Dear Sir,

I am much obliged for your two letters: My difficulty was an à priori one, I thought that the like process should be applicable to seminvariants; which it seems it is not: & I now quite see that for invariants your step from $i = a_1 i_1 \dots + a_m i_m$ to $i = I_1 i_1 \dots + I_m i_m$ is quite right. I think you have found the true solution of a great problem.

But the proof of theorem I seems to me to need revision. I understand "form" to mean <u>homogeneous</u> form: thus $n=1$, the forms φ of theorem I are mere powers of x: and the like for ψ &c.

Suppose to fix the ideas $\varphi_1, \varphi_2 \ldots \varphi_m = x^1, x^2 \ldots x^m$ and $\psi_1, \psi_2 \ldots \psi_m = x^1, x^4, \ldots x^{m^2}$: I is obviously true. we have $\varphi_k = \alpha_{k1}\varphi_1$ that is $x^k = x^{k-1}.x$; and hence $\Psi_k = x^{k^2} - x^{k-1}.x, = x^{k^2} - x^k$, which is not homogeneous, & hence in assuming the theorem to be true for the functions Ψ you are in effect assuming it, not for the value $n=1$, but for the value $n=2$: so that you do not in this way pass from Theorem I, $n=1$ to Theorem II, $n=1$.

I think I see my way to a proof of theorem I, starting with the general case of n variables.

I wrote out my proof for the Seminvariants (founded on yours in the Math. Annalen) & sent it to Prof. Klein: it seemed to me all right, and I trust it will appear so to you when it is published.

Believe me dear Sir, Yours very sincerely

A. Cayley

Cambridge 30th Jan^y. 1889.