VIII.

REMARK ON PAPER NO. 4 IN THE FIRST ISSUE OF CRELLE'S JOURNAL.

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The aim of the study is to find the effect of a force on three given points. The author's results are very much justified when the three points are not located on the same straight line; but not in the case when they are. The three equations by which the three unknowns Q, Q', Q'' are determined are as follows:

$$(1) \qquad \begin{cases} P = Q + Q' + Q'', \\ Q'b\sin\alpha = Q''c\sin\beta, \\ Qa\sin\alpha = -Q''c\sin(\alpha+\beta). \end{cases}$$

These equations hold for any values of P, a, b, c, α, and β. In general, they give, as the author found,

$$(2) \qquad \begin{cases} Q = -\dfrac{bc\sin(\alpha+\beta)}{r}P, \\ Q' = \dfrac{ac\sin\beta}{r}P, \\ Q'' = \dfrac{ab\sin\alpha}{r}P, \end{cases}$$

where

$$r = ab\sin\alpha + ac\sin\beta - bc\sin(\alpha+\beta).$$

However, the equations (2) are not determined when one or the other of the quantities Q, Q', Q'' takes the form $\frac{0}{0}$, which occurs, as is easily seen, for $\alpha = \beta = 180°$. In this case, it is necessary to resort to the fundamental equations

(1), which then give

$$\begin{aligned}
&P = Q + Q' + Q'',\\
&Q'b\sin 180^\circ = Q''c\sin 180^\circ,\\
&Qa\sin 180^\circ = -Q''c\sin 360^\circ.
\end{aligned}$$

The last two equations are identical since $\sin 180^\circ = \sin 360^\circ = 0$, thus in the case where $\alpha = \beta = 180^\circ$, there exists only one equation, namely $P = Q + Q' + Q''$, and consequently, the values of Q, Q', Q'' cannot be derived from the equations established by the author.