XLI. On eliminating the signs in star-reductions

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143. Whatever value this opinion may have, it seems to me that the decomposition of albumen by the passage of very intense induced currents is a fact which deserves the serious attention of physicians and physiologists. The presence of this body in the blood, in urine, in the eye, in amniotic liquors, &c., requires caution in the employment of violent alternate currents.

144. The appearances which I have described equally take place in the albumen extracted from new-laid eggs, immersed for some hours in the vapour of æther. They *appear* even to be developed there more easily.

145. It is perhaps well to add, that the production of these bright coruscations indifferently on the two electrodes negatives any explanation founded on a different polarity of the platinum wires, and all analogy with the phenomena investigated by MM. Gassiot*, Hare†, and Neeff‡.

Geneva, June 18, 1846.

XLI. On eliminating the Signs in Star-Reductions.

By S. M. DRACH, F.R.A.S.

To the Editors of the Philosophical Magazine and Journal.

GENTLEMEN,

THE subject of this paper was broached by the Astronomer Royal in the Monthly Notices of the Royal Astronomical Society for January 1847. I beg to propose the following extension, eliminating even the indices of the logs. employed.

Let $A=E-P$, $B=F-Q$, $C=G-R$, $D=H-S$;
 $a=e-p$, &c. $a'=e'-p'$ for decl., or $=p'-e'$ for N. P. Dist.,
 P , p , p' , &c. are numerical constants afterwards determined.

Corr. R.A. $=\Sigma Aa = \Sigma Ee - \Sigma eP - \Sigma Ep + \Sigma Pp$;

Corr. N.P.D. $=\Sigma Aa' = \Sigma Ee' - \Sigma e'P - \Sigma Ep' + \Sigma Pp'$.

Let $P=28.75$, $Q=30.5$, $R=1.35$, $S=20$ (R.A. given in time).

I. Right ascension, $p=2^s$, $q=2$, $r=30.5$, $s=2$.

* *Archives de l'Electricité*, vol. iii. p. 240.

† Silliman's American Journal, January 1841. I succeeded several years ago in melting in an intermittent manner an iron wire of 2^{mm} diameter, employed as a negative electrode on the surface of impure mercury in which a copper wire bound to the positive pole is immersed. Twenty Daniell's couples, or forty smaller Bunsen's, suffice for this experiment.

‡ *Archives des Sciences Physiques et Naturelles*, vol. i. p. 30.

$$\left. \begin{aligned} \Sigma Pp - \Sigma eP &= -78^s.994 + 41^s.912 \\ &\left\{ 1 + \frac{1}{15} \sec \delta \sin \alpha + 14^h 53^m 14^s \right\} \\ &+ 32^s.937 \left\{ 1 + \frac{1}{15} \tan \delta \sin \alpha + 14^h 18^m 49^s \right\} \end{aligned} \right\} . \quad (J.)$$

$$\left. \begin{aligned} -\Sigma Ep &= -308^s.392 + 55^s.422 \{ 1 + \sin \odot + 42^\circ 32' 4'' \} \\ &+ 1.324 \{ 1 + \sin 2\odot + 55^\circ 29' \} \\ &+ 30.5(1-t) + 21.254 \{ 1 + \sin \oslash + 60^\circ 30' 44'' \} \\ &+ 0.217 \{ 1 + \sin 2\oslash + 235^\circ 52' \} . \end{aligned} \right\} \quad (K.)$$

Sum = $\Sigma Aa - \Sigma Ee = -387^s.386$ + periodical terms.

II. North Polar Distance, $p' = 2$, $q' = 2$, $r' = 30.5$ $s = 2$.

$$\left. \begin{aligned} \Sigma Pp' - \Sigma e'P &= -74''.849 + 12''.476 \cos \delta + 41''.912 \\ &\left\{ 1 + \sin \delta \sin \alpha + 8^h 53^m 14^s \right\} \\ &+ 32''.937 \{ 1 + \sin \alpha + 8^h 18^m 49^s \} \end{aligned} \right\} . \quad (J'.)$$

$$-\Sigma Ep' = -\frac{\Sigma Ep}{15} = -308''.392 + \&c. \quad (K'.)$$

Sum = $\Sigma Aa - \Sigma Ee = -383''.241$ + periodical terms.

