

Dirac and Heisenberg in Hawaii

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The extended correspondences with Dirac and Heisenberg concerning their out-of-the ordinary visit to Hawaii in 1929 are detailed herewith for their implications on the cultural and educational aspects of Physics and Physicists.

Key words : Dirac and Heisenberg—contribution to physics and visit to Hawaii, J.H. Van Vleck, UH-Manoa Physics department.

INTRODUCTION

The visit of Dirac and Heisenberg to Hawaii over half a century ago has been the subject of much coffee-hour and conference-corridor conversation for many a year. I myself was poignantly reminded of it by Gregor Breit during a “between the session” discussion at the 1968 Coral Gables Conference on symmetry principles at high energy. Breit emphasized that because of the “snafu” at that time, there was much to be said for a site revisit to Hawaii for the founders of quantum mechanics even though the hour is late (perhaps too late!). Finally, a version of their visit appeared in print¹. It appears that the time is ripe for a detailed study of their visit to Hawaii to separate facts from fiction and also as an amusing contribution for our department’s record.

To begin our journey it appears to be appropriate to record Van Vleck’s published remarks under *Dirac and Heisenberg Around the World, 1929* :

Dirac decided when he got as far west as Wisconsin he might as well go around the world, and after leaving Madison he made at least the first part of this trip along with Heisenberg. The latter was lecturing at the University of Chicago in the spring in 1929. While Dirac was in Madison, Heisenberg came to Madison for a brief trip to give a colloquium. Whether they

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arranged their voyage then, or before Dirac left England, I don't know. There is one anecdote connected with their stay in Hawaii that I can't vouch for first hand, but I've heard it so often it must have some factual foundation. They decided to visit the university to pass some of the time when their boat laid over for a while in Honolulu. They managed to meet the chairman of the physics department and told him their names. This man looked at the two youthful visitors, and told them that if they would like to attend some of the physics lectures at the university while their boat was in Honolulu, they would be welcome to do so !

The only other piece of information I have about Dirac's trip around the world is that he stayed in the Kanaya Hotel in Nikko, Japan, in early September. This I know as a certainty for the following reason. After my father's retirement, my parents also travelled around the world. I remember father telling me later of Dirac's courtesy in crossing a very muddy street to shake hands with father when they were surprised to see each other in Nikko. In 1953, when I attended an international physics conference, I told the proprietor of the hotel in Nikko of the incident. He proudly produced the hotel register for 1929, and there we found the signatures of my father, of Dirac, and I believe, also of Heisenberg.

Upon reading the above piece, and also recollecting that Gregor Breit had stressed that Heisenberg was the vocal one concerning "an university in the Pacific," I decided to approach Heisenberg first about his recollections using the above Van Vleck excerpt as the basis for his reminiscences. Heisenberg replied very promptly in a letter dated February 20, 1974, on Max-Planck-Institut Für Physik and Astrophysik stationery as follows :

Dear Professor Tuan :

You ask me about Dirac's and my visit to the University of Hawaii in 1929. If I remember correctly we had met in Madison one of the officials of the University of Hawaii—unfortunately I do not remember his name—who suggested that on our trip to Japan we should use the stop at Hawaii for giving lectures in the Physics Department there. We were therefore a bit disappointed when we found nobody from the institute at the pier, and when we later came to the Physics Department nobody seemed to know that we were physicists and had been invited for lectures. Still we were treated very nicely; somebody took us around by car on the island, and so we enjoyed our stay in Honolulu in every way. Perhaps Dirac knows more about the details of this visit.

With best regard,

Yours sincerely,
W. Heisenberg

Clearly the next step is to get Dirac's version of the Pacific crossing. Hence upon receiving Heisenberg's letter, I proceeded at once to write to

Dirac with a xerox of both Heisenberg's account and the published Van Vleck version. Dirac took some time to reflect over this, and it wasn't until the summer of 1974 (when I was at the Aspen Center for Physics) that a letter dated June 13, 1974, from Florida State University and forwarded to me from Hawaii finally arrived. The letter was beautifully handwritten as follows :

Dear Professor Tuan :

It was in Madison that Heisenberg and I agreed to cross the Pacific together, in a Japanese ship, from San Francisco to Yokohama. The ship was to spend a day at Honolulu. Of course we wanted to use the time sightseeing. We certainly did not want to waste any of the limited number of hours we had ashore in lecturing. We were just tourists on holiday and I do not think the question of lecturing was ever mentioned.

Heisenberg said he knew someone in Honolulu and would ask him to show us around. This seemed a very good idea to me. When we arrived at Honolulu we were met at the pier, as far as I remember. We were taken first to the University and met some of the people at the Physics Department.

It is possible that some of them had never heard of us—I do not remember any details. But the question of lecturing was never raised and we certainly did not want to lecture. What I remember best about the University was the department of agriculture, where we saw a large experimental area devoted to the cultivation of pineapples and had the problems of pineapples explained to us.

