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Pinar, 21

M A D R I D .

Madrid, December 1st, 1947.

Prof. John von Neumann,

PRINCETON.

Dear Sir:

Thank you very much for your kind letter of March, 31st., in which you informed me that you had written to Washington concerning the problem of copyright involved in publishing my translation into Spanish of your *Mathematische Grundlagen der Quantenmechanik*. Now that another publishing year is in progress, I should be glad to know your present opinion as to whether a solution is likely to be forthcoming in the near future. I am sure you will understand my eagerness to see the Spanish version in print as soon as possible.

It has occurred to me that in the event you may yourself be planning a new edition of the work, you might care to have a list of the errata of varying degrees of importance which came to my attention while working with the book, and which I note are all preverse intact in the French translation by M- Proca. There are also a few cases in which changes of notation, on occasion in the course of a single demonstration, offer some possibility of confusion to the reader. I would of course be very glad to send you such a list if it would be of interest. Meanwhile, one rather important emendation I should like to submit herewith for your approval:

The two operators \hat{A} and \hat{B} are introduced on p. 229 and defined by the relations

$$(1) \quad \hat{A} = \frac{1}{\sqrt{2}} (\hat{p} + i\hat{q}) \quad \text{where} \quad (2) \quad \hat{B} = \frac{1}{\sqrt{2}} (\hat{p} - i\hat{q})$$

and \hat{A} and \hat{B} are complete systems of orthonormal functions in \mathcal{H} , resp.

\hat{A} is a point of \mathcal{H} ; \hat{B} is a point of \mathcal{H} . Then \hat{A} and \hat{B} act on the elements of \mathcal{H} , resp. and give as results elements of \mathcal{H} . At the bottom of the p. cited one reads as follows: "Da \hat{A} gleich \hat{B} Ausfällt, hat F die Matrix F_{AB} unter Verwendung der vollständigen normierten Orthogonalsysteme \hat{A} und \hat{B} , ebenso hat F die Matrix F_{BA} . Also haben F_{AB} und F_{BA} die Matrizen F_{AB} und F_{BA} ." Also haben F_{AB} und F_{BA} die Matrizen F_{AB} und F_{BA} .

But because of (1) and (2) we obtain actually (3)

$$F_{AB} = F_{BA} \quad \text{and this gives us the matrix of } F \text{ with respect to } \hat{A} \text{ and } \hat{B}$$

Similarly $F_{BA} = F_{AB}$. Thus we have

if F_{AB} and F_{BA} are not real.

The whole reasoning assumes the validity of (A) and (B) which contradict the results obtained above. I think it might perhaps be amended in the following way. Let us introduce the operators \hat{A} and \hat{B} and define

ned by the identities (5)

"vollstetige" one and
mer are defined by

Each of these four operators is a
are definite. The matrices of the for-

so that

Therefore (8) , (9) are the projections of the sta-
tistical operator on resp. (8) agrees with the corresponding
formula as stated in your book, while (9) I think is quite different from
that of the text. According to the former
and from de latter we get
Notwithstan-
ding, the ultimate result (p. 231) holds, in
spite of the modifications I propose.

Finally, if it is not too much of an imposition on your time, I
should like to request a favor. I am accumulating materials for an essay
on the concept of mathematical physics, and would very much appreciate ha-
ving your views on the following questions:

- a) Is there any difference between mathematical physics and theo-
retical physics?
- b) Is mathematical physics merely a methodology, a simple study
of mathematical methods employed in theoretical physics?
- c) What is the purpose of mathematical physics?

I am taking the liberty of writing to Professor Einstein
in the hope that he may find it possible to give me his answers to these
same questions, and I hardly need say that I would be more than grateful
if you had the occasion and should see fit to vouch at least for the se-
riousness of my intentions.

With highest regards and best thanks for all favors, I am,
sir,

Yours very sincerely,

(5) (1) and (2) we obtain actually (3)

and this gives us the matrix of V with respect to

Thus we have

is not real.

if

The whole reasoning assumes the validity of (A) and (B) which con-
tained the results obtained above. I think it might perhaps be amended in
the following way. Let us introduce the operators