Hence

$$\frac{du}{dx} = f_1(x, u, v, \ldots, w).$$

Similar results hold for the other functions. *The functions $u, v, \ldots, w$ are consequently the functions sought.*

CALCUL DES PROBABILITÉS. Par J. BERTRAND, de l'Académie Française, Secrétaire perpétuel de l'Académie des Sciences. Paris, Gauthier-Villars, 1889. 8vo., LVII + 332 pp.

THERE is possibly no branch of mathematics at once so interesting, so bewildering, and of so great practical importance as the theory of probability. Its history reveals both the wonders that can be accomplished and the bounds that cannot be transcended by mathematical science. It is the link between rigid deduction and the vast field of inductive science. A complete theory of probability would be a complete theory of the formation of belief. It is certainly a pity then, that, to quote M. Bertrand, "one cannot well understand the calculus of probabilities without having read La Place's work," and that "one cannot read La Place's work without having prepared himself for it by the most profound mathematical studies."

Though not otherwise is thorough knowledge to be gained, yet an exceedingly useful amount of knowledge is to be had without such effort. In fact, M. Bertrand's forty odd pages of preface on "The Laws of Chance" give an insight into the theory without the use of so much as a single algebraic symbol.

Listen to this *reductio ad absurdum* of Bernoulli's theory of moral expectation:

"'If I win,' says poor Peter, proposing a game of cards to Paul, 'you must pay three francs for my dinner.' 'Meal for meal,' replies Paul, 'you should pay twenty francs in case you lose, for that is the price of my supper.' 'If I lose twenty francs,' cries Peter, frightened out of his wits, 'I cannot dine to-morrow: without coming to that you might lose a thousand; put them up against my twenty. According to Daniel Bernoulli, you will still have the advantage.'"

Even more complete is the upsetting of Condorcet's calculation as to the probability of the sun's rising.

"Paul would wager that the sun rises to-morrow. The theory fixes the stakes. Paul shall receive a franc if the sun rises and will give a million if it fails to do so. Peter accepts