	0
During a quiet stage of Kilauea Volcano, June 1953						
1*a*	10.9	3.2	0	0	13.6	71.5
1*b*†	10.6	2.2	0	0	15.1	70.7
2	10.2	2.9	0	0	13.2	71.8

* No. 3 was a vacuum-bottle collection made at a later date than collections No. 1 and No. 2.
† Poor analysis.

Table 2. Stable carbon isotopic ratio in the carbon dioxide present in volcanic and Sulfur Bank fumarolic gases.

Gas sample	C^{12}/C^{13}
Sulfur Bank 1949, Mauna Loa in eruption	89.0
Sulfur Bank 1952, Kilauea in eruption	89.0
Sulfur Bank 1953, both volcanoes quiet	89.0
Gas collected from 1950 Mauna Loa lava flow	91.2
CO_2 extracted from Olivine Basalt of 1950 Mauna Loa lava flow	90.7

carbon dioxide from a Jurassic limestone that has been used as a primary standard by other workers, through the kindness of A. O. Nier (*5*). Isotopic ratio determinations of the carbon dioxide samples were made on the Consolidated-Nier type of mass spectrometer.

The results for the gas analyses are listed in Table 1. The great difference in the composition of the gas between times of eruption and quiescence of the nearby volcano is noteworthy. During the quiet period, there is strong indication of air contamination from the presence of nitrogen and oxygen in the gas. The possibility of using a systematic gas-analysis routine to detect changes in the proportions of the gaseous components with time and to use this as a predictive tool in volcanology immediately arises and, in fact, has been suggested previously.

The results for the determination of the carbon isotopic ratios are listed in Table 2. The significant points to be noted are (i) the constant value of the isotopic ratio of the carbon dioxide obtained from the Sulfur Bank fumarole despite the eruption or dormancy of the adjacent volcanoes and (ii) the "heaviness" of the fumarolic carbon dioxide when compared with the gas extracted from the lava or from above the active lava flow.

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References and Notes

1. S. S. Ballard and J. H. Payne, *The Volcano Letter,* No. 469, July–Sept. 1940.
2. J. H. Payne and S. S. Ballard, *Science* **92**, 218 (1940).
3. We are deeply indebted to A. O. Nier of the Physics Department, University of Minnesota, for running some of the isotopic determinations, and to Earl Ingerson and Gordon A. Macdonald, U.S. Geological Survey, for aid and advice in the collection of the samples. Some of the early work on the preparation of the samples was done at the Frick Chemical Laboratory, Princeton University, and most of the work was aided by the Office of Naval Research, under contract Nonr-981(00), project NR 081 185.
4. S. Dushman, *The Scientific Foundations of Vacuum Technique* (Wiley, New York, 1949), p. 649.
5. A. O. Nier, *Phys. Rev.* **77**, 789 (1950).

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The Visiting Research Professor

Ten years ago Carl E. Seashore of the State University of Iowa, Emeritus Professor of Psychology, but called back to serve as Dean of the Graduate College, proposed [*Science* **100**, 218 (1944)] the appointment of retired persons who desire to continue their researches as *visiting research professors* at a neighboring university. Supporting his view he appointed two visiting research professors in 1944. As one of those fortunate persons, I can testify to the enormous benefits that have accrued to me. A stipend was granted sufficient to enable the appointee to spend 3 months in residence at the university or to defray the expenses of making frequent visits for longer or shorter periods. Most important has been the fellowship of the resident staff, and the incentive to keep on doing those things that one has been doing and hoping to continue to do. I commend the visiting research professorship to university administrators and to retired professors. It is immediately available. It meets the needs of elderly persons and increases the national scholarly output. And it requires no outlay for additional buildings, libraries, or laboratories.

HENRY S. CONARD
Emeritus Professor of Botany, Grinnell College

7 September 1954

Psi and Probability Theory

The occurrence of significant deviations from mean expectancy in experiments in which guesses, cards, drawings, die faces, and so forth, are matched with targets has been attributed not only to psi (*1*) but also to error in the production, recording, selection, or analysis of the data. That these counterhypotheses to psi have been adequately refuted, either by ratiocination or by the performance of experiments in which the counterhypotheses were precluded, is testified to by the subsequent silence of their proponents. Two explanations for the results of these matching experiments have remained, namely (i) reality of psi and (ii) fallacy of probability theory. While there are comparatively few who have accepted the first explanation, there have been practically none, until recently,