Now if we add to (J.) and (J'.) the constant 180, and to (K.) the constant 420 seconds, there will be only *positive* quantities, and we shall have merely to subtract 10^m or $10'$ from the mean place; the corrections being

$$\begin{aligned} E &= 28.75 - 18.732 \cos \odot & e &= 2 + \frac{1}{15} \cos \alpha \sec \delta \\ e' &= 2 - .434 \cos \delta + \sin \alpha \sin \delta \end{aligned}$$

$$\begin{aligned} F &= 30.5 - 20.420 \sin \odot & f &= 2 + \frac{1}{15} \sin \alpha \sec \delta \\ f' &= 2 - \cos \alpha \sin \delta \end{aligned}$$

$$\begin{aligned} 10G &= 13.5 + 10t - 3.43 \sin \oslash \&c. & 0.1g &= 3.35706 + 0.1337 \sin \alpha \tan \delta \\ & & 0.1g' &= 3.05 - 2.0055 \cos \alpha \end{aligned}$$

$$\begin{aligned} H &= 20 - 9.250 \cos \oslash \&c. & h &= 2 + \frac{1}{15} \cos \alpha \tan \delta \\ & & h' &= 2 + \sin \alpha \end{aligned}$$

It follows that the index of the first set in logarithms is constantly *unity*, and that of the third set constantly *zero*, permitting the omission of the latter. From $86^\circ 10'$ S. dec. to $88^\circ 50'$ N. dec. e, f, g, h will have their values range between 1 and 10, and their indices therefore always *zero*; these may also be omitted. Now of the 8377 British Association Ca-

talogue stars, only sixteen fall out of this category in 1850; viz.

Urs. Min. 2320, 4070, 4150, 4165, 6281, 6320, 6999, 7184, Octans, 71, 2878, 5936, 5959, 6793, 7020, 7713, 8072; a satisfactory result, as these polar segments = $\frac{1}{4\frac{1}{2}}th = \frac{19}{8377}ths$ of the spherical surface.

With my constants, seven of those sixteen (2320, 4070, 4150, 5936, 6281, 6320, 7713) have all their R.A. coefficients positive, the others have some negative. Indeed, near the pole the annual change is so great, as to render *greater constants* to include a dozen of these sixteen needless.

The saving in the above 8362 stars permits an additional column, although five fig. logs. are required, giving a result as far as 0^s.01 or 0^u.01.

App. R.A. = mean R.A. at epoch + yearly precession + proper motion + ephemeral quantity.

+ $Ee + Ff + Gg + Hh$ + stellar quantity -10^m .

App. N.P.D. = similar quantity $-10'$,

which 10' might be already included in the mean place, as in the planetary tables. The ephemeral quantity (depending on the day of the year) is the same in R.A. *time-seconds*, or N.P.D. *space-seconds*.

Possibly these hints may be useful before reprinting the British Association Catalogue.

S. M. DRACH.

London, Sept. 2, 1847.

XLII. On the *Molybdate of Lead*. By Mr. JOHN BROWN*.

MOLYBDATE of lead was first analysed by Klaproth †, who proceeded in the following manner:—

100 grains of the mineral finely pounded were treated with dilute hydrochloric acid, and the whole of the silica was thus separated. Upon cooling, the greater part of the chloride of lead was deposited in fine crystals. The clear supernatant liquor was then drawn off, and when sufficiently concentrated the remaining chloride of lead was deposited. The whole of the chloride was then carefully collected together, dried and weighed. Its weight was 74.5 grs. From this the quantity of oxide of lead was ascertained, which was 64.42 grs. Every 100 grains of molybdate of lead contain therefore 64.42 grs. of oxide of lead. When the solution had thus been freed from lead, it was concentrated by evaporation. Nitric acid was

* Read before the Philosophical Society of Glasgow, April 28, 1847, and communicated by Dr. R. D. Thomson.

† *Beiträge zur chemischen Kenntniss der Mineralkörper*, vol. i. 265.