We were afterwards taken around sight-seeing in the neighbourhood of Honolulu and saw some wonderful scenery. Our driver did not want to go very far away, because he was nervous about his car breaking down and being unable to get back to the ship in time. But still we had a most enjoyable time.

I did visit Honolulu a second time, in 1935, on the occasion of another Pacific crossing. I then did not spend so long in Honolulu, on account of our ship having been delayed in arriving there, and so far as I remember I did not then meet anyone at the University.

With kind regards,

Yours sincerely,
P.A.M. Dirac

I had the inner feeling that Dirac might have been “diplomatic” about the 1929 visit, and given Heisenberg’s version of February 20, 1974. I had made preliminary plans together with Professor E.C.G. Sudarshan (Co-Director of the Center for Particle Theory at the University of Texas, Austin) to effect a joint invitation for Heisenberg to visit Texas and *revisit Hawaii*. Hence on June 25, 1974, I wrote Heisenberg again from Aspen, including both an invitation and Dirac’s version of June 13. Heisenberg again replied promptly in a letter dated July 3, 1974, as follows:

Dear Professor Tuan :

I thank you for your letter concerning Dirac’s and my visit to Hawaii in 1929. I enjoyed reading what Dirac remembers of our visit, and actually our reminiscences are slightly different but not contradictory.

Concerning your kind invitation to a new visit to Hawaii I am afraid that I am getting too old for travelling too much. I do not plan any visit to the States in the near future, and therefore I am afraid that I will not be able to accept your kind invitation.

With best wishes, also to Professor Sudarshan,

Yours sincerely,
W. Heisenberg

Hence Breit was correct; it *was too late*, and Heisenberg passed away in 1976 without ever visiting Hawaii again. With both Heisenberg and Dirac’s versions in hand, I decided to complete the story one must have Van Vleck’s final comments with these additional information. In a Harvard Department of Physics memo (postmarked, September 18, 1974) to me from J.H. Van Vleck, the latter wrote:

Many thanks for your interesting correspondence regarding the visit of Heisenberg and Dirac to Hawaii in 1929. I enclose a photostat of the hotel register in Nikko which I refer to in my article (**Appendix 1**).

I wonder how Breit happened to know about or remember the incident—he’s so dedicated to basic research I’m rather surprised—wonder what his version was—can’t remember where I first heard of it.

In my article I said I couldn’t vouch for the accuracy of what I wrote—what I said wasn’t too far off,—at least according to the Heisenberg letter.

Glad to learn that Dirac and Heisenberg planned their trip in Madison, for then I was indirectly responsible for it. (I was instrumental in getting Dirac over for a term at Wisconsin, and I think it was my suggestion that Heisenberg come up from Chicago for a colloquium at the UW.)

Also pleased my article stirred up some interest. The Cambridge University Press wanted it condensed and I had to get Wigner's backing to keep it unabridged.

I still have pleasant memories of my two or three weeks' visit to the islands in 1958. (I have a hard time convincing New Englanders that I do not mean Martha Vineyard, Nantucket !). My regards to Dr. Yamauchi. I enclose a reprint where I refer to your University.

Actually, Breit told me in 1968 at Coral Gables that he remembered that "island in the Pacific" incident from Heisenberg himself; he did say then that Dirac was quite reticent, and he never heard anything about this subject from the Dirac side. The reprint Van Vleck talked about was a paper Van Vleck wrote² on "Some Recent Progress in the Theory of Magnetism for Non-Migratory Models". Van Vleck acknowledged at the end that "The writer wishes to express his thanks to the staff of the University of Hawaii for the use of their journals and library facilities, which made possible the writing of the present report." I interpret Van Vleck's courteous way of drawing attention to his reference of our University as an indirect way of saying that he held no hostility for our Institution.

The *revisit* of P.A.M. Dirac was achieved from September 20-25, 1975, largely through the foresight of theoretical astrophysicist John T. Jefferies who directs our University's Institute for Astronomy. Under the joint sponsorship of the Institute for Astronomy and the Theoretical Particle Physics Group, Dirac gave a Public Lecture on the *Road to Anti-Matter* where he obliquely mentioned that he *had* indeed visited Hawaii twice before without giving any lectures ! He also gave a department colloquium on *Does the Gravitational Constant Vary ?* Finally, he also visited the LURE observatory on Haleakala (Maui).

What are the morals and conclusions to be drawn ? First, from a local viewpoint, I would venture to say that we in the University of Hawaii are not yet "out of the woods" because of the Heisenberg version. We must therefore continue to maintain very high standards in terms of

the quality of our invited seminar and colloquium visiting speakers; after all there is the Heisenberg benchmark to calibrate from ! It is amusing that both Dirac and Heisenberg agree that they had a good time in Honolulu in 1929 and that "someone" showed them around the Island's scenic spots. Here in Hawaii we are accustomed to think of University Service to the Community. Is 1929 a case of Community Service to the University ?

