

IX.—NOTES.

THE COMPLICATION PENDULUM.

In a brief note upon an article by C. D. Pfau, published in Wundt's *Philosophische Studien*, xv., 1, p. 139 ff., it was remarked (MIND, 1899, p. 564) that the author, who worked with the complication pendulum, had said nothing of the defects of the instrument. "The present writer," it was added, "has never seen an instrument in which the pendulum did not kick at the moment of complication."

Prof. Wundt has penned a reply to this criticism, which appears in the *Studien*, xv., 4, p. 579 ff. He first of all notes the ambiguity of the reviewer's phrase "at the moment of complication". As, however, he himself, and every one who has actually used the instrument, know perfectly well what is meant, no words need be wasted on this score.

Prof. Wundt then proceeds to the charge of incompetency, and gives full directions for the use of the pendulum. The reviewer's experience has been so similar, that it may be briefly stated.

In 1892 the reviewer assigned to a graduate student an investigation into the temporal relations of the "apperception of simultaneous stimuli". The work was to be carried on by aid of a complication pendulum of Krille's make. After a little time, the student reported that he could not make the instrument work. The reviewer impressed on him the importance of the *Balancirhebel H*, and gave him directions for setting the pendulum: Prof. Wundt's sentences on page 582 might be a German translation of them. In a little while the complaint was renewed. The reviewer—knowing full well, what every director of a laboratory knows, that there are instruments which 'won't work' for students, but which will work beautifully when the head of the laboratory comes and looks at them—took the machine in hand himself. Then a mechanic took it in hand. Then it went back to Krille, who apologised and sent another in its place.

This other has also refused to work—for anybody. It has travelled, despairingly, to three mechanics, one after the other; and each has proposed to rebuild it, at something over its original cost. It now rests in a cabinet, and possesses only an 'historical value'.

The reviewer has a passing acquaintance with another pendulum, which also kicked when friendly advances were made to it. This need not be insisted on. To make the criticism more objective, he sent inquiries concerning the instrument to nine of the principal American laboratories, all of which have replied. Five do not own the pendulum. The remaining four speak as follows:—

Instrument I.—Pendulum of Krille's make, in use '91-'92. "We soon discarded it for apparatus of our own construction: partly because it did not, in our opinion, furnish the conditions supposed by Wundt and von Tschisch; partly because of the noise it made, owing to indifferent workmanship in fashioning the gear wheels, . . ." etc., etc. [A long technical criticism follows.]

Instrument II.—"I used it in [name of laboratory], and was not im-

pressed with its working qualities. I prefer " [then follows a description of the writer's own apparatus].—A later account of this machine says: "It was made by Krille. I never used it for anything but rough demonstrations, and have since transformed it to other uses. It did not seem to me a good instrument."

Instrument III.—"The Krille pendulum worked satisfactorily for illustrative purposes when carefully adjusted. I never had any confidence in it for scientific work, and never used it for systematic experiments. The same, however, is true of much of the apparatus used in our laboratories."

Instrument IV.—"I have a complication pendulum, but made by Zimmermann [of Leipzig]. It is fairly satisfactory, except that the motion of the pointer is impeded when the mechanism for ringing the bell is raised, and that it is difficult to determine the objective time of the bell-stroke upon the scale."

Here are five pendulums by Krille (if the reviewer's two be counted), and one by Zimmermann. All five of the former are subject, for one reason or another, to severe criticism. The Zimmermann machine is only 'fairly satisfactory'.

The fact, then, seems to be that the design of the instrument, though meritorious in the first instance, is one that an improved technique and a wider range of problems render out-of-date; that the workmanship, in most cases, is distinctly poor; and that a desire to put a fairly cheap piece upon the market has further led to the use of poor materials. It would be as absurd to continue the charge of incompetency, in face of all these critics, as it would be to say that all German firms do less good work for exportation than they do for home consumption.

THE REVIEWER.

MR. MACCOLL'S QUESTION ON P. 144 OF *MIND* FOR JANUARY, 1900.

IN *MIND*, for January, 1900. Dr. MacColl invites expressions of opinion "as to whether the implication, *If it is probable that A is certain, it is certain that A is probable*, is always true". By *certain* he means *necessarily following from premisses or data* (cf. "Symbolic Reasoning," *MIND*, Jan., 1900, pp. 79, 80). So the proposition in question may be stated in this way:—

If it is probable that *S is P* necessarily follows from given data, then it necessarily follows from given data that *S is P* is probable.

I think that the inference here from Antecedent to Consequent does always follow, because what is pronounced probable from a "probability unsubjective point of view" must be so pronounced as a conclusion from given data or premisses.

If $\begin{matrix} M \text{ is } P \\ S \text{ is } M \end{matrix}$ are probable, then *S is P* is probably certain, but we can only say that $\begin{matrix} M \text{ is } P \\ S \text{ is } M \end{matrix}$ are probable, in the sense explained by Dr. MacColl, if we can produce premisses from which their probability necessarily follows. In the case which he gives on page 77 (*MIND*, Jan., 1900) if we take the figures numbered 1, 2, 8, as the possible alternatives, it is probable that *Some E is A* is certain. But this is only probable because *Some E is A* follows from two alternatives out of three; so that the probability is *certain*—i.e. follows necessarily from the given data.

Thus, it will be observed, the Consequent follows from only *part* of the Antecedent, since *probable* = *certainly probable*.

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