Walter H. Snell, formerly of the Office of Investigations in Forest Pathology of the Department of Agriculture, has accepted an instructorship in the same department.

Professor A. K. Peitersen, who for the past seven years has been assistant professor of botany and assistant botanist of the experiment station, of the University of Vermont, has gone to Fort Collins, Colorado, where he has been elected professor of botany.

Professor Swale Vincent, who has occupied the chair of physiology at the University of Manitoba (Winnipeg) since 1904, has been appointed professor of physiology in the University of London (Middlesex Hospital). He will probably take up his duties in London at the beginning of May.

Dr. Harold Pringle, lecturer on histology and assistant in physiology in the University of Edinburgh, has been appointed professor of physiology in Trinity College, Dublin, succeeding the late Sir Henry Thompson.

DISCUSSION AND CORRESPONDENCE

FURTHER HISTORY OF THE CALCULUS

To the Editor of Science: Please make a correction of my college address to Rose Polytechnic Institute, in the paper on "The Early History of Calculus," in Science for July 11. The error is due perhaps to the fact that only my name was signed to the article.

The quotation from the "Encyclopedia Britannica" should be stated as from the ninth edition, since it has been omitted in the eleventh. The historical part of the article "Inf. Cal." is entirely changed in the last edition to one of still stronger German bias. It makes the statement, for example, that Leibniz did not meet Collins, nor see the tract "De analysi per aequationen . . ." on his first visit to London in 1673. No verification of this statement is offered. English histories and documents have it the other way with regard to Collins.

Evidence of the possible duplicity of Collins which indicates that he was an agent under Oldenberg as early as 1669, appears in the rewritten history. To quote:

> The tract "De analysi per aequationen . . ." was sent by Newton to Barrow, who sent it to John Collins with a request that it might be made known. One way of making it known would have been to print it in the *Philosophical Transactions* of the Royal Society, but this course was not adopted. Collins made a copy of the tract and sent it to Lord Brouncker, but neither of them brought it before the Royal Society. . . . In 1680 Collins sought the assistance of the Royal Society for the publication of the tract and this was granted in 1682, yet it remained unpublished. The reason is unknown. . . .

The usual history is that Collins was the active agent in soliciting the tract "to make it known." Also, Oldenberg was secretary of the Royal Society, and published the *Transactions* for his private profit, without supervision from the society. The relations of these two men were intimate. The tract was probably brought directly to Oldenberg—he has shown that he had knowledge of it—and that he did not act upon it in his official capacity is evidence of conspiracy to suppress it. When both were urging Newton, as already cited, to undertake "for the honor of England," a correspondence which Leibnitz had planned, it was at that time within their power to promote greater honor to England by publishing the tract in the *Transactions*. In reference to the threatened publication in 1680, the death of Oldenberg about two years before, had left Collins without his principal, if Oldenberg were such, and that transaction might have been a shrewd move on Collins' part to retain his honorariums through Leibniz. At least some cause delayed Leibniz seven years in the publication of his calculus, already prepared, while it was put in in the hands of the printer *immediately* after the death of Collins.

There is reason to believe that Leibniz had information of matters transpiring in England before he left Germany. It is difficult to explain otherwise the grandiloquent announcement of wonderful discoveries of new methods in mathematics, which heralded his visit to Paris in 1672, with no work to show, and with admittedly inferior mathematical knowledge for such work. The London exposure by

Pell, in 1673, is clarifying. Leibniz was a politician, not a mathematician, and worked and wrote for the power and prestige of Germany. To this end he founded the Berlin Academy of Science, and was perhaps the first to inaugurate that system of espionage on scientific work in foreign countries by which the usefulness and credit of as much of that work as possible might be transferred to Germany.

It may be urged that calculus has been benefited by the interference of Leibniz. This is true as to notation, but it has been harmful as to the theory and understanding of the subject. On the one hand we have an illogical infinitesimal method, on the other an incomplete derivative one in protest of the first, whose rival expounders reason along different lines, and hardly understand each other. Newton substitutes one rigorous theory, broader than either of these, neglecting no quantity, however small, leaving no unexplained symbol, and yet of an arithmetical character of the utmost simplicity. A free translation of his definition in "Quadrature of Curves," is as follows:

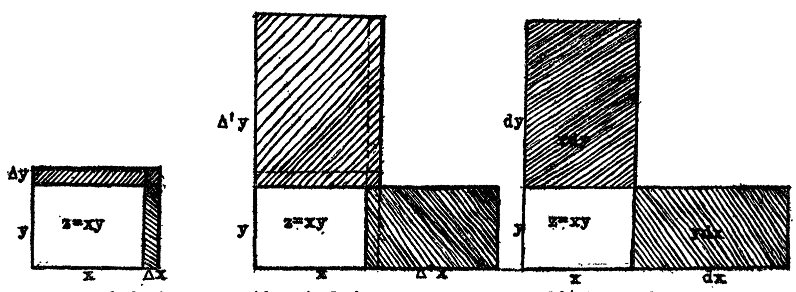
In their highest possible *approximation*, fluxions are quantities in the same ratio as the *smallest possible* corresponding increments of variables, or, in a form of exact statement, they are in the *first* ratio of nascent increments.

Thus fluxions, or differentials, are interpreted as ordinary arithmetical increments, but in a variation defined as *in the first ratio*, or, *as the variables begin to increase*, or, *in the instantaneous state*, which are all one. Starting from given corresponding values, x, y, z, the actual variables are corresponding increments to these with a common *first* value, 0; and starting with any corresponding increments, Δx, Δy, Δz, we form an *ideal* variation *in the same ratio*, $\Delta' x = N\Delta x$, $\Delta' y = N\Delta y$, $\Delta' z = N\Delta z$, where the common multiplier N, varies. This is the familiar law of uniform variation between two sets of values of the variables, and the symbols $\Delta' x$, etc., are not limited to small values but vary from 0 to ∞, as N so varies, however small Δx, etc., may be.

Such $\Delta' x$, $\Delta' y$, $\Delta' z$ are approximate fluxions; and the exact fluxions dx, dy, dz, are limits of these for lim. $\Delta x = 0$, lim. $\Delta y = 0$, lim. $\Delta z = 0$. For example, let $z = xy$, then $\Delta z = y\Delta x + (x + \Delta x)\Delta y$, and multiply both members by N.

$$\Delta' z = y\Delta' x + (x + \Delta x)\Delta' y,$$

whence by limits, $dz = ydx + xdy$.



Δz=shaded area. Δ'z=shaded area. dz=shaded area.

We may illustrate the three variations geometrically:
(1) Actual. (2) In the Same Ratio. (3) In the First Ratio.

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SCIENTIFIC BOOKS

REPORT OF THE CANADIAN ARCTIC EXPEDITION, 1913-18

SHORTLY after the return of the Southern Party of the Canadian Arctic Expedition with their collections in the fall of 1916, steps were taken to arrange for the publication of the scientific results of the expedition. Although the general direction of the operations of the expedition had been under the Department of the Naval Service, most of the scientific men on the expedition were under the Geological Survey, of the Department of Mines, the col-