On a worldwide basis, aside from the interesting insight that these very famous people, well-known for their inventive and abstract contributions to physics, were also human beings who had certain very human concerns and interests, an *additional* moral can be drawn. By 1929, Heisenberg had of course discovered quantum matrix mechanics (1925) and formulated the uncertainty principle (1927), while Dirac had made fundamental contributions to the new fertile forms of atomic theory via discoveries in quantum commutation rules (1925), time-dependent perturbative theory (1926-27), and the Dirac equation for the electron (1928). But given the much slower scientific communication of half a century ago, it is not ruled out that the chairman of the physics department in Hawaii just might not have heard about quantum mechanics by 1929. What is most interesting about the physics chairman's attitude (as inferred from the Van Vleck version) is his lack of belief that the two youthful visitors (then aged 27 and 28) could be anyone other than students rather than the two leaders of the physics revolution earlier on during that decade. The lesson for those of us involved in physics teaching at the high school and undergraduate level is that great creative thoughts in theoretical physics occur to the very young, and we must be especially attentive towards the need to identify and nurture *young* talents, lest the coffers of their genius fail to blossom to the detriment of the physics world.

Van Vleck, very famous in his own right as a major contributor to physics, also revealed via his correspondence very interesting traits. One sees in the Van Vleck memo both his interest in arranging for the conjunction of the very top physics talents in one place (Madison) where personal contacts among Dirac, Heisenberg, and Van Vleck might influence their thinking in physics, but also Van Vleck's courtesy and eagerness to help (via referencing) a less developed physics institution—Hawaii in 1959.

NOTE ADDED

UH Professor Vincent Z. Peterson in compiling the history of the UH-Manoa physics department, pointed out that the Department Chairman in 1929 was Dr. Paul Kirkpatrick, a Ph.D in physics from the University of California, Berkeley. He was offered the job as a “one-man physics department” in 1923. A man of some success in having his X-ray polarization work published by the U.S. National Academy of Science, he used his stimulating contacts to encourage well-known physicists to stop at UH whenever possible. In early 1929 he learned that two world famous physicists, P.A.M. Dirac and Werner Heisenberg (both later to win Nobel Prizes in physics), were planning a joint round-the-world trip in the summer of 1929 and their boat had a stop in Honolulu. Kirkpatrick promptly invited them to stop at UH, and expressed the hope that they could be willing to lecture on their work while in Honolulu. As it turned out, their passage across the Pacific was delayed (to arrive in Japan for a conference in Kyoto in early September). By late August 1929 Kirkpatrick had already left Honolulu to begin his sabbatical at Cornell. However, he had briefed the Acting Chairman Prof. Willard Eller (of engineering background I believe), on the expected visit by Dirac and Heisenberg. Teaching physics was Eller’s major activity at UH; he was not involved in any research, nor did he attempt to keep up with the physics literature. Hence when these two young physicists showed up at UH, Dr. Eller did not recognize them; apparently he had forgotten Kirkpatrick’s briefing.

Of course the UH physics department had come a long way since 1929. We did have an Acting Chairman (Peter N. Dobson Jr.) again in 1975 when Dirac’s revisit was arranged, but Dobson certainly knows quantum mechanics ! In October 2002, the U.S. Department of Energy (DOE) High Energy Physics Division awarded Peter Gorham, an associate professor of physics at UH-Manoa, the Outstanding Junior Investigator award—moving UH into the ranks of universities such as Harvard, MIT, Cornell, John Hopkins, and Princeton, using the yardstick that these awards almost always go to highly promoted faculty at these institutions.

ACKNOWLEDGMENT

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NOTES AND REFERENCES

1. Abdus Salam and E.P. Wigner (ed.) J.H. Van Vleck's *Contribution to Aspects of Quantum Theory*, p. 11, Cambridge University Press, 1972.
2. J.H. Van Vleck, "Some Recent Progress in the Theory of Magnetism for Non-Migratory Models", *Le Journal de Physique et le Radium*, Tome 20, p. 124, Fevrier, 1959.

Appendix I

THE KANAYA HOTEL NIKKO, JAPAN

MONEY, JEWELRY AND VALUABLES MUST BE DEPOSITED IN THE SAFE, OTHERWISE
THE PROPRIETOR WILL NOT BE RESPONSIBLE FOR LOSS OF THE SAME.

Time	NAME	Residence	Nationality	Room No.	Departure	
					Date	Time
	Mr. K. H. ...	Kobe		3	Sept 27	5 pm
	W. Heisenberg	Lipsy	German	51		3 pm
	P. A. M. ...	Cambridge England	English	52	Sept 27	3 pm
	Mr. Mrs. John Leonard	Boston	American	26	Sept 27	4 pm
	W. Narayanaiah	Yokohama	British India	27	Sept 27	3 pm
	H. D. Karanicy	"	India	9		
8 th	29 th Mr. Hans ...	Yumoto	British	7	Sept 27	4 pm
	Anthony Kung	"	Chinese	7		
8 th	1 st Hans ...	Germany	German	32	Sept 27	4 pm