(3) Ψ is defined by the equation $\Psi = Z - \frac{dP}{dt}$, in which (after the explicit differentiation of P with respect to t), x_1, &c., y_1, &c. are to be expressed in terms of the new variables. y_1, &c. are thus expressible by the help of the m equations $\frac{dP}{d\xi} = \eta_i$ and the $n-m$ equations $\frac{dL}{dt} + \Sigma_i\left(\frac{dL}{dx_i}\frac{dZ}{dy_i}\right) = 0$.

If (x_1), &c., do not contain t explicitly, then $\frac{dP}{dt} = 0$, and Ψ is obtained merely by expressing Z in terms of the new variables.

It may be observed that the whole of the above reasoning would apply to the case in which the new variables $\xi_1, \ldots \xi_m$ are more in number than the independent variables of the problem (or $m > n-r$), *with this exception*; that the m equations $\frac{dP}{d\xi_i} = \eta_i$, together with the r equations obtained by differentiating the equations of condition totally with respect to t, would be *more than sufficient* to express $y_1, \ldots y_n$ in terms of the new variables; consequently y_1, &c. might be so expressed in *different ways*, and therefore, although the *value* of Ψ obtained by the above rule would certainly be the same as that obtained by recurring to the original formula (D.), the *form* of Ψ might be different, and therefore the resulting formula erroneous.

There must doubtless exist some rule for choosing $n-m$ combinations of the equations of condition in such a way as to lead to the correct *forms* of $y_1, \ldots y_n$ as functions of the new variables; but I have not at present attempted to investigate it, and perhaps it would be hardly worth while. The theorem in the case in which the new coordinates are independent, may, I believe, be practically useful.

ERRATA IN PART I.

Art. 1. equation (4.), for dx read dx_i.

Art. 10. In paragraph preceding equation (26.) *omit* the words "not containing t explicitly."

Art. 18. equation (β), for y_i read y'_i.

Art. 19. equation (29.), for h_i read b_i.

Art. 24. second line after equation (L.), *for* "such as h, k" *read* "such as f, g."

Art. 30. The expressions equated to h, k, c, and the three terms in the left-hand column of the table of elements, should each be multiplied by m.

Art. 42. near the end, *for* "according as Θ is between o and π, or not" *read* "according as Θ is between π and 2π, or between o and π."